# The Relationship between Dialysis Adequacy and Fatigue in Patients on Maintenance Hemodialysis

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## Abstract

Fatigue and inadequacy dialysis are common problem in hemodialysis patients. The dialysis inadequacy can cause an increased progression of impaired renal function, as well as the increased morbidity and mortality, and declining productivity of hemodialysis patients. Fatigue prevalence ranged from 44,7–97% from mild to severe. Fatigue is a common complaint of hemodialysis patients that can lower physical function and life quality. To determine the correlation between adequacy and the fatigue level of the patients with End Stage Renal Disease (ESRD) undergoing hemodialysis. This study used a descriptive analytic and cross sectional approach involving 75 respondents and the FACIT-G Questionnaire was used to collect the data. The inclusion criteria are male and female patients aged 18–70, undergoing hemodialysis for more than 3 months with a frequency of 2 times at least 4 hours, composmentis patients. The adequacy hemodialysis was assessed using the Kt/V formula. All data were collected during the session of hemodialysis. Pearson Product moment test wes used to analyze the data. The mean dialysis adequacy was 1.43±0.380, 57(76%) only 13 (17.3%) patients had adequate dialysis (minimum laboratory standard Kt / v = 1.8) and inadequate were 62 (82.7%) patients. The mean of fatigue was 20.07 and 62 (82.7%) respondents experienced severe fatigue. There was no significant correlation between adequacy and the fatigue level of the patients with ESRD undergoing hemodialysis with p value 0.504 (α> 0.05). Mostly patients had inadequate dialysis, both adequate and inadequate dialysis patients had experience fatigue from mild to severe. Multiple individuale and personnel factors affect dialysis adequacy directly or conversely.

**Keywords:** Dialysis adequacy, End Stage Renal Disease (ESRD), fatigue.

## Introduction

Dialysis adequacy is an adequate dosage of hemodialysis recommended for evaluating the effectiveness of hemodialysis. There a positive correlation between dialysis dose and normalized protein catabolic rate, hemoglobin, serum albumin, and physical health. Nowadays a great percentage of patients had inadequate HD. The duration and frequency of dialysis session, patients' complaints, and well-functioning vascular access is a several factors were influenced of HD adequacy ((El-Sheikh & El-Ghazaly, 2016), also BMI and type of heparinization (Chayati, Ibrahim, & Komariah, 2014). Inadequate hemodialysis may also result in losses and the declining productivity of hemodialysis patients. End Stage Renal Diseases (ESRD) patients undergoing hemodialysis takes 12–15 hours of dialysis every week, or at least 3–4 hours for each treatment with 2–3 times of dialysis per week schedule. This activity will take place continually throughout his life (Smeltzer, Bare, Hinkle, & Cheever, 2010).

Based on Perhimpunan Nefrologi Indonesia (PERNEFRI) Consensus (2017) and National Kidney Foundation (NKF) (2015) the measurement dialysis adequacy (Kt/V) for three times weekly of Kt/V is considered sufficient when it is greater than or equal to 1.2 and 1.8 for hemodialysis twice times weekly. Some of the factors affecting the dialysis adequacy are solute or molecule, the patient and the dialysis process itself (Yeun, Ornt, Depner, Chertow, 2015), also BMI and type of heparinization (Chayati, Ibrahim, & Komariah, 2014). There are nine factors that directly affect the measurement of dialysis adequacy in hemodialysis patients, surface area dialyzer, hematocrit, weight (body mass index/BMI), duration of sessions of hemodialysis, type of vascular access, frequency of hemodialysis in a week, the speed of blood flow, ultrafiltration average, and kind of heparinisation. The relationship between Kt/V and URR revealed that all patients with spKt/V ≥1.2 had URR ≥65% There statistically strong correlation between URR and eKt/V (P < 0.001) (El-Sheikh & El-Ghazaly, 2016). The result of multiple linear regression analyses suggested that sleep disorder, poor social and family functioning, comorbidity, exercise less than one hour every day, Kt/V <1.2 and high creatinine serum contribute were (Wang et al., 2016).

Increasing Quick Blood (Qb) can increase the achievement of hemodialysis adequacy. Inappropriate dialyzer and Low Blood Flow Rate (BFR) choice were the leading causes of inadequate dialysis ( Nafar et al., 2017). The main obstacles to achieving an adequate dialysis dose are the type of catheter used, female sex, old age, greater body weight, shorter dialysis time and lower quick blood ( Maduell et al., 2016). The most influencing factors on the value of Kt/V and URR is the surface area of the dialyzer (Amini et al., 2011). Many patients undergoing hemodialysis complaint about muscle weakness, lack energy and fatigue and the main problem is fatigue in maintenance hemodialysis. Previous studies showed that the prevalence rate of fatigue rates among hemodialysis patients range from 44.7–97%, the level of fatigue experienced is from mild to severe level (Sulistiani, Yetti, Hariyati, 2012; Horigan, J., Khakha., Mahajan, 2012; Biniaz et al, 2013; Gorji et al, 2013; Sodikin and Suparti, 2015). Fatigue is caused by physical inactivity and emotional distress (Horigan, et al., 2012). Fatigue is a serious problem for patients on hemodialysis. Low serum albumin values, presence cardiovascular disease, depressive symptoms, poor sleep quality, excessive sleepiness and restless leg syndrome are independently associated with greater fatigue in the multivariable regression model. The FACIT-F score was closely correlated with the SF-36 vitality score (r = 0.81, p <0.0001) (Jhamb et al, 2013). Consequences of fatigue experienced by hemodialysis patients are socialization inhibition, a feeling of being isolated, losing time with family and the difficulty of activities, worsening life quality, and reducing life survival (Horigan, 2012).

One study in RSUD Margono Soekarjo indicates the general conditions like being weak, thin body, high blood pressure, anemia, itchy skin, darker skin color, decreasing appetite and experiencing nausea. These conditions an represent inadequate dialysis (Yeun, Ornt, Depper, 2015). The Previous research by Septiwi, Yetti, and Gayatri (2011)

in hemodialysis room of Margono Soekarjo hospital investigated the correlations between hemodialysis adequacy and life quality found among 101 respondents, they were 42.6% obtained hemodialysis adequacy while 57.4% did not. There is a correlation between the Quality of life and hemodialysis adequacy. Patients who got adequacy hemodialysis had 10.6 times of better life quality those who dis not. Research by Sodikin and Suparti (2015) described that the fatigue level of hemodialysis patients was predominantly moderate (67%), mild (16.5%) and severe (16.5%). However this research did not discuss the relation between the adequacy of hemodialysis and fatigue level, so the objective of this study was to determine the correlation between the hemodialysis adequacy and the fatigue levels of ESRD patients undergoing hemodialysis.

**Method**

This research was a correlational descriptive study through cross sectional approach with 75 participants recruited using purposive sampling in Hemodialysis Unit of Prof Dr. Margono Soekardjo Hospital in Purwokerto city, Banyumas Regency Indonesia. We used total purposive sampling technique, all patients who did hemodialysis 2 times per week there were 100, 69 patients had AV shunts and 32 patients had femoral access. But participants who are willing and meet the criteria are 90 patients. The criteria inclusions participants were men and women aged 18 –70 years, undergoing regular hemodialysis ≥3 months with a frequency of at least 2 times a week hemodialysis, able to reading and writing in Indonesian, undergoing hemodialysis process at least 4 hours. The patients were excluded with mental disorders.

The questionnaire used is a demographic questionnaire respondents, and the adequacy of hemodialysis was measured using the formula Kt/V observation sheets and questionnaires of Functional Assessment of Chronic Illness Therapy (FACIT G) to measure the level of fatigue created by Kathleen F. Tennant (2015). The questionnaire is devoted to the management of patients with chronic diseases that have been translated and tested for validity in many countries so there are

many versions, including Indonesian. The Validity test showed that all of the questions were valid because r count was bigger than r table=0.279 (by Pearson correlation test) and reliable because of r11=0.646>0.6 (by Cronbach's alpha test.). The Indonesian version of the FACIT Fatigue Scale was a brief and valid to monitor important symptom and its effect on Chronic Kidney Diseases patients with routine hemodialysis (Shihobing et al., 2016).

To be able to use these questionnaires, investigators requested a permission from the FACIT-G, FACIT Fatigue Scale consists of 13 statements with a score range of 0-52. The assessment mentions that the higher the score ≥ 30, the less fatigue and a good quality of life, the lower the score below 30 indicates severe fatigue. To determine the achievement of dialysis dose researchers used guidelines PERNEFRI (2017) and NKF (2015) to measurement dialysis adequacy (Kt/V), for three times weekly of Kt/V is considered sufficient when it is greater than or equal to 1.2 and 1.8 for hemodialysis twice times weekly. The ethical clearance of the research was obtained from the ethics department of Prof Dr. Margono Soekardjo Purwokerto Hospital (No: 420/15897/VI/2016).

The research data was taken on July-August 2016 by researchers, all the patients who have been described and willing to become respondents, then signed informed consent and fill out a questionnaire. Researchers conducted observations on hemodialysis activities and recorded the results of lab measurements, then calculated the hemodialysis adequacy with the Kt/V formula. From 90 questionnaires given, only 85 returned and 10 did not complete questionnaire. All data were analyzed using SPSS software version 16, with a significant p value <0.05. The data analysis was conducted by calculating the univariate including frequency distribution and bivariate analysis used pear test on product moment with 95% confidence level. The results of the normality test using Kolmogorov-Smirnov Z showed that data were normally distributed, the score of hemodialysis adequacy variables was 0.686 and fatigue was 0.146, so the bivariate analysis used the Pearson product moment test (Dahlan, 2014)

## Results

A total number of 75 patients were included, 52% of them were males and 48% were female. More than half of them (69.3%) had low education level, were married (70%). The most access used is the Arterio Venosus (AV) shunt as much as 73.3% and 98.7% of respondents are anemia (Table 1). Based on the results shows 81.23% patients achieve adequate dialysis and the most respondents 62 (82.7%) experienced a severe fatigue.

The mean average of dialysis adequacy was 1.42 and fatigue is 20.07 (table 2), which means experiencing severe fatigue, when viewed in the distribution of 82.7% (62) of respondents with scores $\geq$ 30, in this study used a questionnaire Facit-G Version 4 with a

**Table 1 Distribution of Respondents According to Gender, Education, Occupation, Marital Status, HD Access and Hemoglobin Levels**

| Variable | Frequency (f) | Percentage (%) |
|---|---|---|
| Sex | | |
| Male | 36 | 52 |
| Female | 39 | 48 |
| Education | | |
| Low | 52 | 69.3 |
| High | 23 | 30.7 |
| Marital Status | | |
| Mariied | 70 | 93.3 |
| Unmarried | 5 | 6.7 |
| Profession | | |
| Working | 55 | 73.3 |
| Jobless | 20 | 26.3 |
| Hemodialysis Access | | |
| AV shunt | 55 | 73.3 |
| Femoral | 20 | 26.3 |
| Hemoglobin Category | | |
| Anemia | 74 | 98.7 |
| Non Anemia | 1 | 1.3 |

**Table 2 The Frequency Distribution of Respondents by Qb, Age, HD Duration and Dialysis Adequacy**

| Variable | Mean | Med | SD | Min-MAx |
|---|---|---|---|---|
| Quick Blood | 284.03 | 250 | 37.783 | 200–300 |
| Ages | 49.11 | 50 | 11.681 | 22–73 |
| HD Duration | 24.45 | 22 | 18.789 | 1–108 |
| Dialysis Adequacy | 1.42 | 1.39 | 0.380 | 0.61–2.84 |
| Fatique | 20.07 | 19 | 5.78 | 10–32 |

**Table 3 Correlation between Dialysis Hemodialysis Adequacy and Fatigue Level (n=75)**

| Variable | p | r |
|---|---|---|
| Dialysis Adequacy | 0.504 | 0.078 |
| Fatigue | | |

total score of 0–52. The assessment mentions that the higher the score show, the less fatigue and better quality of life, the lower the score below 30 indicates severe fatigue. The minimum research score is 10, so it can be concluded that all patients experience fatigue

Bivariate analysis (Table 3) by the Pearson product moment test showed no correlation between dialysis adequacy and the fatigue level in hemodialysis patients with p value 0.540 and p > 0.05. Based on the observation results, 17.3% achieve dialysis adequacy and 82.7% did not achieve dialysis adequacy.

## Discussion

All patients experience fatigue, the results of this research support the previous studies that concluded that fatigue is the main problem of ESRD patients undergoing hemodialysis and its prevalence indicates the percentage of over 60% (Dadgari, Dadvar, & Eslam-Panah, 2015; Sodikin & Suparti, 2015; Jhamb et al., 2013). Fatigue scores increased significantly with decreasing Hb levels. HD patients with low Hb levels (<90 g/l) had significantly higer fatigue score (Yamasi, et al., 2016). Base on research data, the majority of patients did not achieve their dialysis adequacy targets. Because the minimum target for hemodialysis 2 times a week is 1.8 (PERNEFRI, 2017; NKF, 2015). The average dialysis adequacy score (1.42) is higher than Chayati, Ibrahim and Komariah (2015) research is 1.36.

The results in line with previous studies of El-Sheik and El-Gazaly (2016) and Rezaiee, Shangolian, and Shaidi (2016) which states that most dialysis adequacy is not achieved optimally. Field findings indicate that in a week almost all patients only had dialysis for 8 hours, whereas the recommendation of PERNEFRI (2017), the minimum number of hours of hemodialysis in a week was 10-15 hours. This condition contributes to the patient's dialysis adequacy achievement. Even PERNEFRI data (2017), show dialysis adequacy with a minimum limit of 1.8 for HD 2 times a week, only 69% meet the target of all dialysis in Indonesia.

Fatigue is a subjective feeling of weakness, (Jhamb et al., 2013), so that the conditions are varied depending on the patients. Based

on the observation results, it revealed that the patients achieving adequacy of dialysis experienced both severe and mild fatigue. Even for those reaching adequacy, most experienced severe fatigue. This condition reflects that fatigue does not correlate directly to dialysis adequacy or even fatigue level is not a major determinant in dialysis adequacy. Physiological causes of fatigue include anemia, malnutrition, uremia, hemodialysis adequacy was not achieved, hyperparathyroidism, comorbid, sleep disorders, depression and drug side effects, (Horigan et al., 2012) result of Rezaiee, Shangolian, and Shaidi (2016) study showed that approximately half of the patients did not have an optimal level of dialysis adequacy, and multiple individuale and personnel factors affect dialysis adequacy directly or conversely. The adequacy of dialysis decreased with increased age of the patients (Anees et al., 2016). There was no significant relationship between the adequacy of hemodialysis and quality of life in all dimensions of quality of life except for the dimensions of the physical composite (Hany et al, 2019).

It is incontrast to research by Dadgari et al. (2015) who found that low levels of hemoglobin and low adequacy of hemodialysis are significantly correlated with fatigue in hemodialysis patients. Based on the results of logistic regression, it was known that there is a decrease in one component of Kt/V that can increase the risk of increased fatigue by 1.85 times. And the study of El-Sheik and El-Gazaly (2016), showed a positive correlation between dialysis dose and hemoglobin, serum albumin, normalized protein catabolic rate, and physical health. Although based on the results of research showing that almost all patients (98.7%) had anemia and suffered severe fatigue (82.7%), and most respondents not achieve dialysis adequacy. In the future, it is necessary to conduct research related to the achievement of the adequacy of hemodialysis using hemodialysis calculations with different formula parameters. There are some drawbacks of dialysis dose measurements using Kt/V, which do not take into account individual variables related to the patient such as volume control, unstable hemodynamics, clinical symptoms and biochemical parameters of the patient which are reported

to be related to patient outcomes (Vanholder, Glorieux, & Eloot, 2015).

Based on the results the majority of respondents did not achieve dialysis adequacy, in line with this, almost all respondents experienced fatigue. This reinforces the finding that there is no relationship between dialysis adequacy and fatigue. Besides that, many factors that play a role in achieving dialysis dose as well as the fatigue level of hemodialysis patients. The research data also showed that the patients received erythropoietin stimulating agents at least 2 weeks as well as iron. So that future studies need to confirm the effectiveness of Erythropoietin stimulating agents to the hemodialysis patients. It also needs to see the correlation between the levels of hemoglobin (anemia) and the fatigue level.

Based on observations, blood sampling was done for post Hemodialysis urea checkup from the blood taken from the venous line and carried out by nurses on duty in the rooms. As already disclosed by a research of Septiwi et al. (2011), blood samples taken from the venous line does not reflect the composition of circulating blood urea in the patients body in real. In hemodialysis room nurses and doctors have not measured the patient's fatigue level, dialysis adequacy is measured every 4-6 months. During the research process the health workers also have not provided programmed education especially related to fatigue and the importance of adequate dialysis doses, education is incidental when needed or patient requests, this is caused due to insufficient number of nurses, one nurse is responsible for 6 patients. It needs to be reconsidered regarding the minimum standard of dialysis hours which is 10–15 hours per week, considering that currently only 8 hours per week. The imitations of this study are the small number of partisipants, only use single value Kt / V, it is necessary to develop other similar studies involving more samples and various laboratory parameters.

## Conclusion

There is no significant relationship between dialysis adequacy and the fatigue level in hemodialysis patients. We suggest that the inadequacy of dialysis and fatigue is a common condition in hemodialysis patients and to improve service to these patients, nurses and physicians should be informed and educated about these conditions and give hemodialysis appropriate on schedule and guideline.

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# Associations between Dependency Behavior and Management Ability in A Cross-Sectional Study of Mother who Care for Children with Avoidant Restrictive Food Intake Disorder

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## Abstract

ARFID phenomena commonly found on children are strongly dependent on parental behaviors. A dependency behavior shown by parents constitutes a specific behavior that helps the parents fulfill children's needs. This kind of behavior will define a parental management ability in dealing with eating disorder phenomena on their children. This research, therefore, was set to analyze parental dependency behavior on parental management ability in dealing with eating disorder phenomena. A cross-sectional design was occupied to accommodate the research. A total of 245 families were selected to be the respondents, especially those who were taking care of children with ARFID. Data were collected using self-administered questionnaire. For descriptive data analysis, Manne-Whitney U test, one-way analysis of variance, Kruskal-Wallis, correlation product moment, and multiple linear regression were employed.  Parental dependency behavior was closely related to parental management ability in dealing with eating disorder phenomena, especially in taking care of children with ARFID ($r = 0.354$; $p = 0.000 < 0.05$). This dependency behavior encompassed parents calming children down (with $p = 0.000 < 0.05$), giving hug to children ($p = 0.000 < 0.05$), listening to children ($p = 0.001 < 0.05$), solving children's problems ($p = 0.000 < 0.05$) and fulfilling needs of food and drink ($p = 0.000 < 0.05$). On top of that, parental management ability in dealing with eating disorder occurrence was perceived referring to the result of multiple linear regression analysis, which was said to be mainly influenced by a predictor of parental dependency behavior in solving children's problems (with $\beta = 0.211$; $p = 0.001$) and fulfilling children's needs of food and drink (with $\beta = 0.134$; $p = 0.047$).Parental management ability in dealing with eating disorder was necessarily influenced by parental dependency behavior in solving children's problems and fulfilling children's needs of food and drink. Therefore, we suggest that nursing intervention be provided in respect of this case upon the population of families taking care of children with ARFID.

**Keywords**: ARFID, parental dependency behavior, parental management ability in dealing with eating disorder occurrence.

## Introduction

Parental dependency behavior refers to a specific behavior to provide children with assistance in response to parenting needs, particularly in physical and attention forms. On one hand, dependency is defined as "... it's clearly not in control of itself" (Groarke, 2016). In short, parental dependency behavior is a particular behavior that aims at giving assistance to children in response to parenting obligatory needs in forms of attention or confession and physical assistance (Fawcett, 2017). that children are highly dependent on their parents in terms of fulfilment of food need (Hansson et al., 2016; Herschell et al., 2016).

Problems rising in parental dependency behavior can be instigated by knowledge on children's nutritional status and physical assistance on children. In fact, majority of parents are found unaware of their children's nutritional status with a number of 97% (Munthofiah, 2010). In addition, a total of 57.4% of parents are still categorized aware, but with not really high level of awareness (Bumi, 2015). On one hand, as many as 31.5% of parents do not directly provide their children with physical assistance, mainly in serving food and drink to the children, due to occupational and other contributing factors (Hidayati, 2011). As a consequence of low dependency behavior, children are found to have poor dietary habit. Moreover, 44.4% of children commit unhealthy lifestyle, buying unhealthy food (Sitoresmi, 2014). On top of that, lack of attention given by parents also results in children's nutritional disorder due to minimum fulfilment of food need by the parents (Spruijt et al., 2018).

Parental dependency behavior can elevate a behavioral response of giving attention. Children's age aggregate is equipped with high dependency on parents as regards fulfilment of food need (Hansson et al. 2016; Herschell et al. 2016). Children suffering from eating disorder are significantly influenced by a factor of dependency (Ben-Porath et al., 2014) so that parents are required to create a pleasant eating behavior and promote children's independency in fulfilling their own needs (Cullinane & Novak, 2013)

health management refers to actions of identifying, controlling, showing up, and integrating several conducts as an attempt for defensive action for the sake of status of health and prosperity (Johnson et al., 2000; McCloskey et al., 1996). Further, there are also some indicators for eating disorder management, such as: cooperation with health team, cooperation with family members, involvement and development on positive relationship, monitoring on vital signs, monitoring intake of fluid output, defining desired expectation, making use of behavioral modification, discussion with health team, and taking over responsibility. Avoidant Restrictive Food Intake Disorder (ARFID)

Avoidant Restrictive Food Intake Disorder constitutes a new term to draw upon eating disorder on infants and toddlers with some characteristics of: refusing to eat, having poor eating schedule, showing up poor eating skills (inappropriate with children's normal development stage) (Davies et al., 2006), and less tempted to eat. In addition, the avoidance is due to food sensor covering look, smell and taste, fear of eating (dysphagia), and fear of swallowing food (Fisher et al., 2014; Kostro, Lerman, & Attia, 2014; Nicely et al., 2014) Children with ARFID are in need of assistance from parents to give protection, direction, and family support (Cismaru & Pioufle, 2016) What is more, this research was mainly intended to analyze the influence of parental dependency behavior on parental management ability in dealing with eating disorder on children with ARFID.

## Method

### Research Design

This current research occupied descriptive cross-sectional survey design.

### Setting and sample characteristics

The study was conduct in Malang District, Indonesia, between August 2018 and February 2019. The sample size was determined based on the rule of tumb in structural equation modelling, which is to multiply the total number of parameters by 5 or 10 (Azman, 2017). Normally, there are 10 paramaters included; thus, the total sample would be 10

x 10, which would equal 100 participants (minimum number). There were 245 potential participants. Multistage sampling was employed to gradually determine the final size of the sample (Taherdoost, 2018).

In addition, there were inclusive criteria of the respondents, such as that: 1) they took care of 5-year-old children; 2) the children suffered from ARFID which were shown by the following symptoms, such as food avoidance based on food sensor including look, smell and taste; 3) the children did not suffer from chronical illnesses; and 4) the children were not congenitally disordered, especially on dietary tract.

## Questionnaire

Data collection was executed through questionnaire. The questionnaire of dependency behavior was developed from Johnson Behavioral System Models consisted of 6 (six) items in total with some indicators of:1) calming children down when crying or sad, 2) giving hug when in fear, 3) keeping eye contact, 4) listening to children's problems, 5) helping solve the problems, and 6) providing children with food and drink. Each of the items was equipped with 5-point Likert scale with the descriptors of: 1= never, 2= seldom, 3= sometimes, 4= frequently, 5= always). Moreover, the validity values of the six domains signified: 0.40; 0.58; 0.53; 0.76; 0.73; and 0.40, with Cronbach's Alpha value of 0.62. The questionnaire of management in eating disorder developed from manual book nursing intervention criteria occurrence comprised 9 (nine) items with indicators of : cooperation with health team, cooperation with family members, involvement and development on positive relationship, monitoring on vital signs, monitoring intake of fluid output, defining desired expectation, making use of behavioral modification, discussion with health team, and taking over responsibility, with the use of 5-point Likert scale with the descriptors of: 1= never,

2= seldom, 3= sometimes, 4= frequently, 5= always). the validity values of the nine domains consecutively signified: 0.74; 0.72; 0.71; 0.72; 0.73; 0.81; 0.84; 0.77; 0.77, with Cronbach's Alpha value of 0.88.

## Data Collection

Data of the research were collected in between August 2018 and February 2019,. The questionnaire, further, was administered to integrated public health service posts and/or residences on the targeted area. In fact, there were a total of 245 participants involved.

## Data Analysis

The whole data were analyzed using IBM SPSS Statistics 23.0 software (IBM Corp., Armonk, NY, USA) with $p < 0.05$ as the level of significance. Demographic data of mothers and children were presented in a form of frequency distributions (percentages). The data of dependency behavior and management ability in dealing with eating disorder phenomena were presented as mean values (or standard deviation). Moreover, Pearson Correlation Coefficient was occupied to analyze the correlation between parental dependency behavior and management ability in dealing with eating disorder occurrence. In addition, multiple linear regression was used to examine the influence of parental dependency behavior on management ability in dealing with eating disorder occurrence, especially for those mothers taking care of children with ARFID. Initially, this research had been granted an ethical approval from ethical committee of research of Faculty of Public Health, Airlangga University with reference number of 333-KEPK. All the participants had also written informed consent alongside their signatures. Thus, privacy and confidentiality were totally assured.

## Results

**Table 1 Demographical Characteristics of Mothers and Children**

| Characteristics | Parental Dependency Behavior | | | | |
| --- | --- | --- | --- | --- | --- |
| | **Good** | **Fair** | **Poor** | **Total** | **P Value** |
| | **n (%)** | **n (%)** | **n (%)** | **n (%)** | |
| Age | | | | | |
| 17–25 | 14(23.0%) | 37(6.7%) | 10(16.4%) | 61(100%) | 0.207 |

| | Good | Fair | Poor | Total | P Value |
|---|---|---|---|---|---|
| 26–35 | 31(22.3%) | 95(68.3%) | 13(9.4%) | 139(100%) | |
| 36–45 | 5(11.1%) | 36(80.0%) | 4(8.9%) | 45(100%) | |
| Educational Background | | | | | |
| Elementary School | 9(18.0%) | 36(72.0%) | 5(10.0%) | 50(100%) | 0.078 |
| Junior High School | 12(16.0%) | 52(69.3%) | 11(14.7%) | 75(100%) | |
| Senior High School | 26(29.2%) | 53(59.6%) | 10(12.2%) | 89(100%) | |
| Higher Education | 3(9.7%) | 27(87.1%) | 1(3.2%) | 31(100%) | |
| Employment | | | | | |
| Unemployed | 42(22.1%) | 130(68.4%) | 18(9.5%) | 190(100%) | 0.219 |
| Employed | 8(14.5%) | 38(69.1%) | 9(16.4%) | 55(100%) | |
| Number of Children | | | | | |
| 1 | 20(19.2%) | 70(67.3%) | 14(13.5%) | 104(100%) | 0.868 |
| 2 | 21(21.6%) | 67(69.1%) | 9(9.3%) | 97(100%) | |
| 3 | 9(25.0%) | 24(66.7%) | 3(8.3%) | 36(100%) | |
| 4 | - | 6(85.7%) | 1(14.3%) | 7(100%) | |
| 5 | - | 1(100.0%) | - | 1(100%) | |
| Monthly Income | | | | | |
| <1 Juta | 10(17.9%) | 36(64.3%) | 10(17.9%) | 56(100%) | 0.336 |
| Between 1-2 Juta | 29(23.0%) | 87(69.0%) | 10(7.9%) | 126(100%) | |
| >2 Juta | 11(17.5%) | 45(71.4%) | 7(11.1%) | 63(100%) | |
| Children's Age | | | | | |
| 0–3 years old | 40(22.6%) | 120(67.8%) | 17(9.6%) | 177(100%) | 0.257 |
| >3–5 years old | 10(14.7%) | 48(70,6%) | 10(14.7%) | 68(100%) | |
| Children's Gender | | | | | |
| Male | 22(20.0%) | 76(69.1%) | 12(10.9%) | 110(100%) | 0.987 |
| Female | 28(20.7%) | 92(68.1%) | 15(11.1%) | 135(100%) | |
| Children's Body Weight | | | | | |
| Very Underweight | 1(14.3%) | 6(85.7%) | - | 7(100%) | 0.485 |
| Underweight | 10(25.6%) | 24(61.5%) | 5(12.8%) | 39(100%) | |
| Normal/Ideal | 39(19.8%) | 137(69.5%) | 21(10.7%) | 197(100%) | |
| Overweight | - | 1(50.0%) | 1(50.0%) | 2(100%) | |
| Children's Body Height | | | | | |
| Very Short | 13(26.0%) | 32(64.0%) | 5(10.0%) | 50(100%) | 0.771 |
| Short | 7(18.4%) | 26(68.4%) | 5(13.2%) | 38(100%) | |
| Normal | 27(18.1%) | 106(71.1%) | 16(10.7%) | 149(100) | |
| Tall | 3(37.5%) | 4(50.0%) | 1(12.5%) | 8(100%) | |

**Table 2 Parental Management ability in dealing with eating Disorder Occurrence**

| Characteristics | Parental Dependency Behavior | | | | |
|---|---|---|---|---|---|
| | Good | Fair | Poor | Total | P Value |
| | n (%) | n (%) | n (%) | n (%) | |
| Mothers' Age | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| 17–25 | 15(24.6) | 40(65.6) | 6(9.8) | 61(100%) | 0.048 |
| 26–35 | 18(12.9) | 102(73.4) | 19(13.7) | 139(100%) | |
| 36–45 | 2(4.4) | 35(77.8) | 8(17.8) | 45(100%) | |
| Educational Background | | | | | |
| Elementary School | 5(10.0) | 35(70.0) | 10(20.0) | 50(100%) | 0.049 |
| Junior High School | 10(13.3) | 49(65.3) | 16(21.3) | 75(100%) | |
| Senior High School | 15(16.9) | 68(76.4) | 6(6.7) | 89(100%) | |
| Higher Education | 5(16.1) | 25(80.6) | 1(3.2) | 31(100%) | |
| Employment | | | | | |
| Unemployed | 28(14.7) | 138(72.6) | 24(12.6) | 190(100%) | 0.749 |
| Employed | 7(12.7) | 39(70.9) | 9(16.4) | 55(100%) | |
| Number of Children | | | | | |
| 1 | 23(22.1) | 73(70.2) | 8(7.7) | 104(100%) | 0.018 |
| 2 | 10(10.3) | 74(76.3) | 13(13.4) | 97(100%) | |
| 3 | 2(5.6) | 24(66.7) | 10(27.8) | 36(100%) | |
| 4 | - | 5(71.4) | 2(28.6) | 7(100%) | |
| 5 | - | 1(100) | - | 1(100%) | |
| Monthly Income | | | | | |
| <1 Juta | 7(12.5) | 37(66.1) | 12(21.4) | 56(100%) | 0.248 |
| Between 1-2 Juta | 16(12.7) | 95(75.4) | 15(11.9) | 126(100%) | |
| >2 Juta | 12(19.0) | 45(71.4) | 6(9.5) | 63(100%) | |
| Children's Age | | | | | |
| 0–3 years old | 25(14.1) | 126(71.2) | 26(14.7) | 177(100%) | 0.665 |
| >3–5 years old | 10(14.7) | 51(75.0) | 7(10.3) | 68(100%) | |
| Children's Gender | | | | | |
| Male | 17(15.5) | 79(71.8) | 14(12.7) | 110(100%) | 0.870 |
| Female | 18(13.3) | 98(72.6) | 19(14.1) | 135(100%) | |
| Children's Body Weight | | | | | |
| Very Underweight | 2(28.6) | 4(57.1) | 1(14.3) | 7(100%) | 0.826 |
| Underweight | 7(17.9) | 26(66.7) | 6(15.4) | 39(100%) | |
| Normal/Ideal | 26(13.2) | 145(73.6) | 26(13.2) | 197(100%) | |
| Overweight | - | 2(100) | - | 2(100%) | |
| Children's Body Height | | | | | |
| Very Short | 7(14.0) | 32(64.0) | 11(22.0) | 50(100%) | 0.096 |
| Short | 6(15.8) | 29(76.3) | 3(7.9) | 38(100%) | |
| Normal | 20(13.4) | 113(75.8) | 16(10.7) | 149(100) | |
| Tall | 35(14.3) | 3(37.5) | 3(37.5) | 8(100%) | |

**Table 3 The Correlation between Parental Dependency Behavior and Management Ability in Dealing with eating Disorder Occurrence (r/p)**

| Variables | Management Ability |
|---|---|
| Parental Dependency Behavior | 0.354 / 0.000 |

| | |
|---|---|
| Calming children down | 0.243 / 0.000 |
| Giving hug to children | 0.288 / 0.000 |
| Keeping eye contact | 0.064 / 0.316 |
| Listening to children | 0.205 / 0.001 |
| Solving children's problems | 0.301 / 0.000 |
| Fulfilling children's needs of food and drink | 0.281 / 0.000 |

**Table 4 Multiple Linear Regression of The Influence of Parental Dependency Factor Corresponding to Management Ability in Dealing with Eating Disorder Occurrence**

| Variables | B | SE | β | t | p |
|---|---|---|---|---|---|
| Constants | 15.371 | 4.716 | | 3.260 | 0.001 |
| Calming down children | 0.531 | 0.795 | 0.046 | 0.668 | 0.505 |
| Giving hug to children | 1.098 | 0.679 | 0.112 | 1.617 | 0.107 |
| Keeping eye contact | -0.038 | 0.353 | -0.007 | -0.107 | 0.915 |
| Listening to children | 0.697 | 0.403 | 0.112 | 1.730 | 0.085 |
| Solving children's problems | 1.557 | 0.464 | 0.211 | 3.355 | 0.001 |
| Fulfilling children's needs of food and drink | 1.710 | 0.856 | 0.134 | 1.999 | 0.047 |

### Dependency Behavior as a Representative of the Characteristics of Mothers and Children

With reference to Table 1, it is shown that dependency behavior was not necessarily influenced by such factors as age, educational background, employment, number of children, and income families had made in a month as each of the factors was equipped with p value of bigger than 0.05. Parental dependency behavior could be drawn from the majority of age groups, specifically in the category of 17–25 years old (with a total of 23.0%). According to educational background, good parental dependency behavior was shown by those graduating from senior high school with a total of 29.2%. Meanwhile, referring to data of occupational domain, it is demonstrated that good parental dependency behavior was performed by unemployed parents with a total of 22.1%. In respect of number of children, good parental dependency behavior was made by those taking care of 3 (three) children with a total of 25.0%. In addition, those who made monthly income of 1–2 million were also found to perform good dependency behavior with a total of 23.0%. Parental dependency behavior, furthermore, was not also influenced by such other factors

as children's age, gender, body weight, and body height since each of the factors had the p value of bigger than 0.05. On top of that, good practice of parental dependency behavior was demonstrated alongside the following criteria found in children, such as aging 1-3 years old (22.6%), female (20.7%), having ideal body weight (25.6%), and tall (37.5%).

### Management ability in Dealing with Eating Disorder Occurrence

With reference to Table 2, it is shown that parent's management ability in dealing with eating disorder occurrence was defined by some factors, such as mother's age (with p value of 0.025), educational background (with p value of 0.049) and number of children (with p value of 0.018). In addition, parental management ability in dealing with eating disorder occurrence was not necessarily determined by factors of employment and income since the p value was shown bigger than 0.05. Further, good parental management ability was demonstrated based on the following criteria, such as: mothers aging 17–25 years old (24.6%), graduating from senior high school (16.9%), unemployed (14.7%), taking care of only a child (22.1%),

and making income more than 2 million (19.0%).

Moreover, parental management ability in dealing with eating disorder occurrence had nothing to do with some factors, in the sense of children conditions, such as age, gender, body weight, and body height since each of the factors was equipped with the p value of bigger than 0.05. In fact, good parental management ability in dealing with eating disorder occurrence was performed to those aging >3–5 years old (14.7%), male (15.5%), very underweight (28.6%), and tall (15.8%).

**The Correlation between Parental Dependency Behavior and Management Ability in dealing with eating Disorder Occurrence**

Table 3 demonstrates the correlation between parental dependency behavior and management ability in dealing with eating disorder phenomenon endured by children with ARFID. The correlation was fair, with r = 0.354. There were some parameters to define the correlation between the two variables, such as calming children down (with p = 0.000 < 0.05), giving hug to children (with p = 0.000 < 0.05), listening to children (with p = 0.001 < 0.05), solving children's problems (with p = 0.000 < 0.05) and fulfilling children's needs of food and drink (with p = 0.000 < 0.05).

**Parental Dependency Behavior on Management Ability in Dealing with Eating Disorder Occurrence**

Tabel 4 the result of multiple linier regression, indicating that two domains of parental dependency behavior, solving children's problems and fulfilling children's needs of food and drink, could influence parental management ability in dealing with eating disorder occurrence. In addition, parental dependency behavior in solving children's problem was assumed positively influencing management ability in dealing with eating disorder occurrence (with β = 0.211, p = 0.001 < 0.05). Furthermore, parental dependency behavior in fulfilling children's needs of food and drink was also positively influencing the management ability (with β = 0.134, p = 0.047 < 0.05).

**Discussion**

**Parental Dependency Behavior Based on the Characteristics of Mothers and Children**

Parental dependency behavior had not correlation with mother's age. This was because the majority of mothers aged in the ranks of 17–25 years old, which was found equipped with good dependency behavior. Mothers aging 17–25 years old would be having better understanding on children's development so that they could reach optimum development according to their level of age (Nihen Grah Prihantanti 2017). In addition, parental dependency behavior was not influenced by educational background. High educational background could not totally ensure that mothers would be fully understanding determining factors that might influence children's nutritional status. A research carried out by Pratiwi, Masrul, and Yerizel (2016) explained that mothers who took high education would be easier in receiving information regarding how to give good attention to children. Nonetheless, alongside the massive advancement of science in any disciplines, any mothers who had attended senior high school and was found perseverant would be able to gain access to information about children's needs of nutrition (Rarastiti 2013; Solehati et al. 2017).

Henceforth, parental dependency behavior was not influenced by employment status. This was mainly because unemployed mothers would be having much more time to spend with their children so as to make them easier to control or notice their children's dietary habit very well (Bumi, 2015). In addition, the dependency behavior was not influenced by number of children. It was due to the fact that those taking care of some children (>1 child) would be more enjoyable in performing their main role as a mother, primarily in fulfilling children's needs, since they had acquired previous parenting experiences with previous children they had been raising (Myrskylä & Fenelon, 2012). Also, the dependency behavior did not also correlate with income. Different amount of income people had made would be making them have different lifestyle. those parents

making income of 1-2 million would be easier in fulfilling children's needs. Thus, their needs of food and drink will be of great assurance (Rohma, 2017).

**Management ability in dealing with eating Disorder Occurrence Based on the Characteristics of Mothers and Children**

Good management ability in dealing with eating disorder occurrence refers to a specific attitude shown by parents to their children for the sake of warmth, sensitivity, and awareness of limitation in addition to enforcement to children (Taraban & Shaw, 2018). The management ability was influenced by mothers' age (with p value of 0.048). In addition, age was also assumed one of factors influencing mothers' attention. Parenting was categorized good only if mothers age belonged to criteria of 17–35 years old (Hidayah, 2017),. The research indicated that a rank of ages strongly influenced parenting style. When mothers were too mature and young, therefore, they could not do their role optimally since, in parenting, it was in need of both physical and psychosocial strengths. In addition, those who were ideally more mature and stable, in terms of psychological condition, would be able to performed a quality parenting style for their children (Burlaka, Graham-Bermann, & Delva, 2017). children who were born from mothers aging younger than 17 years old or older than 25 years old would be having more negative outcome with reference to health, body weight, and obesity probability than those born from mothers aging 17–25 years old (Myrskylä & Fenelon, 2012).

Management ability in dealing with eating disorder occurrence was influenced by educational background (with p value of 0.049). The majority of the respondents who were identified graduating from senior high school was categorized good in terms of management on eating disorder occurrence. The educational background possessed by parents, further, would influence parental behavior in doing parenting upon their children. Those mothers who were senior high school graduates would not only make very simple understanding, but also do good parenting and provide children with

anything they were in need of. This was because of the presence of awareness that to support children optimally, they did not only need one thing to complete, but also things considered vital (Bao et al. 2016; Uyun, Fitri, dan Rakhmawati 2013).

Management ability in dealing with eating disorder occurrence was not influenced by status of employment. Most of the respondents were unemployed and had performed good management in dealing with eating disorder occurrence. Unemployed mothers would be having more time to keep their children company, managing and raising their children with the ultimate aim of giving serious attention to children's nutritional supply (Labada, 2016). According to the research, it was shown that there were some other factors found to influence parenting style in managing children's eating disorder occurrence.

Factor of number of children raised in a family was also proved influencing management ability in dealing with eating disorder occurrence with a category of good (with p value of 0.018). A good parenting applied in managing eating disorder occurrence on children was majorly performed by those respondents taking care of a child (Adawiah, 2017). In addition, her research claimed that number of children possessed by a family would give influence upon parenting style. The more the number of children in a family, the less maximum the parenting would work since the parents' time would be divorced between one to others.

Furthermore, management ability in dealing with eating disorder was not influenced by factor of income. With reference to a research carried out by (Widyastuti, 2017), it was stated that the higher the parents' income was, the better the parenting style would be. Allegedly, this was due to the fact that high income made by families would make them much easier to fulfill their children's needs of food and drink (Kartiko 2013).

**The Influence of Parental Dependency Behavior on Management ability in dealing with eating Disorder Occurrence**

Parental dependency behavior constituted the ultimate factor to define

management ability in dealing with eating disorder occurrence. This was because the dependency behavior shown up through attitudes and behaviors in educating, guiding, communicating with, and doing many things with children was aimed at fulfilling children's basic needs as well as influencing children's characteristics (Nurhayati, 2017). To actualize the dependency behaviors, some actions could represent, such as giving attention to children, getting close to children, and giving physical assistance in a form of support to children. Henceforth, the primary aspect of dependency referred to attention. Parental attention was considered pivotal to be highlighted by parents towards their children since it encompassed exemplary model and direction which would be positively influencing children's growth and development (Fausi, 2017). Parental attention and awareness of children would make the children feel loved and safe. One of various examples could be by inviting other children to have a talk, listen to what was children are talking about, and giving praise to children based on their achievement (Rezky, 2010). On top of that, parental attention to children was strongly influencing the occurrence of children's eating disorder for the attention could be given by both fathers and mothers in event of fulfilling children's needs of food and drink (Fausi, 2017).

Parental dependency behavior, moreover, was in a form of either physical assistance or support. Both the physical assistance and support was alleged very influencing upon children's eating disorder since they constituted social support that could be provided by parents or families which were deemed positive to children in response to their needs. In addition, parental support also manifested a form of receival from parents to children so as to raise children's perception that they were loved, recked, and respected (Zahra, 2018). Parental support would raise warmth in the relationship of parents and children and was so responsive that parents could interact with children regularly and respond to children's needs of food (Lopez et al., 2018).

Parental dependency behavior in fulfilling children's needs of food and drink would make children feel so happy and contented when all

they needed were fully fulfilled. Nutritious food and intensive stimulation from parents were obviously necessary for children's growth and development (Haerunisa, Taftazani, dan Apsari 2014; Naim, Juniarti, dan Yamin 2017; Rahayuwati et al. 2019). Taking over full responsibility of children's physical activities and food, according, had made mothers play important roles for basic need fulfilment which was categorized into 3 (three), namely affection, attention, and safety for the sake of their growth and development based on their age level (Rarastiti, 2013). Parenting needs, especially in fulfilling children's needs, covered needs for raising and caring of children, such as fulfilment of food and drink, in order to preserve children's health. By doing so, children could grow up physically, mentally, socially, and spiritually healthy. Besides, the parenting need was also defined as fulfilment of children's needs of education so that they would transform to be more independent and prepared for their future.

**Conclusion**

Parental dependency behavior constitutes an important factor in defining management ability in dealing with eating disorder occurrence. Parental skill in solving children's problems and parental ability to fulfil children's needs of food and drink shown by a good pattern of feeding would be impactful to manage children with ARFID. This can be a basis for further consideration, especially for the community of nurses, to design a series of plans as a form of nursing intervention in an attempt to prevent the occurrence of nutritional disorder on children with ARFID.

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# Patients Experience and Perception in Preventing Tuberculosis Transmission in Rural Areas: A Qualitative Research

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**Abstract**

Tuberculosis (TB) transmission awareness is crucial for TB prevention in the community. However, efforts to prevent TB transmission from TB patients' perspectives, especially in the rural area, are not well documented. This study aimed to explore the efforts made by TB patients in preventing transmission to the community. This research was qualitative research with a phenomenological approach. Participants in this study were 12 people selected by purposive sampling. Data collection was done by in-depth interviews and recorded. Data analysis was carried out by thematic analysis. This study produced seven themes: perception of TB disease, performing alternative treatments, using personal protective equipment, environmental modification, adhering to treatment, limiting interactions with others, and increasing food intake. Knowledge and awareness of TB patients are still an issue in preventing the transmission of TB in the community. Immediate intervention needs to be made regarding increasing knowledge and awareness of TB patients and the supervision of health workers regularly in handling TB disease in the community.

**Keywords:** Community setting, transmission prevention, tuberculosis patients.

## Introduction

The global tuberculosis report 2019 stated that Indonesia was ranked third (8%) with the most TB sufferers after India (27%) and China (9%). The total TB Incidence in Indonesia in the last five years was always increased; in 2017, there were 844.000 TB cases, and in 2018 there were 845.000 cases (World Health Organization, 2019). The trend of TB cases in Indonesia has never declined, there are still many cases that have not been reached and detected, even though they were detected and treated but have not been reported (Kementerian Kesehatan RI, 2018). TB is the second leading cause of death in the world. The TB rate in Indonesia is microscopically based on 759 per 100,000 people for ages 15 years and over with a higher number of men than women, and the number in urban areas is higher than in rural areas (World Health Organization, 2019).

Indonesian government has carried out several interventions such as increasing detection with a family approach, resolving under-reporting TB treatment with strengthening Public-Private Mix (PPM), improving TB treatment compliance, Improving the drug-resistant TB detection system in the form of MDR TB clinics and access to MDR TB therapy, education related to TB in the community and repair of housing, as well as the fulfillment of analysts with increased sensitivity to diagnosis. Indonesia has collaborated with USAID to establish a referral hospital to help improve the number of MDR TB case detection in the past four years and train TB cadres (local health workers) to educate the public about TB control and prevention (USAID, 2017).

Effective collaboration between health services and the community can increase access to TB patients' homes and reduce medical expenses for TB patients and reduce the workload of health workers. The involvement of TB patients in the treatment of TB can also facilitate patient and community empowerment interventions in handling TB. Community empowerment and TB patients can be done by involving patients and communities, health education related to TB related issues, and encouraging changes in healthy living behavior (World Health Organization, 2008, 2015). Empowering patients and communities require knowledge regarding the rights and responsibilities of each individual, access to information, and the ability to utilize the knowledge and skills needed. Some of the rights of TB patients are attention related to care, appreciation, information, choice, confidence, fairness, organization and security while the obligation of TB patients in the form of information sharing, adherence to treatment, and patient contributions to community health and solidarity (World Health Organization, 2008).

Patients' challenges facing TB transmission prevention in the community might vary within a different context. Therefore, an in-depth understanding of the challenges faced by TB patients in TB transmission prevention is crucial to identify potential areas for improvement. This study was thus conducted to explore TB transmission prevention from TB patients' perspectives. This study aims to explore the experience of the efforts of TB patients in preventing TB disease in the community.

## Method

### Design

This research was qualitative research with a phenomenological approach.

### Participant

The participants of this study were TB patients who received treatment with a duration of treatment of six months, lived in a Pandalungan area, were native to the Pandalangan, were at least 18 years old, and could speak Indonesian or Local (Madura). Participant data were obtained from Klakah Public health centers, which were then selected according to inclusion criteria and selected using purposive sampling. The participant has no relationship prior to the researcher. The researcher came to the participant's house to self introduce and explain the purpose of the study and how to collect data and ask for approval to become the participants of the study.

### Data Collection Procedure

Qualitative data was collected through

in-depth interview methods individually by exploring the experiences of TB patients in an effort to prevent TB transmission in the community using the phenomenology approach. The phenomenology approach aims to describe individual experiences related to a particular phenomenon about how the individual interpreted his experience (Yusuf et al., 2017). The interview process was conducted by ES, which has been experienced in qualitative data collection before and works as a lecturer in community nursing. The interview question begins with the opening question "Tell us about your experience in preventing TB transmission in the environment around you?". Subsequent questions were developed based on participants' responses regarding the questions that were asked to participants. Interviews were conducted in the participant's house, where participants felt comfortable in the interview process. Interviews were conducted using the local language of participants and Indonesian for approximately 30–45 minutes per participant. Participant answers are recorded using a recorder and recorded in the note field during the interview process. The verbatim process of recording into a direct transcript was carried out after the interview was conducted to obtain accurate data. Data collection ends when data saturation occurs.

This study was a part of research tree that explore TB prevention from professional health worker perspectives (Sulistyono et al., 2019) and this study was explore the TB prevention from patient perspectives.

## Analysis

The data analysis process is carried out simultaneously with the process of collecting data. All data were transcribed verbatim and analyzed thematically include identification, coding, analysis, and clustering. The identified themes are displayed with statements from participants with the aim of increasing the wealth and depth of the data found. The participant's quotation is displayed in Italic and followed by participant details.

To ensure rigour, transcripts were read by two researchers (ES and DT). The thematic framework was developed, keeping agreed themes by discussing, negotiating, and agreeing on the content, as well as the development of new themes (or subthemes) where there was disagreement. To ensure the data trust-worthiness, the researcher (ES) was conduct member checking by verifying the transcript to participants and matching it with records and field notes. The study process is discussed with the research supervisor (TS) and the research team.

## Ethical Clearance

The study had obtained ethical approval from the Faculty of Dentistry, Universitas Jember No 114/UN25.8/KEPK/DL/2018 and informed consent were signed by all participants, interview transcripts were coded, and participant details were not collected.

## Results

**Table 1 Participants demographic data**

| No of Participants | Sex | Age (years) | Job | Living with | Education Level | Smoking Habit |
|---|---|---|---|---|---|---|
| 1 | F | 55 | Housewife | Son | Junior High School | No |
| 2 | F | 24 | Islamic Teacher | Husband | Senior High School | No |
| 3 | M | 39 | Migrant Labor | Wife and Son | Junior High School | No |
| 4 | M | 49 | Farmer | Wife and Daughter | Junior High School | Yes |
| 5 | M | 61 | Pedicab | Grandson | Junior High School | Yes |
| 6 | F | 38 | Housewife | None | Junior High School | No |
| 7 | M | 60 | Farmer | Wife | Junior High School | Yes |
| 8 | M | 21 | Student | Parents | College | Yes |
| 9 | M | 58 | Repairman | Children | Junior High School | No |
| 10 | F | 43 | Grocer | Husband and Children | Senior High School | No |

| 11 | M | 55 | Farmer | None | Junior High School | No |
|----|---|----|--------|------|--------------------|----|
| 12 | M | 50 | No Job | Wife and Son | Junior High School | Yes |

Abbreviation:
F=Female
M=Male

The sample in this study amounted to 12 participants (n = 12) (Table 1). The age range of participants is 21–65 years. The total participants in this study were male of 8 participants and four female participants. Almost all participants were educated in junior high school (9 participants). Two participants were educated in high school, and one participant was studying. Two participants were a housewife, one participant as a Moslem reciting teacher; one participant was migrant labor, three participants were farmers, one participant was a pedicab driver, one participant was still in college, the rest were mechanics, sellers and had no job.

**Knowledge and Participant Perception of TB disease**

TB is known as lung disease or is known to the public by the name of TBC. Most participants stated that TB was an infectious disease and could be cured. Participants said that the TB disease they suffered could recover if they adhered to treatment. Two participants stated as follows:

"... at first I was worried about coughing up blood, afraid of why, but he said (health professional) this disease could heal..." (Male 39 years)

"... It was already explained by the health workers, I forgot the name that my illness was severe, but this disease can be healed with treatment for about six months ..." (Male 49 years)

Almost all participants said that TB disease is a contagious disease. Some participants stated that TB was transmitted through the airborne, but most interpreted TB transmission with incorrect perceptions, as stated by the following participants:

"I am careful (in behaving) afraid of contagious. I also rarely gather with my wife during treatment, so as not to spread "(Male 49 years)

"I separate my plate from where I eat and drink with my family, so it's not contagious" (Female, 55 years)

**Efforts of TB Patients in Prevention of Transmission of TB**

**Performing Alternative Treatment**

Some participants stated that they performing alternative therapy, for example, go to Kiai (Islamic teacher), dukun (Traditional Healer), and drank traditional medicine as an effort to recover while still taking the medication in health services. Participants stated their statements as follows:

"Yeah ... I went to the Kiai (Islam Teacher), Bu he didn't give me medicine. He told me to drink herbal medicine. What is the herbal medicine name ... (thinking) ... it is white turmeric just the same ... just like gingers" (Female 55 years)

"I drank herbs such as turmeric, temulawak (Curcuma xanthorrhiza Roxb), temu ireng (Curcuma longa L.) is cut into small pieces, the water is boiled. Water with green, water sablukan (rice laundry). Anyway, there are instructions from people; I did it because I wanted to get well. I even do things besides medicine" (Male 49 years)

"I take traditional medicines such as turmeric when coughing" (Female 38 years)

**Using personal protective equipment**

Some participants said using personal protective equipment such as masks or closing with their hands when coughing to prevent transmission of TB to others. As stated by participants as follows:

"Even though I always wash until I have something. Ask why I use masks every day. I tell you to get well soon and not spread to others "(Male 39 years)

"Every time I cough, I always close with my hands or tissue or turn back" (Female 24 years)

Another participant said that they were only wearing a mask when they go to the public health center because of fearful that health professional workers would be angry because they did not comply with the order to wear a mask. Participants stated the reason for not wearing a mask when outside the health

facility because they felt uncomfortable and some participant thought incorrect perceptions of wearing a mask could cause the TB disease that he suffers is hard to be cured as did the participants as follows:

"... I rarely use masks at home. Because when you wear a mask it's hard to breathe. But when I go to the puskesmas (public health center), I use a mask because I must be scolded if I don't obey wearing a mask. I think that when the mask is in the mask, I will breathe again so that the diseases do not heal. If I don't have a mask, I can breathe comfortably ... "(Male 49 years)

"No, I don't wear a mask because it's not good. It feels sticky. Usually, when you check into the puskesmas (public health center), you just use a mask, if you don't use a mask, you can be scolded by the officer. Instead of being scolded, I use it "(Male, 61 years)

## Environmental Modification

### Adequate ventilation
Participants stated that improving ventilation in the home environment is one of the efforts to prevent transmission of TB disease. As the participant's statement is:

"I open the room window so that the sun goes in" (Male 21 years)

"In the past, there was no window, but after being told by Pak Budi (Health Officer) to open it so that sunlight could enter, finally put on the window" (Female 43 years)

"In addition to often opening windows, some tiles in my house are replaced with glass tiles" (Female 24 years)

### Sputum Disposal
Participants said several different ways related to sputum disposal. Sputum disposal is carried out in the toilet, in the trash and wrapped in cloth, and then thrown into the river or burned. As stated by participants as follows:

" I waste my spit (sputum) on the toilet." (Female 55 years) & (Female 38 years)

"They (sputum) were dumped in the trash, in the river, but they were thrown away at 9-10 a night, I afraid that someone would be in the river, then they would spread. I have to think of others" (Male, 61 years)

"When coughing, the sputum is put on a cloth, clothes that are not worn. After that it is thrown into the river, sometimes burned, sometimes in the toilet "(Male 39 years)

"Usually I waste it sometimes on the ground, then it is evenly spread using sand with my feet" (Female 55 years)

Some participants did not throw sputum in a certain place but are considered throwing out cough sputum even though they know that the disease is an infectious disease. As stated by participants in the following statement:

"Yes, I just do a normal cough without covering it. I throw it wherever I want to throw it" (Male 49 years)

## Smoking Behavior
Participants stated that they quit smoking because they were afraid that the disease would get worse with smoking as said by participants as follows:

"I used to smoke a while, but now that my illness has stopped. Coffee is also rare "(Male 39 years)

Participants said that avoiding cigarette smoke to prevent the disease from getting worse, as told by participants as follows:

"In tahlilan (praying in community), which is usually served by cigarettes, I always choose the position in the front because it feels like to breathe smoke rather tightly" (Male 49 years)

Participants stated that they could not stop their smoking habits. Participants lied to health professional workers when asked about smoking habits such as participant statements as follows:

"When I asked by health professional workers, I said no smoking. It is true when I was asked not to smoke, but after I was at home I smoked in a stall "(Male 61 years)

"When I was at home or asked by my parents to say I didn't smoke, sometimes I kept smoking" (Male 21 years)

## Adhering with treatment
Some participants stated that they tried to take anti-TB drugs on a regular basis despite causing discomfort due to high motivation from themselves to recover. As stated by participants as follows:

"The red medicine causes stomach ache if the officers say at the health center, there is a stomach ache, nausea, and so on. This is what

pains the stomach. But I still drink medicine; I want to get well" (Female 55 years)

"Initially there was a feeling of boredom, but because I wanted to get well, I drank continuously" (Male 58 years)

Attempts to adhere to taking medication were also carried out because the experience of failure in terms of medication compliance was previously delivered by participants as follows:

"I initially did not like taking medicine, then with Pak Budi (program holder) motivated. It's uncomfortable to take medicine; it feels like there's no change. But he said if it is not treated, it will get worse and more easily spread to the closest people. I have been hospitalized, hot, uncomfortable eating, my appetite dropped. At that time, I did not take medicine. Finally, I have to start treatment since the beginning again "(Male 49 years)

### Limit interactions with others

Some participants said limiting interaction with others to prevent transmission of TB. The interaction limitation is in the form of separating the bedroom from the family and partner and limiting the interaction outside the home with the neighbors. The statement was said by participants as follows:

"I slept alone; my children are in another room. Pak Budi (the holder of the TB program at the Public health center) said that I have to sleep in separate rooms with my family, had to sleep alone for a while during treatment "(Female 55 years)

"I am afraid of contagious care. I also rarely gather with my wife during treatment, so as not to rub off "(Male 49 years)

"While I separate beds with husband" (Female 38 years)

"I often stay at home and rarely gather with neighbors" (Male 50 years)

### Increase food intake

Some participants stated that they increased the number of food portions to prevent worsening of TB disease suffered as presented by participants as follows:

"I Eat three times a day; no restrictions only reduce the oily. I have had no side effects" (Male 49 years)

"Yeah ... yeah, it's not good. After a few days later, it feels good. A day, I eat many times. if there are rujak (traditional food), the main thing is that there are no restrictions that are important to eat" (Male 61 years)

### Discussion

This study produced seven themes: perception of TB disease, performing alternative treatments, using personal protective equipment, environmental modification, adhering to treatment, limiting interactions with others, and increasing food intake.

Most of the participants interpreted TB transmission with incorrect perceptions, even though TB patients in this study conduct care in community health centers and contact with health workers. Incorrect perceptions about TB is an issue that needs to be addressed because it can lead to a false understanding of TB that can hamper efforts to control and prevent TB in the community. Other studies regarding the opinions and false beliefs about TB disease (Buregyeya et al., 2011; Mbuthia et al., 2018) that is regarding the transmission of TB through alternating using tableware from TB sufferers and transmission through smoking behavior.

Some participants performed alternative treatment for the disease. Indonesian community treatment choices, still involve the traditional and the modern, and also individuals who pragmatically decide who to consult, with access and affordability prominent determinants of choice (Viney et al., 2014). this finding can be one of the considerations to include a traditional healer as one of the means of health promotion, especially in TB sufferers to continue to follow the treatment until completion.

The use of masks as an effort to prevent transmission of TB is still not done optimally by TB patients. This finding is consistent with previous study that found that mask use in TB patients tends to be low (Nurhayati et al., 2015). World Health Organization issued a policy that patients need to be educated about the ethics of coughing and respiratory hygiene, such as covering the mouth and nose when coughing or sneezing or using covers such as tissues or masks to prevent transmission of TB germs, especially in health care

environments. (Jo, 2017). Some participants have carried out the ethics of coughing and using masks to prevent transmission of the disease. However, there are still many participants who do not know the ethics of coughing and are less concerned with the ethics of coughing and the use of masks. Some studies suggest that the implementation of cough ethics is less effective in preventing TB droplet transmission (Zayas et al., 2013) but other studies and WHO state that ethical behavior of coughing needs to be done to reduce TB germs transmission, especially in health care settings and vulnerable groups in the community (Jo, 2017; USAID, 2015).

Air infection control is an effort to control TB disease, which is an essential and often overlooked action. Participants said they made modifications to the environment, so the environment was not humid. Many studies suggest increasing natural ventilation to reduce the transmission of TB in the home environment (Lygizos et al., 2013; Richardson et al., 2014). The intervention is one of the responses with minimal costs and effective in preventing TB transmission in the environment. Increased ventilation can be done by increasing the number of windows, the ratio of larger windows, as well as windows and doors that are always left open (Lygizos et al., 2013). This is expected to increase the flow of air and sunlight into the room.

The appropriate sputum disposal in TB patients in the home environment is one of the efforts to reduce the transmission of TB in the community. Some literature suggests that health workers should provide education on how to do sputum disposal in TB patients in the home environment that is removing sputum into tissue or paper and burning it or burying it, removing sputum in a pot or a small container that is closed and then burying it (Cheriamane et al., 2017). Proper sputum disposal is an effective way to minimize the spread of TB (Singh et al., 2016). Some participants threw their sputum into the river, and some did not care about sputum discharge management. Health workers need to provide education regarding the safe and correct disposal of phlegm from TB patients. Health workers also need to supervise the residence of TB patients to improve the

correct disposal behavior of phlegm so that it can reduce the transmission of TB in the community. Different perceptions related to the place and method of phlegm disposal need to be facilitated by health workers, for example, the place used for the disposal of phlegm such as cups, cans, places that have been disinfected (Ministry of Health Republic of Indonesia, 2017) or other landfills. Health workers can work with rural cadres in charge of supervision in the home environment.

Most male participants still carry out smoking behavior even though it has been banned by health workers. Other studies suggest that the prevalence of smoking in TB patients is high (Jiménez-Fuentes et al., 2016) where active and passive smokers are independent risk factors for the incidence of TB and increase the progressiveness, severity, and risk of recurrence and mortality of TB disease suffered. The highest smoking behavior is carried out by men (Popovska & Zakoska, 2014). Health workers can provide education to special groups, especially men, to raise awareness not to smoke. Education also needs to be done on male adolescents to prevent smoking behavior, which can increase the risk of suffering from TB disease. In addition to education, health workers can intervene to change smoking behavior into other habits.

Compliance with TB patients for treatment is an important issue related to TB treatment carried out over a long period of time, which is approximately six months. The long duration of treatment is often the reason for treatment failure in TB patients (Danso et al., 2015). Encouragement from health workers and families is important to maintain TB patient compliance in TB treatment. The experience of failure in TB treatment causes TB patients to have to repeat from the beginning of TB treatment. Increased knowledge of TB patients about the impact that might occur if treatment is not carried out thoroughly needs to be done plus supervision of compliance with taking medication for TB patients at home.

In this study, there were many participants who chose to separate their homes and separate rooms with their spouse or family. Isolation in family and community is a common issue found in TB patients (Tadesse,

2016). Participants even chose to stay alone away from home because they were afraid of infecting their families and even parting with their husbands due to TB disease suffered. The Previous study found that the knowledge and perceptions of families of TB patients related to understanding of TB disease and its treatment are still in a less category (Herawati et al., 2013). Health workers need to provide education about TB disease not only to TB patients but also to family members, so that stigma and isolation do not arise, and social isolation can reduce the quality of life for TB patients. The fulfillment of nutrition is closely related to the treatment of TB. Some studies state that providing nutritional support to TB patients, especially those in poverty, can increase the success of TB treatment in the community (Samuel et al., 2016). The provision of free nutrients that are high in protein needs to be done to support the fulfillment of nutrition for TB patients, especially in rural areas and in the community in the poverty line. TB patients should be educated to do self-management about tuberculosis treatment (Yu et al., 2014).

The benefit of preventing individuals from progressing to active TB, especially persons at high risk of reactivation, is widely accepted (Moonan et al., 2018). The results of this study indicate that TB patients have participated in efforts to prevent the TB transmission into the community, but need support from various parties both from health workers and families and surrounding communities.

## Conclusion

TB patients in rural areas have made efforts to prevent transmission of TB in the community. Some TB patients have done the right way, and some still lack understanding regarding TB disease. Health workers need to educate and increase awareness of TB patients to be involved in preventing the transmission of TB in the community. The self-management ability of TB patients should be increased. This intervention also needs to be accompanied by supervision in the community with cross-sector collaboration or involving health cadres in supervising compliance and preventing TB transmission behavior in the community.

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# The Influence of Gong Waning Music Therapy toward Anxiety in Patients with Acute Coronary Syndrome

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**Abstract**

Anxiety  becomes a psychological response when there is an attack and becomes a cause to bad treatment of Acute Coronary Syndrome (ACS) patients. Music therapy interventions to reduce anxiety need to be considered because it has no harmful effects. The study aimed to analyze the influence of gong waning music therapy toward anxiety in patients with ACS in Regional Public Hospital of dr. T.C. Hillers Maumere. The research design was quasi experimental with non-equivalent control group design. The sample was 32 patients divided into 2 groups with 16 patients per group taken by using purposive sampling technique. The intervention was implemented in three days. State Trait Anxiety Inventory (STAI) was used as the instrument of the study. The study used paired t-test, independent sample t-test and repeated anova for data analysis. The study showed that experimental group's trait anxiety and state anxiety were reduced (p 0.000 and 0.001). There was a difference on anxiety in experimental and control group (p 0.043 and 0.049). There was a bigger decrease of anxiety level in experimental group and it was statistically significant (p 0.000). The findings proved to support intervention of traditional music therapy to reduce anxiety. Nurses should not only focus on physical problems and ignore anxiety. It is hoped that nurses can use music therapy as a non-pharmacological adjunct therapy to help reduce anxiety of ACS patients.

**Keywords:** ACS, anxiety, music therapy.

**Introduction**

Acute Coronary Syndrome (ACS) is the emergency condition of Coronary Heart Disease (CHD) and is the most leading cause of death in the world that is increasing annually. Each year, around 1.8 million of Europeans die due to CHD (Townsend et al., 2016; Piironen et al., 2016). It is also reported that there are 7 million deaths in Asia-Pacific annually due to the disease (Ohira et al., 2013; Chan et al., 2016). American Heart Association (AHA) reports that as many as 16.5 million adult Americans suffer from CHD (Benjamin et al., 2018). CHD's prevalence increases in developing countries such as Indonesia, China, India, Iran, Turkey and Africa from 9 millions in 1990 to 19 millions in 2020 (Okrainec et al., 2004; Sanchis et al., 2016). Based on the Basic Health Research of 2013, the heart disease prevalence in Indonesia was 0.5% and it increased to 1.5% in 2018. The highest CHD prevalence (4.4%) was in East Nusa Tenggara (Ministry of Health of the Republic of Indonesia, 2018).

Anxiety becomes a psychological response when there is an attack and it is reportedly that more than 86.3% of ACS patients experience anxiety during their treatment in the hospital (Abu Ruz et al., 2010; Wan-Nor-Asyikeen et al., 2017). Anxiety is caused by chest pain, bad conditions, helplessness and death threat (Meneghetti et al., 2017). Anxiety becomes a risk factor to accelerate cardiac death (Parker et al., 2010; Roest et al., 2014). Roest et al. (2010) explained that 36% of morbidity and cardiac death are due to anxiety. Additionally, anxiety is related to acute level of the disease and prolonged treatment period and decreased quality of life (Abu Ruz et al., 2010; Nuraeni et al., 2016). Celano et al. (2016) in their meta-analysis reported that anxiety affects 1.2 times in accelerating death risks.

Anxiety can be managed by giving sedation, yet this action does not completely solve the problem, therefore, adjunctive non-pharmacological therapy such as music therapy are needed. The use of music therapy was chosen, because there were no side effects, non-invasive, inexpensive and easy to implement (Stern, 2013; Hole et al., 2015). Systematic reviews of research results have reported that music therapy not only reduces anxiety in heart patients but also in patients with mechanical ventilation and chemotherapy (Trape, 2010; Bradt, 2016). Music therapy is not only able to reduce anxiety but also stabilize physiological functions such as blood pressure and heart rate (Di Nasso et al., 2016). Boccara et al. (2018) in their study mentioned that with music therapy patients who undergoing coronary angioplasty require three times less midazolam.

Music as therapy is music that gives relaxing effect and hemodynamic system stabilization (Supnet et al., 2016). Leininger (1978) stated that the result of treatment would be optimal if adapted to local culture (Busher, 2016; Giger, 2016). Facai et al. (2016) in their study using Chinese traditional music therapy, showed psychological disorders can decrease in the experimental group. Currently, many studies in Indonesia use classical music from Europe to reduce anxiety, but the use of traditional music is still rarely chosen. While in Indonesia, there is a lot of traditional music that needs to be developed as a therapy. One of the traditional music in Sikka District is "Gong Waning". Gong Waning's music is the same as other traditional music in Indonesia, gong waning music gives a calm, peaceful and happy effect. When the patient relaxed it will stimulate the parasympathetic nerves, lower blood pressure and reduce anxiety (Loomba et al., 2012).

An initial study in Regional Public Hospital of dr T.C.Hillers Maumere in June 2018 showed that the nurses did not pay attention to patients' anxiety. The nurses focused more on physical problems and medical therapy, meanwhile anxiety affects to clinical deterioration of the patients. The initial study also showed that 7 out of 10 patients feeling worried, threatened, afraid of illness, often thinking about death and helpless. Based on the problems being discussed in prior, the researcher was interested to conduct a study on the influence of Gong Waning music therapy toward ACS patients'. The study aimed to analize the influence of gong waning music therapy toward anxiety in patients with Acute Coronary Syndrome in Regional Public Hospital of dr. T.C. Hillers Maumere.

**Method**

This study used quasi experimental with non-equivalent control group design. The population of the study was ACS patients being treated in Intensive Care Unit (ICU) of Regional Public Hospital of dr. T.C. Hilllers Maumere in 2019. Purposive sampling was used in the study. Based on the average visit of ACS patients in two months as many as 35 patients. Then the sample size can be calculated by the formula (Dahlan, 2013):

$$n1 = n2 = \left[\frac{(Z\alpha + Z\beta).SD}{d}\right]^2$$

Information:
n= sampel size
Zα= type I error (α 5%= 1.96)
Zβ= type II error II (β 10%= 1.28)
SD = standard deviations between groups (previous studies)
d= the minimum difference that is considered significant from the results of previous studies.

Based on the research of Alamsah et al. (2018), the standard deviation was obtained (5.29) and the minimum difference (4.51). Then the sample size needed in this study:

$$n1 = n2 = \left[\frac{(1.96+1.28).5.29}{4.51}\right]^2$$

n1=n2= 14.44. Round to 14.

To avoid samples that drop out, a correction of 10% is carried out (Sastroasmoro, 2014). So the sample must be added as much as 10%, so to get the overall sample size can be calculated by the formula: n'=n/(1-f)
Information:
n = sample size
f = drop out
n'= 14/(1-0.1)
n'= 16.04. Rounded up to 16 respondents for each group. The total sample size in this study were 32 respondents.

The inclusive criteria of the samples in the study were: 1) Patients have been diagnosed to suffer from ACS, 2) ACS patients come from Sikka district, 3) Patients were getting standard treatment of ACS, 4) Patients were those who got first attack, 5) Patients could communicate well and were willing to be respondents. The exclusive criterion of the study was patients did not follow the process of the study to completion.

The study took place in ICU of regional public hospital of dr. T.C. Hillers Maumere during May–August 2019. The instrument of the study was State Trait Anxiety Inventory (STAI). This instrument fit the problem of the study because there is no statement of psychological response so that it will not cause mistakes between anxiety response and physical effect of ACS. The validity test results obtained the correlation coefficient (0.526-0.897) and the reliability test results obtained Cronbach Alpha: 0.740. There were 2 parts of STAI: State Anxiety and Trait Anxiety; each contained 20 numbers. Each part was given score ranging from 20 to 80 (Julian, 2011).

Data collection includes: 1) Pre-test. Conducted after an ethics test and research permit are obtained, then introducing themselves to prospective respondents, explaining the purpose of the study and giving informed consent to the respondent to be signed. Keeping the environment calm and maintaining patient privacy by putting up barriers or lowering curtains, then measuring anxiety. 2) Intervention. The intervention was carried out for three days. In the experimental group, the patient was arranged in a comfortable position (lying down), the patient closed his eyes, keeping the environment calm and patient privacy. Patients listen to gong waning music for 30 minutes every morning through headphones/earphones (once a day). Music volume is determined by the respondent (maximum 60dB). In contrast, no music therapy intervention was applied to the control group. 3) Post-test. Post-tests were carried out after the intervention was given to the experimental group. Measurements were also made in the control group

Normality test results showed anxiety data both the experimental group and the control group were normally distributed, then the statistical test used paired t-test. Meanwhile, to know the difference of anxiety

between the experimental group and control group, independent sample t-test was used. In addition, repeated anova test was used to compare the average number of anxiety with more than two times measurement. This study has got ethical approval agreement from the research ethics commision of Medical Faculty of Nusa Cendana Univesity of East Nusa Tenggara Timur with number: 22/UN15.16/

KEPK/2019. Based on the results of the ethical decision, the study was only carried out on respondents who were already stable and if in the research process the respondent suddenly experiences deterioration, then the respondent is excluded from the study.

**Results**

**Table 1 Distribution of Demographic Characteristics of Respondents (n= 32)**

| Respondent Characteristics | Experimental Group (n=16) | | Control Group (n=16) | | P value |
|---|---|---|---|---|---|
| | F | % | F | % | |
| Age | | | | | |
|   Mean ± SD | 59.2±5.5 | | 57.6±5.6 | | 0.989 |
| Sex | | | | | |
|   Male | 11 | 68.8 | 12 | 75 | 0.350 |
|   Female | 5 | 31.2 | 4 | 25 | |
| Education | | | | | |
|   Primary school | 5 | 31.2 | 4 | 25 | 0.790 |
|   Junior high school | 7 | 43.8 | 6 | 37.6 | |
|   Senior high school | 3 | 18.8 | 5 | 31.2 | |
|   Higher education | 1 | 6.2 | 1 | 6.2 | |
| Occupation | | | | | |
|   Housewife | 4 | 25 | 4 | 25 | 0.628 |
|   Farmer | 7 | 43.8 | 5 | 31.2 | |
|   Civil servants | 2 | 12.5 | 2 | 12.5 | |
|   Retired | 1 | 6.2 | 0 | 0 | |
|   Fisherman | 1 | 6.2 | 2 | 12.5 | |
|   Entrepreneur | 1 | 6.2 | 3 | 18.8 | |
| Type of ACS | | | | | |
|   STEMI | 5 | 31.2 | 4 | 25 | 0.903 |
|   NSTEMI | 9 | 56.2 | 9 | 56.2 | |
|   UAP | 2 | 12.5 | 3 | 18.8 | |

**Table 2 Distribution of Respondents Based on Anxiety (n=32)**

| Anxiety | Experimental Group (n=16) | | Control Group (n=16) | |
|---|---|---|---|---|
| | Mean | SD | Mean | SD |
| Pre | | | | |
| Trait Anxiety | 43.62 | 6.22 | 38.37 | 6.54 |
| State Anxiety | 45.87 | 6.28 | 40.00 | 7.78 |
| Post | | | | |
| Trait Anxiety | 42.87 | 6.35 | 38.06 | 6.52 |
| State Anxiety | 43.75 | 6.21 | 39.00 | 6.88 |

**Table 3 Influence of Gong Waning Music Therapy toward Anxiety in Patients with ACS (paired t-rest) (n=32)**

| Anxiety | Experimental Group (n=16) | | | Control Group (n=16) | | |
|---|---|---|---|---|---|---|
| | Mean | SD | P value | Mean | SD | P value |
| Trait Anxiety | | | | | | |
| Pre | 43.62 | 6.22 | 0.001 | 38.37 | 6.54 | 0.136 |
| Post | 42.87 | 6.35 | | 38.06 | 6.52 | |
| State Anxiety | | | | | | |
| Pre | 45.87 | 6.28 | 0.000 | 40.00 | 7.78 | 0.088 |
| Post | 43.75 | 6.21 | | 39.00 | 6.88 | |

**Table 4 Differences in Anxiety after Intervention between Experimental and Control Group (independent samples t-test) (n=32)**

| Anxiety | Experimental Group (n=16) | | Control Group (n=16) | | Mean Difference | Levene's Test | P value |
|---|---|---|---|---|---|---|---|
| | Mean | SD | Mean | SD | | | |
| Trait | 42.87 | 6.35 | 38.06 | 6.52 | 4.81 | 0.758 | 0.043 |
| State | 43.75 | 6.21 | 39.00 | 6.88 | 4.75 | 0.832 | 0.049 |

**Table 5 Comparison of Anxiety Before and After The Administration of Gong Waning Music Therapy (repeated anova) (n=32)**

| Anxiety | Experimental Group (Mean±SD) | Mean Difference | F | P Value | Control Group (Mean±SD) | F | Mean Difference | P value |
|---|---|---|---|---|---|---|---|---|
| Trait | | | | | | | | |
| Pre | 43.62 ± 6.22 | | 12.00 | 0.000 | 38.37 ± 6.54 | 1.56 | | 0.211 |
| Post 1 | 43.12 ± 6.25 | 0.50 | | | 38.12 ± 6.34 | | 0.25 | |
| Post 2 | 42.87 ± 6.19 | 0.75 | | | 38.12 ± 6.56 | | 0.25 | |
| Post 3 | 42.87 ± 6.35 | 0.75 | | | 38.06 ± 6.52 | | 0.31 | |
| State | | | | | | | | |
| Pre | 45.87 ± 6.28 | | 50.89 | 0.000 | 40.00 ± 7.78 | 2.16 | | 0.105 |
| Post 1 | 44.37 ± 6.24 | 1.50 | | | 39.75 ± 7.65 | | 0.25 | |
| Post 2 | 43.81 ± 6.15 | 2.06 | | | 39.81 ± 7.06 | | 0.18 | |
| Post 3 | 43.56 ± 6.15 | 2.12 | | | 39.00 ± 6.88 | | 1.00 | |

Based on the demographic characteristics of the respondents in table 1. The highest average age is 59 years old. In addition it was dominated by male, junior high school education, employment as a farmer and type of ACS: NSTEMI. All aspects of characteristics obtains the p value > 0.05, meaning that there are no differences in characteristics both group.

Based on table 2. The highest average anxiety score in the experimental group and at the post-test all anxiety scores decreased.

Based on table 3, the result of paired t-test showed that the p value of experimental group was < 0.05 (trait anxiety = 0.001 and state aniety = 0.000), Ho was rejected while Ha was accepted. Hence, there was an influence of gong waning music therapy to ACS patient's anxiety.

Based on table 4, before the independent samples t test was tested, a homogeneity test (levene's test) was performed as a test requirement. Levene's test results obtained p value on trait anxiety and state anxiety (0.758 and 0.832), p value > 0.05, then the data have the same variant (homogeneous). Independent

samples t test results obtained p values in trait anxiety and state anxiety (0.043 and 0.049), p values < 0.05, so there are differences in anxiety after the intervention between the experimental and control groups.

Based on table 5, after 3 days of intervention the decrease in anxiety was higher in the experimental group The results of repeated anova test showed in the treatment group the p value (0.000) and in the control group the p value (0.211 and 0.105), so it can be concluded that there are differences in anxiety in the experimental group and there is no difference in anxiety in the control group.

## Discussion

The study resulted p value of trait anxiety = 0.001 and state anxiety = 0.000) < 0.05, in which Ho was rejected and Ha was accepted. In other words, there was an influence of gong waning music therapy toward ACS patients' anxiety. Anxiety is the psychological response toward changes of physical condition and becomes a phenomenon that often occurs during treatments in the hospital. Anxiety is also a form of emotion which causes mental strain, and if it is not resolved the depressed emotion can disturb heart system and respiratory system (Thompson, 2009). Increased heart workload and increased oxygen demand can worsen myocardial perfusion. The decrease of myocardial perfusion can cause increased chest pain. According to Musey and Kline (2017), anxiety is closely related to chest pain frequency, impacts the activity intolerance and develops physical limitation. Anxiety also impacts reduce of immunity and increases cortisol's production (Lenze et al., 2011).

Anxiety is a form of unpleasant emotion dominated by fear, worries and uncontrolled discomfort toward threatening condition. There are many ways to reduce ACS patients' anxiety; two of them are through pharmacology and non-pharmacology therapies. The pharmacology therapy is given by sedation, yet this therapy causes many side effects that can worsen physical condition of the patients, such as nausea and vomits, bradycardia, hypotension, digestive disorder, physical activity's degradation, easily tired

and delirium. Although there are standard operational procedures and instructions on sedation usage by doctor, patients still significantly experience anxiety (Chlan et al., 2013).

Non-pharmacology intervention such as music therapy can help reduce anxiety and also reduce administration of sedative medicine (Bradley et al., 2015; Yeo et al., 2013). Music can strongly distract attention that can also reduce anxiety. It is because music affects brain work with an effect of hemodynamics stabilization (Loomba et al., 2012). Clinical reports also show that music therapy reduces sedative and analgesic medicine administration (Good, 2008). A study by Berbel et al. (2007) compared the use of diazepam with music therapy and it showed that both diazepam and music therapy were effective in reducing anxiety. Unlike pharmacology therapy, music therapy does not have any side effect. Moreover, some studies show that music therapy can help reduce nausea and vomit (Zhou et al., 2011).

In Indonesia, a research using traditional music was shown on Alamsah et al. (2018) study. They used music from Kacapi Suling "Ayun Ambing" that gave influence to anxiety on patients who were doing hemodyalisis. Yusli and Rachma (2019) in their research also stated that there was an influence of Gamelan Jawa music toward elderly's anxiety level. This study was different from that of Rahman et al. (2017). They used traditional music of hariring kabayan in West Java, but there was no influence of the music toward anxiety. This was because patients focused on the pain they were feeling. A study in Turkey using Turkish music also showed there was no significant difference on anxiety decrease between two groups (Toker & Kömürcü, 2017).

Based on the study result, the mean difference of trait anxiety was 4.81, while mean difference of state anxiety was 4.75. The result of levene's test on trait anxiety (0.758) and state anxiety (0.832) was more than (>) 0.05, hence the data variant on trait anxiety and state anxiety was same. Additionally, p values in the study were 0.043 and 0.049, with p value less than 0.05, so it can be concluded that there was a difference of anxiety level between experimental group

and control group. This difference occurred due to the intervention of gong waning music therapy. Music therapy is a comprehensive, systematic and therapeutic management to help reduce anxiety, improve quality of life and fasten recovery (Bruscia, 2014; Aggelopoulou et al., 2017).

According to repeated anova test result, F value was obtained for both trait anxiety and state anxiety (12.00 and 50.89) with p value = 0.000. Thus, it can be inferred that the provision of gong waning music therapy influenced significantly toward ACS patients' anxiety. The control group did not show a significant change on anxiety level (p = 0.211 and 0.105). This study is similar to a meta-analysis study by Tao et al. (2016) explaining that Chinese traditional music can help reduce anxiety. Nilsson's study (2009), showed a different result in which there was no difference of anxiety level among the groups due to limited choice of music. Hanser (2014) explained that although there were many studies on music therapy with different results, the anxiety level of all traces of patients with heart disease decreased after listening to music.

This study showed that the state anxiety level was higher than trait anxiety level both in experimental group and control group, while trait anxiety in control group tended to settle. According to Leal et al. (2017), the higher the trait anxiety level, the higher state of anxiety level it is. Although during the study patients did not say they were worried, they were susceptible toward various situations making them anxious. Based on Spielberger's statement (2010), he explained that there was a relationship between trait anxiety and state anxiety. The higher the level of trait anxiety, the higher level of state anxiety it is that the patients are experiencing. Level of someone's trait anxiety tends to be settling because trait anxiety refers to his/her characteristics or relatively sedentary trait that directs someone to interpret a condition as threats affected by previous experience. This study is in line with the study conducted by Miličić et al. (2016) showing that there was a higher level of state anxiety than trait anxiety (p 0.001). Likewise, the study of Maisyaroh et al. (2015) showed that 46.4% of respondents had moderate state anxiety originating from

mild trait anxiety. Trait anxiety is not directly seen on someone's behavior, but it can be seen from the frequency of state anxiety which conditions can change depending on recent situations.

Based on the findings of the study, it is shown that state anxiety score decreased for 1.50 on the first day of gong waning music therapy. This number is higher than that in control group (0.25). On the second day, the state anxiety level decreased for 2.06. Meanwhile, the score of state anxiety decreased up to 2.12 on the third day. It means that when patients listened to gong waning music for 3 days, their anxiety level decreased for 2.12. Trait anxiety and state anxiety in the control group tend to persist. Anxiety decrease was due to strains of gong waning music that could create relaxing, happy and calming effects. The study is also in agreement with nursing theory from Leininger stating that nursing intervention will be optimal if it is linked to local cultural elements. This study will definitely add to the treasury of scientific studies on the influence of traditional music therapy toward anxiety decrease.

Emphasis on scientific approach has become a key to develop and apply traditional music therapy to overcome anxiety. Nurses should pay attention to anxiety and provide comprehensive nursing care. Nurses should not only focus on physical problems and ignore anxiety. This study implies on the process of nursing care and becomes foundation for anxiety management in health services. Nurses can use traditional music therapy to reduce anxiety because music is medicine to patients and it has no harmful side effects.

This study has a limitation that is the researcher does not have data about the use of sedation.

**Conclusion**

Gong waning music therapy can help decrease ACS patients' anxiety. This research supports the application of music therapy in overcoming anxiety. Nurses should not only focus on physical problems and ignore anxiety. It is hoped that nurses can use music

therapy as a non-pharmacological adjunct therapy to help reduce anxiety of ACS patients.

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# Factors Related to the Low Nutritional Status among Tuberculosis Patients

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## Abstract

Tuberculosis and malnutrition are serious problems. Tuberculosis causes malnutrition that potentially lessen patients' immunity and increase the risk for activating tuberculosis. The purpose of this study was to identify the factors related to the low nutritional status among tuberculosis patients in Malang City. This research applied a corelational study. The subjects involved were tuberculosis patients with BMI<18.5. Chi-square and Fisher Exact Test were used to analyse the identified factors. Moreover, binary logistic regression to identify factors related to the low nutritional status among tuberculosis patients in Malang City. This study found almost half of participants (46.8%) had poor family knowledge about dietary TB patients. More than half of the participant's culture (62.5%) was abstinence. A more than half of participant (59.6%) had Moderate malnutritions. There was no significant correlation between low nutritional satus and variable of gender p=1.000, education p=0.404, family knowledge p=0.767, and culture p=0.310. The significant correlation was occupational status with p=0.043. The binary logistic regression showed that tuberculosis patient with unoccupied are 1.286 times more likely to have a low nutritional status. Occupational status was the one factor that significantly related to the low nutritional status among TB patients in Malang City.

**Keywords:** Nutritional status, relating factor, tuberculosis.

## Introduction

The prevalence of pulmonary TB based on the Doctor's Diagnosis History in East java and Malang, East Java is 2,161 and 98,566 cases, respectively (Riskesdas, 2018). Pulmonary TB disease suffered by individuals results both physically, mentally, and social life. Physically, if a person with pulmonary TB does not receive treatment, after 5 years the patient will die (50%), will heal themselves with good immune system (25%), and will become a chronic case (25%). Physical is not good will make someone lose the opportunity to actualize themselves due to physical limitations possessed. These limitations will hamper disrupting physical well-being, which in turn will have an impact on low quality of life (Kusnanto, Pradani, & Karima, 2016).

The relationship between TB and malnutrition has long been known. TB worsen malnutrition that then weakens immunity and increase the risk for activating latent TB. A previous study found that a majority of patients had chronic and severe undernutrition which persisted even after successful treatment. These findings indicate the important of nutritional support during treatment of pulmonary TB (Bhargava et al., 2013). A study reported that TB incidence among respondent with BMI <18.5 was approximately 3% of the population or 260.2 per 100,000 person-years equal to11.7-fold higher than that among participants with normal BMI (Cegielski, Arab, & Huntley, 2012).

A study reported that majority of the tuberculosis patient with active tuberculoasis had low nutritional status, which IMT score <18,5. This situation affects the nutritional status of a person which affects the body's endurance (Lazulfa et al., 2016). Most individuals with active tuberculosis experience weight loss and some of them showed signs of vitamin and mineral deficiency at diagnosis. Weight loss among patients with TB can be caused by several factors, including reduced food intake due to loss of appetite, nausea, and abdominal pain; loss of nutrition due to vomiting and diarrhea and metabolic changes due to disease. Low body mass index (BMI) (below 18.5 kg/m2) and lack of weight gain with TB treatment are associated with an increased risk of death and relapse of TB and can be indicator of TB severity, poor treatment response and/or presence other comorbid conditions (WHOa, 2013).

According to the Depkes (2011), about 75% of patients with pulmonary TB mostly come from economically productive age group (15-50 years). It is estimated that an adult pulmonary TB patient, will lose an average working time of up to 3 to 4 months. This results in a loss of annual household income of around 20-30%. This can decrease the consumption of quality food (Kusnanto et al., 2016). Another study by Noviyani et al. (2015), work activities carried out development of social relationships that will improve one's knowledge compared to people who do not work, so that information related to good nutrition among people with tuberculosis will be more updated.

There were numerous factors influence the low level of nutrition. A previous study (Gurung et al., 2018) reported that working conditions and food intake frequency were significantly associated with calorie intake in TB patients. It also found that the amount of calories, food frequency per day, types of TB, and nutritional status during registration were significantly associated with recent nutritional status among TB patients.

According to Dodor's (2008), nutritional status is significantly associated with marital status, income per month, education level, trust to avoid certain types of food and close family size at the time of starting TB treatment. Two months after starting treatment, changes in BMI were significantly associated with age groups, marital status, employment status, level of education and beliefs to avoid certain types of food. In addition, the success of patients suffering from active phase pulmonary TB to be able to maintain good nutritional status cannot be separated from the support of family's roles. In general, participants said that it was their family (wife/husband, parents and children) who often kept on endlessly to motivate participants to always maintain good health. The family performs health care functions ranging from routinely delivering control, reminding taking medication, to motivation to eat while providing healthy food for

participants (Masruroh, Kurnia, & Melizza, 2019).

Indonesia, which consists of various tribes and cultures, has diverse socio-cultural conditions. Socio-cultural which is a human-human relationship, is often influenced by myths, norms, values, beliefs, habits related to cultural patterns and is the effect of various accesses, which can be in the form of access to food, access to information and access to services and capital owned (Kasmini, 2012). Furthermore, according to Leininger (2002) reported that transcultural nursing refers to culture related to healthcare delivery that can affect disease management and the status of individuals' health and well-being. Transcultural nursing have improved nursing care to diverse populations by providing a means to overcome difficulties and challenges when facing with culturally diverse patients. Furthermore, in this study will exemine culture as a factor that rlated to the low nutritional status (Albougami, Pounds, & Alotaibi, 2016).

This study aims to determine factors related to the low nutritional status of tuberculosis patients. Those factors consist of gender, occupational status, family knowledge, and culture. The finding factors can lead to apply properly treatment for tuberculosis patient with low nutritional status.

## Method

This study was used a corelational study with cross-sectional design. Purposive sampling was applied using some inclusion criteria namely had low nutronal status (BMI<18.5), active tuberculosis, able to communicate, and agree to be a respondent. There were 47 TB patients and their family who met the criteria out of 63 TB patients in Kedungkandang and Ciptomulyo public health centers.

The data were collected by using questionnaire and physical examination. The questionnaire contains of patient's characteristics, family knowledge, culture, and occupational status. Patient's characteristics included age, gender, educational level, and occupational status status. Family knowledge questionnaire was developped by Melizza (2018), consisted of 'right' and 'wrong' questions (right answer = 1 & wrong answer = 0) and included 15 items. The realibity of the family knowledge questionnaire was $\alpha= 0.928$. Meanwhile culture questionnaire consist of 'yes' and 'no' questions (yes = 1 and no = 0) and included 3 items. The realibity of the culture questionnaire was $\alpha= 0.605$. The total score of each questionnaire was categorized poor = $\leq 55\%$, sufficient = 56–75%, and good = 76–100%. Correspondence's body weight also must be scaled, as well as their height. Severe malnutrition was categorized as BMI <16 kg/m2, moderate malnutrition as BMI 16–18.4.

The study was obtained permission from the participant before collected the data. The study was conducted in august 2018 with ethical permission from the Ethical Review Board (ERB) committee of University of Muhammadiyah Malang (ERB No.E.5.a/259/KEPK-UMM/VIII/2018).

## Data Analysis

The descriptive data analysis applied to analyse patients' characteristics namely age, gender, education, occupational status, and nutritional status. The analysis applied Chi-square and Fisher Exac Test because of the data was not normally distributed. The correlation between age, gender, education, culture occupational status, family knowledge and low nutritional status were analized using Fisher Exact Test because of the expected count more than 25% . While to identify the most significant factor that related to the low nutritional status among tuberculosis patients in Malang City used binary logistic regression due to the data was not normally distributed.

## Results

Demography Data

**Table 1 Demography Data of Participants**

| Demography Data | Number | Frequency |
|---|---|---|
| Age (46 ± 11.64) | - | - |

| | | |
|---|---|---|
| Gender | | |
| a. Male | 12 persons | 25.5% |
| b. Female | 35 persons | 74.5% |
| Education | | |
| a. Not taking formal education | 1 person | 2.1% |
| b. Elementary School | 16 persons | 34.0% |
| c. Junior High School | 15 persons | 31.9% |
| d. Senior High School | 13 persons | 27.7% |
| e. Undergraduate | 2 persons | 4.3% |
| Occupational status status | | |
| a. Employed | 26 persons | 55.3% |
| b.Unemployed | 21 persons | 44.7% |
| Family Knowledge | | |
| a. Good | 25 persons | 53.2% |
| b. Poor | 22 persons | 46.8% |
| Culture | | |
| a. Abstinence | 35 persons | 62.5% |
| b. Non-Abstinence | 12 persons | 37.5% |
| Low Nutritional Status | | |
| Moderate Malnutritions | 28 persons | 59.6% |
| Severe Malnutritions | 19 persons | 40.4% |

**Table 2 Crosstabulation between Independent Variables and Low Nutritional Status among TB Patients.**

| Independent Variables | Low Nutritional Status | | P |
|---|---|---|---|
| | **Severe malnutrition** | **Moderate malnutrition** | |
| Gender[1] | | | |
| Men | 5 (26.3%) | 7 (25%) | 1.000 |
| Women | 14 (73.7%) | 21 (75%) | |
| Education[1] | | | |
| No education | 1 (5.3%) | 0 (0%) | 0.404 |
| Formal education | 18 (94.7%) | 28 (100%) | |
| Occupational status[2] | | | |
| Employed | 7 (36.8%) | 19 (67.9%) | 0.043* |
| Unemployed | 12 (63.2%) | 9 (32.1%) | |
| Family Knowledge[2] | | | |
| Good | 11 (57.9%) | 14 (50%) | 0.767 |
| Poor | 8 (42.1%) | 14 (50%) | |
| Culture[1] | | | |
| Abstinence | 16 (84.2%) | 3 (15.8%) | 0.310 |
| Non- Abstinence | 19 (67.9%) | 9 (32.1%) | |

Note: [1]Fisher Exac Test; ([2]) = Chi-square

*Correlation is significant at the .05 level (2-tailed)

**Table 3 Determinant of the Low Nutritional Status among Tuberculosis Patients**

| Variable | B | Sig. |
|---|---|---|
| Ocupational status | 1.286 | 0.039* |

*Correlation is significant at the .05 level (2-tailed)

Table 1 showed that most of the participants (74.5%) were women. Approximately, 35% participants had elementary school for educational level. More than half of the participants (55.3%) had employed, had good family knowledge about dietary TB patients (54.8%), abstinence culture (62.5%), and (59.6%) Moderate malnutritions.

Table 2 showed that participants who suffered the most of moderate malnutritions (75%) and severe malnutritions (73%) were woman. The most of partisipant that have low nutritional status in category of moderate malnutritions are educated participants (100%). The majority of participants who worked experienced moderate malnutritions (67.9%), while respondents who did not work mostly experienced severe malnutritions (63.2%). Eleven people have good knowledge, the percentage of participants who experience severe malnutritions is quite high at 57.9%. Furthermore, 84.2% of participants who abstained from certain foods experienced low nutritional status in the severe category. Among identified factors, only occupational status that significantly correlated to low nutitional status among TB patients (p <.05).

Table 3 showed that tuberculosis patient with no occupational status are 1.286 times more likely to have a low nutritional status.

## Discussion

The results also showed that gender was not associated with low nutritional status in patients with tuberculosis. This is supported by research conducted by Hoyt et al. (2019) which explained that gender is not related wth nutritional status among people with tuberculosis. Another reason is also mentioned because biological factors, namely women have a greater ability to adapt to starving (Bharvaga et al., 2013).

In addition, education is also not related to the low nutritional status of patients with tuberculosis. The statement is not in accordance with the research of Widianti (2007) in Putri, Harmayetty, & Utomo (2016) which stated that through knowledge obtained during formal education, people with highly educated will have broader knowledge than those with low education, in this case regarding health knowledge. Nevertheless, education can also be connected to age and knowledge. Since, based on the demographic data, approximately 35% of participant had elementary school of educational level. This finding in line with a previous study by Hoyt et al. (2019) that reported years of education did not differ significantly between subjects with severe malnutrition, moderate malnutrition and normal BMI among people with Tuberculosis.

Another research finding stated that family knowledge is not related to low nutritional status of patients with tuberculosis. As explained above, the knowledge level not only corresponds with formal education but also age and social interaction. The results of the research showed that even the family have good knowledge about tuberculosis, approximately 60% of the participant had severe malnutrition. This condition might be occurred due to information accessibility is not spread well among family member. However, the spread of information will increase individual knowledge and understanding regarding disease information (Driscoll et al., 2009 in Mohammadpour et al., 2015). Essentially, knowledge also can be influenced by people interaction. It helps an individual to develop the knowledge and hopefully, an individual will treat himself well (Mohammadpour et al., 2015).

Culture does not influence low nutritional status in TB patients. It is related to abstinence of consuming certain foods. According to Dodor (2008), belief to a certain food can affect nutritional status in

TB patients. Shivalli et al. (2015) revealed that culture is responsible for the occurrence of the disease. Nutritional treatment of TB can be solved by identifying and preventing the cause of poor nutrition through education, counseling, and dietary habit. In a severe case, nutritional treatment aims at reducing death risk and rehabilitation period (WHOb, 2013). Somehow, several foods should be avoided due to cough stimulus can distract the respiratory system of TB patients.

Furthermore, the results indicated that occupational status relates to low nutritional status in TB patients. Tuberculosis patient with unemployed are 1.286 times more likely to have a low nutritional status. This result might be caused by the activity will led them to improve their intake nutrition. The percentage stated that working and not working patients are not deeply different. It is in accordance with Dodor (2008), nutritional status is related to marriage status, monthly income, and avoiding certain foods. Occupational status surely affects individual income. Winetsky et al. (2014) explained that low access to nutrition corresponds with the low economy condition, difficulty in obtaining nutritional food, and a geographical factor which affect the occurrence of TB.

## Conclusion

There are numerous factors that influence nutritional status, such as age, gender, education, occupational status, family knowledge, and culture. However, the most dominant factor is occupational status. Tuberculosis patient with unemployed are 1.286 times more likely to have a low nutritional status. The occupational status is highly related to nutrition intake and family attention to treat TB patients.

**Conflict of interest**
There was no conflict of interest declare in this study.

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World Health Organization (WHO). (2013b). *Guideline: nutritional care and support for patients with tuberculosis*. Geneva: WHO.

# Comparison of Four-Level Modification Triage with Five Level Emergency Severity Index (ESI) Triage Based on Level of Accuracy and Time Triase

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## Abstract

The triage system currently recommended by the Association of Emergency Physicians (ACEP) and Emergency Nurses Association (ENA) is a five levels triage, Emergency Severity Index (ESI) due to more structured, concise, and clear. Cibabat Hospital used a relatively new triage of four modified levels of the Australian Triage Scale (ATS) which accuracy and time triage have not been evaluated. The purpose of this study was to compare the four level triage of modification of ATS and five levels of ESI triage based on accuracy and time triage. The researcher used a quantitative quasi-experimental design with samples of triage activities totaling 38 in the control group and 38 intervention groups, using accidental sampling techniques. Univariate analysis consisted of frequency distribution for nurse characteristics, time triage and accuracy, bivariate analysis used the Mann-Whitney test. The results showed there were no differences, triage modification of ATS with ESI triage in accuracy (p-0.488), and length of triage (p-0.488) ESI triage accuracy was in the expected triage category (76.3%), under triage (13.2%), and over triage (10.5%). Triage modified ATS, expected triage (73.7%), under triage (18.4%), and over triage (7.9%). ESI triage has more expected and less under triage than ATS modification triage. Under triage caused prolong waiting times, unexpected risks, increases morbidity and mortality. Based on the length of time, ESI triage averaged 167 seconds, triage modification of ATS an average of 183 seconds. ESI flowchrat is easier to understand because is simple, has slight indicators in each category. Conclusion of this study is there is no significant difference in the level of accuracy and duration of triage. However, based on data distribution, ESI triage gives more expected triage decisions, less under triage and 16 seconds faster. Suggestions given to the Cibabat Hospital, can use ESI triage as an alternative triage assessment option because easy to use, structured, simple, and clear.

**Keywords:** Accuracy, Australian Triage Scale (ATS), Emergency Severity Index (ESI) Time Triage, triage.

## Introduction

Emergency department (ED) is one of the most vital service units in saving the lives of patients who get emergencies situation. Nurses are health workers with the biggest and holding presentation an important role in service delivery health. Nurse in ED often exposed to various sources of danger can threaten his life and health. Nurses can also get an accidents due to having to provide fast and accurate when they do triage assessment (Ramdan & Rahman, 2017). Triage is an important component of ED in the management of these emergency patients. Triage is defined as the process of evaluating patients to prioritize administration of care based on the urgency of existing clinical conditions (FitzGerald, Jelinek, Scott, & Gerdtz, 2009). Accuracy in determining triage criteria can improve the flow of patients who come to the emergency department, maintain unit resources so that they can focus on handling truly critical cases, and transfer non-emergency cases to appropriate health facilities. Triage decisions will place patients on a triage scale. Three types of decision of triage are expected triage, over triage, and under triage. Inappropriate triage decisions will threaten patient safety, increase mortality and morbidity inappropriate use of resources. Patients with over triage make the patient in the room that is not right and under triage makes the patient seriously wait longer (Considine, Ung, & Thomas, 2001). Wait longer made length of stay in Emergency departement increase. Lengthening the period of hospitalization will also add to the activities and workload of nurses (Nurmansyah, Susilaningsih, & Setiawan, 2014; Ardiyani, 2015). Although the workload does not have an impact on job satisfaction, it must still be adjusted the workload in order to improve service quality to the patients (Safdar, Susilaningsih, & Kurniawan, 2019).

Another important thing in triage is time triage. Time is considered an important tool for measuring the quality of services at the ED (Bukhari et al., 2014). According to Khankeh, Zavareh, Naghdloo, Hoseini, and Rahgozar in 2013 stated that triage can significantly reduce the waiting time interval for patients entering the ED to receive treatment services and increase patient satisfaction. Another study conducted by Levsky, Young, Masullo, Miller, and Herold in 2008 reinforced the results of the Khankeh study, which explained that the implementation of the use of triage and treatment programs in community hospitals was closely related to reducing patient waiting time. The duration of triage is the time used by nurses in conducting triage studies.

The triage system used by emergency departments in world has many variety. Starting from two levels, three levels, four levels up to five levels triage. The triage system that is currently being developed is a five-level triage. Some triage five levels are Emergency Severity Index (ESI), Canadian Triage Acuity Scale (CTAS), Manchester Triage Scale (MTS), and Australian Triage Scale (ATS) (Gilboy, Tanabe, Travers, & Rosenau, 2011). ESI is the most superior triage than the others. ESI is easier to use, reduces subjectivity in determining triage decisions, more accurate, can predict resources who needed by patients and has a good of validity and reliability (Elshove-Bolk, Mencl, Rijswijck, Simons, & Vugt, 2007; Christ, Grossmann, Winter, Bingisser, & Platz, 2010; Mace & Mayer, 2008; Golzari, Soleimanpour, Raoufi, Salarilak, Sabahi, Nouri, & Heshmat, 2014).

The triage system in Indonesia has not been standardized so that its use in various regions varies greatly. In several major hospitals in Indonesia which adopted the ATS triage, Cipto Mangunkusumo Hospital in Jakarta used ATS modification which shortened to 3 levels. Karyadi Semarang Hospital also modifies ATS to 3 levels based on color categories (red, yellow, and green). Hasan Sadikin Hospital Bandung modifies ATS into 3 categories, mild, moderate, and severe. The same thing was done by Cibabat Hospital which adopted ATS but they shortened into 4 levels.

The application of this triage system is still relatively new because it was first used at the end of November 2016, where previously there was only a primary and secondary triage

at emegency departemen in Cibabat Hospital, so it was not known what patients were included in the emergency category. This caused a classification error where the patient who is in the false emergency enters a true emergency patient. According to the Cibabat Hospital annual report data in 2015 it was found that false emergencies were 54% while true emergencies were only 46% (RSUD Cibabat Cimahi, 2015). So, its needed to decrease the number of false emergencies by using new triage which reduces subjectivity in determining triage decisions. ESI is of choices system triage which easy to use and more accurate.

**Method**

The design of this study is quantitative research with a quasi experimental approach. This researched setting in Emergency Unit Cibabat Hospital. The Data was collected in Oktober 2017. Sample of this research was 38 triage activity from 15 nurses who accepted to join in this study. It used comparatif numeric unpaired with $Z\alpha = 1.96$ and $Z\beta = 1.28$ (Dahlan, 2013). There were two groups, the control group was patients with assessment used four levels of ATS modification triage while the intervention group was used the five-level ESI triage method. The study sample was a triage activity of 38 triage studies conducted by 15 nurses. The research instrument used the observation format of level accuracy and time triage of ATS modification triage and ESI triage format. Univariate analysis consisted of frequency distribution for nurse characteristics, time triage and accuracy, bivariate analysis used the Mann-Whitney test. ESI has a good validity 0,68 (Christ, Grossmann, Winter, Bingisser, & Platz, 2010). This study was approved by the ethics committee of medical faculty of Padjadjaran University in October 2017. Informed consent was given to triage nurses regarding the title, purposes, and advantages of the study.

The level of accuracy was done by collected data twice. First, the nurses used a triage of four levels of ATS modification in 38 patients. Second, the same nurses carried out triage used five levels of ESI triage and triage four levels of ATS modification in

**Table 1 Level of Accuracy of the Triage Method Four Levels of ATS Modification and Five-Level ESI Triase Method**

| Triage | Expected Triage | | Over Triage | | Under Triage | | (%) |
|---|---|---|---|---|---|---|---|
| | (f) | (%) | (f) | (%) | (f) | (%) | |
| ATS modification | 28 | 73.7 | 3 | 7.9 | 7 | 18.4 | 100 |
| ESI | 29 | 76.3 | 5 | 10.5 | 4 | 13.2 | 100 |

**Table 2 Mann-Whitney Test Difference Test Accuracy Levels**

| Triage | n | Mean Rank | Sum of Ranks | Z | p-value |
|---|---|---|---|---|---|
| ATS modification | 38 | 37.17 | 1412.50 | -693 | 0.488 |
| ESI | 38 | 39.83 | 1513.50 | | |

**Table 3 Time Triage Overview using the Four Levels of ATS Modification and Five-Level ESI Triage Method**

| Triage | n | Mean | Categories | Std Deviation | Min | Max |
|---|---|---|---|---|---|---|
| ATS modification | 38 | 183 seconds (3 minute 3 seconds) | standard | 54.22909 | 75.00 | 290.00 |
| ESI | 38 | 167 seconds (2 minute 47 seconds) | standard | 48.48889 | 72.00 | 260.00 |

**Table 4 Time Triage Test Mann-Whitney Test**

| Triase | n | Mean rank | Sum of Ranks | Z | P-value |
|---|---|---|---|---|---|
| Teriase modifikasi ATS | 38 | 41.54 | 1578.50 | -1.200 | 0.230 |
| Triase ESI | 38 | 35.46 | 1347.50 | | |

38 other patients. Each triage assessment conducted by nurses is also accompanied by an assessment by Gold Standard. All result by nurses compared with result from Gold Standar. There were three results of accuracy triage, Over triage, Expected triage, and Under triage. In time triage, a triage assessment by nurses was conducted twice used triage four levels of modification of ATS and triage of five levels of ESI in the same patient. The two triage system was compared how long it would taken.

## Results

Based on the table above it is known that ESI triage compared to the triage of four ATS modification levels is given more expected than overtriage and undertriage categories.

Based on table 2 above it is known that the value of p-value > alpha or 0.488 > 0.05 it showed that the accuracy of triage four levels of ATS modification used by the Cibabat Hospital with ESI triage is not significantly different.

Based on table 4, it is known that the average time triage used four modification levels of ATS is 183 seconds or 3 minutes 3 seconds. In triage of five ESI levels the average time triage was 167 seconds or 2 minutes 47 seconds. So, ESI faster than ATS modification.

Based on table 4 above, it is known that the value of p-value > alpha is 0.230 > 0.05 thus the time triage used four levels of ATS modification with ESI triage duration is not significantly different.

## Discussion

Based on the results of the study, it is known that there was no significant difference indicated by the use of four levels of ATS modification triage with five levels of ESI triage both in terms of accuracy and length of triage. Statistically, the two results showed there is no difference, but from the distribution of data there is a difference 16 seconds from the two triages where the ESI average is 16 seconds faster than four ATS modification triage. ESI triage on average takes 2 minutes 27 seconds while triage four modification levels of ATS for 3 minutes 3 seconds. The fastest time needed for ESI in 72 seconds and the longest takes 4 minutes 20 seconds. In triage four modification levels of ATS the fastest time used is 75 seconds and a maximum of 4 minutes 50 seconds. The fastest time difference is only 3 seconds and the longest difference is 30 seconds. From the minimum and maximum time in both triages there is a considerable distance. This is due to the variety of cases of patients with different severity.

Based on the difference in time in the triage period above, it is known that the use of ESI triage is faster than the triage of four levels of ATS modification. Although only slightly different, we must know that triage time is an important element of triage use. When it becomes one of the important factors in making the right decision for triage, the information needed must be collected quickly and decision-making must be done on time (Dadashzadeh, Abdolahzadeh, Rahmani, & Ghojazadeh, 2013).

If we faster to take triage time, so the patient will be soon transferred from triage room to emergency room. The use of shorter triage will reduce patient waiting time for treatment and this will increase patient satisfaction during the ED (Khankeh, Zavareh, Naghdloo, Hoseini, & Rahgozar, 2007). According to Villa, Weber, Polevoi, Fee, Maruoka, and Quon in 2018, based on the results of their research, it is known that the reduction in the length of triage can be done by implementing ESI triage in the ED. The reduction in time was mainly due to nurse intervention focused only on the questions posed by ESI without being accompanied by patient administrative data. The fast triage time will have a positive impact on the quality of care in the hospital

emergency departement. Besides being fast, ESI triage also has other advantages, including simple, easy to understand, and easy to apply. According to Elshove-Bolk, Mencl, Rijswijck, Simons, and Vugt in 2007, the nurses stated that ESI was easier to use, reduced subjectivity in determining triage decisions and was more accurate than other triage systems. This was also confirmed by statements from several emergency nurses in Cibabat Hospital using ESI triage. They stated that ESI was very simple, there were not many indicator points or signs and symptoms in each category, the flow of sorting was also easy to understand. But sometimes it is rather confused when determining the resources according to patient needs.

As we know the philosophy of triage prioritizes are accuracy, and fast. When viewed from accuracy, both triage four levels of modification of ATS and ESI triage were not significantly different. This shows that both triages are equally accurate to use. But we need to examine it more deeply based on the results of triage decisions that are obtained whether over trage, ecpexted triage, and under triage. These three decisions provide a clearer picture of the results of the accuracy of the triage assessment. In under triage and expected triage categories, ESI triage is better than the triage of four ATS modification levels.

Over triage is the result of a triage assessment decision where the patient receives a triage code that is higher than the actual level of urgency. Over triage in ESI triage is 10.5% while in triage four modification levels are 7.9%. There was a difference of 3.4% between the two triages where ESI triage has a good contributed than the triage of four ATS modification levels. Overtriage decisions can result in short waiting times for medical intervention. However, it will have a negative impact on other patients who are waiting at the ED because they have waiting time longer. Significantly, the overtriage decision does not have consequences for the patients, instead patients will benefit from being given action first by health worker compared to other patients who are at the lower levels. Overtriage does not have a direct effect, but an Overtriage can interfere with the provision of health services and provide risks to other patients (Ekin & Mophet, 2015; Hinson et al., 2018).

Expected triage is the result of a triage assessment according to a triage decision where the patient receives a triage code that suitabel with level of urgency of the patient. The expected triage decision on ESI triage is 76.3 while the triage of four ATS modification levels is 73.7 with a difference of both at 3.4%. This shows that ESI triage gives more appropriate triage decisions compared to triage four levels of ATS modification. This decision can optimize the time for patient medical intervention and reduce adverse risks. This decision is expected to be carried out by triage nurses while carrying out their duties. The right decision will provide the right rescue action.

In under triage category, ESI triage was a smaller percentage of 13.2% compared to triage four ATS modification rates of 18.4% so that the difference obtained was 5.2%. Under triage is the result of a triage decision where the patient receives a lower triage code than the actual one. This decision has the potential to produce prolonged waiting times for medical intervention and risk of poor outcomes. Under triage is a medical error that can increase the number of mordibitas and mortality. Patients who are supposed to get treatment first are not prioritized so that the patient's life cannot be immediately give treatment. Under triage also directly impacts patient safety due to long waiting times (Ekin & Mophet, 2015). Patients will be more need a long time to get the medical treatment. Of course this will greatly endanger the lives of patients, especially if the patient's level of emergency is in level one . Because the triage nurse provides a level below the patient does not receive priority treatment by health workers.

Accurate and fast triage decisions have a significant impact on patient management. Accuracy triage decision making is the based for determining priorities to provide emergency care so that it has a positive impact on patient care outcomes (Dadashzadeh, Abdolahzadeh, Rahmani, & Ghojazadeh, 2013). The accuracy of the use of triage can not be separated from the ability to decide the patient's emergency. According to Smith and Cone 2010, triage decision making is

based on critical thinking, intuition, and experience. Experience has a tremendous impact on decision making. Autonomy, satisfaction, frustration, and feelings of uncertainty are some of the experiences in triage decision making. Nurses who have more years of experience as triage nurses will increase consistency in decision making. The same thing was stated by Dadashzadeh, Abdolahzadeh, Rahmani, and Ghojazadeh in 2013, that the more experience a nurse has, the more consistent in making decisions. Besides experience, intuition has an important role in triage decisions. Interventions according to decision-making chosen through intuition that is owned by nurses will make it more consistent in carrying out all their duties and responsibilities (Smith & Cone, 2010).

## Conclusion

Based on the results of this study, there was no significant difference used triage of four levels of modification of ATS and triage of five levels of ESI in accuracy and time triage. However, based on the distribution of data it can be concluded that the level of accuracy in the ESI triage results in a greater expected triage and a smaller under triage than a triage of four levels of ATS modification. Under triage causes long waiting times, unexpected risks, increases morbidity and mortality. The length of time required by the two triages were not exceed the standards time by the Ministry of Health (≤5 minutes) (Departemen Kesehatan RI, 2011). ESI is easy to used because the flow is concise, clear, and structured as well as simple in making decisions in each indicator of existing categories. However, nurses at the Cibabat Hospital are sometimes confused in determining the amount of health workforce resources needed by patients.

Based on the results of the study stated that there is a tendency to use five levels of ESI triage. However, because the results obtained were not significantly different, the hospital could use a triage of four levels of ATS modification or a five-level triage of ESI. ESI Triage can be an alternative choice for using triage studies because it is applicatively easier to understand, faster, and accurate.

The results of this study can be used as further research related to the use of the five level ESI triage method in Emergency Services with several hospitals with the same criteria (multy center) so that more varied types of patient cases are obtained, nurse skills are more varied, and the number of patients is more many.

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# Demonstration and Audio-Visual Methods for Improving Knowledge, Attitude and Skills of Breast Care among Pregnant Women

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**Abstract**

One of the physical changes during pregnancy is their breasts that usually get larger and heavier, the areola mammae becomes darker and the nipples get bigger. These conditions cause the breasts need to be treated in preparation for exclusive breastfeeding. However, in reality, there are many pregnant women who have not done much breast care due to their ignorance of its importance and lack of information. The aimed this study was to identify the effective of audio-visual and demonstration method for improving knowledge, attitude, and skills of breast care among pregnant women in Aceh. This study was used a pre-test post-test design with a control group (37 of pregnant women) and intervention group (36 of pregnant women). The intervention group was given health education about breast care using demonstration method, while the control group was given by watching videos. The instruments used in this study was a questionnaire about breast care and checklist to assess breast care skill. The instruments was developed based on the existing theory. Data was analyzed using t-independent test ($p<0.05$). There were significantly difference of knowledge ($72.83 + 8.48$ vs. $45.43 + 12.06$), attitudes ($58.76 + 6.20$ vs. $46.83 + 4.58$), and skill ($73.74 + 7.98$ vs. $56.17 + 10.62$) of breast care between intervention and control group among pregnants women ($P<0.001$). Furthermore, the scores of knowledge, attitudes, and skills of breast care among pregnant women using demonstration (intervention groups) method were more higher compared pregnant women using audio-visual method (control groups). Health education using demonstration method is more effective for improving knowledge, attitudes, and skills of breast care among pregnant women than audio visual method. Therefore, demonstrations and re-demonstration using guideline should be implement for women with guidance during pregnant.

**Keywords**: Audio-visual, breast, care, demonstration, education, health, videos, watching.

## Introduction

Pregnancy causes a pregnant woman to experience hormonal changes in her body, causing various physiological and psychological changes. One of the changes occurs in the breast. Changes in the breast have started since the fourth week of pregnancy. These changes occur due to the increased blood flow to the breast area. Some breast changes that occur are tingling, pain, or become more sensitive, especially in the nipple area. The nipples also become bigger, more upright and the areola becomes darker. In addition, the formation of glands and the development of milk ducts for milk production. This makes the breast size also becomes larger. These transformations develop together with the increase of the gestational age, as in the third trimester the breasts are getting bigger and sometimes there is even a fluid discharge (Fauziah & Sutejo, 2017; Deswani dkk., 2019).

Breast changes during pregnancy can certainly cause discomfort and sometimes even pain in the breast. Therefore, it is necessary to do breast care. Breast care during pregnancy is very important to increase milk production which will be the sole source of nutrients for babies. Breast care should be done when the gestational age has entered the second trimester, or when the gestational age reaches 5 to 6 months (Fauziah & Sutejo, 2017; Hamilton, 2010).

Breast care during pregnancy is an important thing to do as the preparation for breastfeeding after the baby is born. Breasts need to be prepared since pregnancy so that they can provide and deliver the milk needed by the newborns baby. Breast care also highly contributes to the success of early and exclusive breastfeeding (Deswani dkk., 2019; Hamilton, 2010).

Breast care during pregnancy can provide many benefits. For instance, the breast hygiene will be maintained, especially in the nipple and areola areas which are getting darker during pregnancy, also flexing and strengthening the nipples so that it will be easier for babies in breastfeeding. Breast care also stimulates the mammary glands so that the milk production is well and smooth. Additionally, it can detect early breast abnormalities and also prepare the mother mentally for breastfeeding (Adam et al., 2016; Bobak, 2012).

A research conducted by Adam et al. (2016) showed a significant relationship between breast care during pregnancy and exclusive breastfeeding. Out of 44 women who paid attention to breast care during pregnancy, 30 of them gave exclusive breastfeeding. The same study was done by Al Hadar and Umaternate (2016), and found that there was a significant relationship between breast care during pregnancy and exclusive breastfeeding.

In fact, currently, there are many pregnant women who do not pay attention to breast care during pregnancy. This is caused by their ignorance on how to take care of their breasts. The results or risks that can arise from not doing breast care are shrunken nipples, low milk production or no produced milk, breast infection and various other disorders (Jamaan, 2018). To prevent these, it is necessary to do health education regarding breast care for pregnant women.

Health education can be form a good behaviour, that was caused health education is one of way to gain the knowledge, attitude and skill. The research result by Purnamasari, et. al (2011) about health education by sms center pregnancy to knowledge abaout maternal and child health in Bandung, shown a significant difference (p=0.000) between the knowledge before and after the pregnancy center of SMS. The other, if the people had a knowledge, that make them to compliance to do something. The study by Naim (2017) about effect of family-based education towards pregnant women intension for nutrision optimalize at 1000 first day of life, shown that there was a significant effect between the family-based education towards pregnant women intention to optimize the nutrition of 1000 first days of life (p = 0.00). The results of studies shown that the health education can make the positive behaviour.

Various methods of health education about breast care during pregnancy can be done. Edgar Dale said that providing direct experience during learning is a real practice and making it easier to understand what is being taught. Likewise, if health education about breast care is carried out by demonstration for pregnant women, they

will understand easily and will be able to do it directly. Also, if health education is given using videos, the information about breast care will also be accepted easier and is more effective than using text and images. The reason is that with the videos, people will use both their sense of sight and sense of hearing in receiving the information (Nugraha, 2019).

Research by Wulandari (2017) about the relationship between the level of knowledge of pregnant women and their attitude towards breast care revealed that as many as 47% of respondents had a proficient knowledge and 53% of respondents were lack of knowledge. Regarding the mother's attitude towards breast care, it was found that 58% had negative attitude and 42% had positive attitude. Statistical test results also stated that there was a relationship between knowledge and the mothers' attitude in doing breast care during pregnancy.

The discussions that were previously mentioned clearly explain the importance of breast care that must be done by pregnant women to prepare for the breastfeeding process. However, in fact, there are many pregnant women who have not done so because of their ignorance. To overcome this problem, various methods of health education can be done to increase the knowledge, skills and attitudes of mothers regarding the breast care, including the methods of demonstration and watching videos on how to do breast care. In earlier study researcher didn't found the specific study about demonstration and watching video methods to gain the knowledge, skills and attitudes of pregnant women, but the study more explained about the breast feeding and the other health education for health during pregnancy. So, this study wants to figure out which health education method is the most effective between demonstration or watching video methods to forming behaviour about breast care in pregnant women.

This research is expected to make a positive contribution to pregnant women in the form of knowledge development about breast care so that they can have a healthy pregnancy. In addition, it is also an input for health workers to design effective learning method(s) in providing health education to pregnant women about breast care. Therefore,

the aimed this study want to the effective of audio-visual and demonstration method for improving knowledge, attitude, and skills of breast care among pregnant women in Aceh.

## Method

This study used a pre-test post-test design with control group. The treatment group received an intervention of health education about breast care by demonstration technique. Meanwhile, health education about breast care for the control group was given through watching videos. Sampling was done by purposive sampling technique with criterions the pregnant women in second or third semester of pregnant at public health center, with a total sample of 73 participants. The sample of the intervention group was 37 participants, and the control group was 36 participants.

The study was conducted in the working area of the public health centre in Aceh. The duration of the research process was 3 months. Pre data collection was done for one day in each group while post data collection was done one week after the health education process had been carried out.

The study was conducted by distributing samples into two groups randomly using paper rolls. The respondents who picked up a paper roll labeled with letter P, they would be included in the treatment group. If their paper roll was labeled with letter K, they should be in the control group. After the distribution of respondents, the study started with the control group by providing them with health education about breast care through watching videos.

Previously, the writer measured the respondents' knowledge, attitudes and skills, then measured them again a week after the health education. In the second week, the treatment was carried out for the intervention group in the form of health education about breast care using demonstration method. The writer also measured the respondents' knowledge, attitudes and skills before treatment and measured it again one week after the treatment. In collecting the data, the writer used a questionnaire about knowledge, attitudes and skills in pregnant women. The

data then being processed and analyzed using the univariate analysis to calculate the frequency distribution and using bivariate analysis for value differences. The pre-and post-test values were tested using paired t test and the differences between the intervention

and control groups were checked by using unpaired t test.

## Results

**Table 1 Distribution Frequency of Demographic Data of Participants (N= 73)**

| Demographic Data | | Frequency (f) | Percentage (%) |
|---|---|---|---|
| Age (years) | Less than 25 | 26 | 35.6 |
| | 26–35 | 47 | 64.4 |
| Qualification | High school | 45 | 61.6 |
| | University | 28 | 38.4 |
| Employment | Employed | 30 | 41.1 |
| | Unemployed | 43 | 58.9 |
| Gestational Age | Trimestes II | 33 | 45.2 |
| | Trimester III | 40 | 54.8 |
| Number of Pregnancy | Primi Gravida | 53 | 72.6 |
| | Multigravida | 20 | 27.4 |

**Table 2 Score Differences between Pre-Test and Post-Test of Knowledge, Attitude and Skill about Breast Care in Intervention Group**

| Variable | | Video Experiment Group | | p-Value |
|---|---|---|---|---|
| | | Pre-Test | Post-Test | |
| Knowledge | Mean + SD | 42.7 + 11.2 | 72.9 + 9.2 | 0.001 |
| | Range | 20–65 | 55–85 | |
| Attitude | Mean + SD | 47.6 + 2.5 | 58.8 + 6.2 | 0.001 |
| | Range | 44–55 | 48–75 | |
| Skill | Mean + SD | 46.9 + 7.7 | 73.7 + 7.9 | 0.001 |
| | Range | 33–60 | 60–86 | |

**Table 3 Score Difference between Pre-Test and Post-Test of Knowledge, Attitude and Skill About Breast Care in Control Group**

| Variable | | Video Experiment Group | | p-Value |
|---|---|---|---|---|
| | | Pre-Test | Post-Test | |
| Knowledge | Mean + SD | 59.3+ 17.8 | 53.4+ 13.7 | 0.820 |
| | Range | 25–80 | 25–80 | |
| Attitude | Mean + SD | 47.6+ 2.5 | 47.2+ 2.2 | 0.920 |
| | Range | 41–53 | 40–53 | |
| Skill | Mean + SD | 38.6+ 12.0 | 43.02+ 13.6 | 0.051 |
| | Range | 20–66 | 13–73 | |

**Table 4 Score Difference of Pre-Test and Post-Test of Knowledge, Attitude and Skill About Breast Care between Intervention Group and Control Group**

| Variable | Mean+SD | Mean Difference | 95% CI | | p-value |
|---|---|---|---|---|---|
| | | | Lower | Upper | |
| Knowledge | | | | | |
| Intervention Group | 72.83 + 8.48 | -25.33 | 27.77 | 38.84 | 0.001 |
| Control Group | 45.43 +12.06 | -7.98 | | | |
| Attitude | | | | | |
| Intervention Group | 58.76 +6.20 | 11.15 | 3.63 | 8.79 | 0.021 |
| Control Group | 46.83 + 4.58 | 4.94 | | | |
| Skill | | | | | |
| Intervention Group | 73.74 + 7.98 | 26.78 | 12.19 | 24.01 | 0.001 |
| Control Group | 56.17+ 10.62 | 9.55 | | | |

The results of this study include demographic data, knowledge, attitudes and skills as presented in Table 1.

Table 1 showed that the majority of the respondents were in the early adult category (26-35 years) at 64.4%, the education qualification was in the high school category at 61.6%, most of the mothers were unemployed at 58.9% and the most gestational ages were in the trimester III at 54.8% with the highest number of pregnancies being primigravida at 72.6%.

Table 2 showed that the score difference of pre-test and post-test of all variables after health education on breast care by demonstration method with p value of <0.05. The post-test score of all variables indicates an increase, particularly in the knowledge variable with the lowest score of 20 in pre-test to 55 in post-test, and the highest score of 65 to 85. It is the same for the skill variable where the lowest score of 33 increases to 60 and the highest score of 60 to 86.

Table 3 showed that the score no difference of pre-test and post-test of all variables after health education on breast care by video watching method with p value of >0.05. The mean post-test score of the knowledge variable the same between pre and post-test were 80, and the lowest score stays at 25. That it's same with the attitude variable. But for the skill variable mean post-test arise that pre-test, but not significantly the was 13 score differences.

Table 4 revealed that there is a difference in result of knowledge, attitude and skill between intervention group and control group (p <0.05). Out of the three variables, the biggest result is in the knowledge variable with mean difference = 26.78.

## Discussion

The research result shows that there was a score difference between the pre-test and the post-test in knowledge, attitude and skill variables after health education on breast care, for both intervention group and control group. Likewise, there was a score difference in knowledge, attitude and skill between intervention group and control group, with p value of <0.05. It is an indication that health education on breast care effectively enhances the knowledge, attitude and skill of pregnant women on breast care.

The study about the impact of perinatal education on behaviour change toward breast feeding and smoking cessation in a healthy start population by Caine et al. (2012), shown that women with advanced education were more likely to have quit smoking, as were women who were breast feeding at hospital discharge. After controlling for education, IHS clients tended to be less likely to continue to smoke during the third trimester (OR, 0.76, 95% CI, 0.49–1.16), as were those with a first pregnancy (OR, 0.32; 95% CI, 0.10, 0.98) and no other smokers in the home (OR, 0.25; 95% CI, 0.08, 0.74). Breast feeding and smoking cessation are modifiable risk factors that were impacted by behavioral interventions through case management education.

Health education during pregnancy should be effective to gain of quality of pregnancy. That due the health education can be increase of knowledge, affective and psychomotor to prepare pregnant women for childbirth and post-partum period (Herval et al., 2019). Yikar and Nazik (2019) conducted the study about effects of prenatal education on complaints during pregnancy and on quality of life shown that providing prenatal education reduces complaints and increases quality of life of pregnant women.

However, it is crucial to understand that there are multiple contexts, and pregnant women represent multiple demographic groups. The strategies of health education must be specifically designed to provide the desired outcomes for different target groups (Herval et al., 2019). A positive pregnancy experience, ante natal care guidelines and services should be designed to deliver it, and those providing ANC services should be aware of it at each encounter with pregnant women (Downe et al., 2015).

The principles of ante natal care for pregnant women to provide advice, education, reassurance, and support. That to address and treat the minor problems of pregnancy and to provide effective screening during the pregnancy. There were many studies done which found that educated women have better pregnancy outcomes compared with uneducated women and that education during the antenatal period can reduce pregnancy and delivery complications (Al Ateeq & Al Rusaiess, 2015). Health education during pregnancy to make positive behaviour and must be designed suitable with women pregnant. In several situation transfer of information with psychomotor skill like demonstration or watching the video about health care during pregnancy are the choices.

Learning through demonstration gives a first-hand experience for the group members. In this method, the tutor would demonstrate a certain action, and then the learners were given time to re-demonstrate what they had been thought. This kind of learning process will provide deep understanding, because the learners were directly involved in the learning process. Learners will experience and be involved in the things they are learning, and the learning process happens in real situation (Nugraha, 2019).

Demonstration method makes the learning process more certain and concrete, so the learners can easily learn the things that they are taught. Moreover, the learning process is more interesting, and the learners are encouraged to be active in correlating between the theory and practice (Nursalam & Effendi, 2007).

Furthermore, Millis (1977) explained that to gain optimum skill, the learning process must be done by the sequences: setting the goals by doing, analyzing skills in detail and in order, demonstrate the skills, elaborate and focus on key competencies, give opportunity to learners to try to practice under monitoring and guidance, and then giving assessment towards the effort of the learners. In the health education on breast care using demonstration method, these steps were executed. The process was commenced by setting and explaining the objective of the learning and demonstrating steps for breast care. After that, the participants retry the process taught under guidance of the tutor and the tutor then assessed what had been practiced by the participants (Bouner, 2007).

The audio visual learning method by watching video is also one of the most suggested learning methods. This is because the object or the teaching materials shown on a video is more realistic and original. This condition also gives more concrete experience to learners. Video learning method requires the learners to actively use their visual and auditory senses (Bouner, 2007; Bravo et al., 2011).

Video is a media learning that can be used to deliver messages, stimulate the minds, feelings, attention and the will of learners to keep learning. Anderson (1987 in Siwi, 2012) stated that video media can develop cognitive ability because of the stimulation of moves and sensations. Video also exhibits how to react to and do something. It can also affect behaviour and emotion, so learners can be more involved in the learning. Video is suitable media learning for skills involving moves (Akhtar & Akbar, 2011).

The research result of Bravo et al. (2011), about video as a new learning tool to boost university students' motivations showed that the use of video carried a positive effect

towards the improvement of their learning motivations. The content and the amount of information delivered from the video need to be considered order to increase the effectiveness. From the tutors' interviews it was discovered that video gave faster explanation compared to verbal or written explanations.

Referring to the above explanation, the two learning techniques, both by demonstration or watching video had significance towards the improvement of knowledge, attitude and skill on breast care during pregnancy. This is in line with the research by Devi et al. (2019) on the results comparison of the effectiveness of learning the obstetric palpation skill by watching video and traditional demonstration among nursing students. The result revealed significant difference of the students' skill score in the pre-test and the post-test after the learning program by video watching and traditional demonstration (t = 18.35, p < 0.001). Although the two methods were both effective in improving the skill learnt, the traditional demonstration had higher score compared to video watching score at the post-test (t = 36.40, p = 0.001). This is similar to the research by Pradan et al. (2018) on the effectiveness of learning by demonstration and watching video towards the knowledge and skills of the students of nursing in India. The result showed that both learning methods were significant in improving the score of knowledge and skill. However, the learning method by watching video was more effective than by demonstration.

## Conclusion

The research results indicated that there was a crucial difference or a significant increase in the scores of knowledge, attitude and skill before and after health education on breast care during pregnancy, both by means of demonstration and video watching. Nevertheless, the scores of knowledge, attitude and skill were higher after health education on breast care by demonstration method.

The research results shown that the demonstration method better than audio visual method to learn about skill.

It is suggested to health workers to practice on doing health education which gives firsthand experience to target learners, thus the content of the health education felt real and can be practiced directly. Demonstration method is better way to teach pregnant women about breast care. Re-demonstration of breast care needs to be conducted so learners can directly practice abaout breast care which will give an excellent learning experience. A follow-up research with more homogenous samples and a larger number of respondents needs to be conducted.

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# Nurses' Reflections on Challenges and Barriers of Communication in The Intensive Care Unit: A Phenomenology Study

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## Abstract

Communication among nurses, patients, and families takes an important role in the intensive care unit in which the patients are in critical condition and unable to involve in two-way communication. Research related to effective nurse-patient communication has been done extensively, but the information regarding communication in intensive care unit is still limited. This research aimed to explore nurses' experiences in the intensive care units in effective communication to patients/patient's families. This was a qualitative study project with phenomenology approach. The data were collected using the in-depth interview technique approximately 60 minutes involving ten nurses who were selected using the purposive sampling at Al Islam Hospital Bandung. Data were analysed using the Colaizzi method and the results were presented in themes. Based on the nurses' experiences, four themes were emerged in this study including (1) Nurses' dilemma of their professionalism and personal issues/matters, (2) Contextual factor affects selection of nurses' communication technique, (3) Barriers in effective communication; difficulties in accompanying families to accept critical patient conditions, care and treatment procedures in the ICU which were complicated, and misunderstanding between nurse-patient and family (4) Compassion and patience are required in nurse-patient communication in ICU. The complex patient/ family conditions in the ICU require nurses to choose the appropriate communication technique accompanied by a sense of compassion and patience. Nurses need to improve their ability to communicate effectively in order to lower the barriers in communicating between nurses-patients/families. Recommendations, training and assistance of effective communication become important for nurses in improving services in the Intensive Care Unit.

**Keywords:** Effective communication, family-patient, ICU, nurse experience.

## Introduction

Communication plays a role in the patients' healing, related to the collaboration of nurses and other health workers, and also affects patient and family satisfaction (Suryani, 2014). Thus, good communication is necessary for every service available in the Hospital. Specifically, nurses with good ability and skills in communication will easily establish positive relationships with patients and their families (Liljeroos, Snellman, & Ekstedt, 2011) especially nurses who work in intensive care unit (ICU) one of the services available in the hospital in which a special service for patients with critical condition. This particular skill is important and should be continuously improved by any nurses, so it would become a habit in their duty to provide health services in the hospital.

ICU is a specialized care unit that manages a treatment for seriously ill and critical patients and injuries with life-threatening or potentially life-threatening complications; involves trained health personnel; and is supported with completely specialized equipment intended for patient observation, treatment and therapy (Ministry of Health, 2010). Unstable patient condition in ICU and their generally lower state of consciousness makes the patients' family as one of important decision makers related to nursing interventions. Under such conditions, effective communication between nurses and patients/families is required.

The research of therapeutic communication; processes, strategies, challenges between health workers and patients along with their families have been widely done. For example the research of Liestriana, Rejeki, and Wuryanto (2012) which aimed to identify the relationship of therapeutic communication with postoperative patient satisfaction in RSUD Kajen Pekalongan District. The research method used a descriptive correlative and the cross-sectional approach with 32 nurses as samples. The data were collected by using questionnaire with a correlation test. The study found that there was a significant correlation between therapeutic communication and postoperative patients' satisfaction in RSUD Kajen Pekalongan District. The result of this research was supported by the research of Bolla (2013) that aimed to see the nurse's therapeutic communication relationship with patients' satisfaction level in the Melati inpatient room of RSUD Subang with 16 nurses and 16 patients as samples. The research method of the study was qualitative descriptive. Data collection included questionnaires and observations. The study found that there was a relationship between nurse therapeutic communication and the patients' satisfaction level. The study conducted in ICU by Azoulay et al. (2000) aimed at identifying factors related to the family understanding level of the condition of the patients treated in the ICU. The sample size was 102 patients with 76 families of patients who visited or accompanied the patient during treatment. There was a lack of understanding of the patient's family about the patients' condition because the doctor's communication time was less than 10 minutes. There was also a lack of information given in brochures or leaflets. It caused the family to misunderstand the patients' condition.

A nurse is the core of communication and plays an important role in facilitating professional communication because a nurse is a bridge between patient and family with other health professionals including in Intensive Care Unit (Ghiyasvandian, Zakerimoghadam, & Peyravi, 2015). In the communication process, especially in the room of patients with the critical condition, nurses, patients, and families may experience many challenges such as the determination of patient care decisions must be immediate, complicated procedures for life saving and life threatening. Research related to effective communication and therapeutic between nurses and patients have been done quite extensively, but research information that explores nurse experience when communicating with patient and family in ICU was still limited. One of them is due to the limited number access of families allowed to enter the treatment room in addition to the condition of the patient in an unconscious condition. This study aimed to explore nurses' experiences in the intensive care units in effective communication to patients/patient's families.

## Method

This study was a qualitative research project using a phenomenology approach. Phenomenology is a research method that aims to reveal live experiences about a phenomenon (Suryani, Welch, & Cox, 2013). This study particularly explored nurses' experiences in communicating with patients and their families in the Intensive Care Unit. Ethics approval was obtained from the Human Ethics Committee of Universitas Padjadjaran, and the site permission letter was approved by Al Islam Hospital, Bandung number 3059/RSAI/DIK/VI/2016.

### Setting and Participants

The study was conducted in the Intensive Care Unit, Al Islam Hospital Bandung. The participants were ten nurses consisting of five men and five women selected by a purposive sampling technique. The inclusion criteria include nurses who have worked for more than 3 years, holds nursing education at least Diploma 3 and ICU training certificates. Participants were selected with the assistance of the head nurse (the manager of the nursing unit at each ward) using the nurse's database as a consideration of conformity with the inclusion criteria. Participation itself was voluntary.

### Data Collection and Analysis

Data collection was done by in-depth interview. An interview is an effective method to explore human's behaviour including experience (Carter, Bryant-Lukosius, DiCenso, Blythe, & Neville, 2014). Data collection and data analysis on phenomenology research approach put the researcher as the main instrument which functions to plan, perform data collection, analyse, determine the results, and make the report (Polit & Beck, 2014). In this study, interview to 10 participants was conducted by the lead researchers who had experienced interviewing in the qualitative study and had clinical experiences in critical care unit area including intensive care unit for 16 years. The interview was conducted in 60-90 minutes with each participant, recorded using a digital voice recorder and transcribed in Bahasa Indonesia. The stages of the interview included: developing trusts with participants and exploring nurse's experience in communicating with patients and families. The researcher paid attention to the principles of social skills including friendly, empathy, polite, and showing open attitude in data interpretation and reporting research results.

Data analysis was undergone by using Colaizzi 1978 method (Wojnar & Swanson, 2007). Stages of data analysis included first understanding the content of each transcript by listening to the recording and reading transcripts at least 5-8 times depending on the researcher's understanding. The second stage was marking the participants' important expression related to nurse's communication with patients and families and separating the transcribe into a distinct file (file 1). The third stage was formulating unit meaning reading file 1 then grouping the same ideas (file 2). The fourth stage was reading file 2 and clustering it in the same themes, and they were put together into the major theme. The fifth stage was integrating all results into a very complete explanation of the theme. At this stage, the researcher narrated the major theme supported by data from the team cluster, files 1 and 2 and discussed themes with the research team. The sixth stage involves explaining the basic structure of the discovered phenomenon, using the full description of the fifth stage. In this stage the researchers identified the basic structure of phenomena related to communication between nurses with patients and families in intensive care unit. The seventh stage, validating the results of the analysis by returning to the participants to explain the results of the sixth stage to ensure that it was in accordance with the nurse's experience when communicating with patients and families. Based on the analysis, four major themes obtained are described in the results.

### Trustworthiness of this study

This qualitative research was carried out by taking into account the reliability of data by using data validity including credibility, dependability, confirmability, and authenticity (Polit & Beck, 2014). Credibility means that the researcher verified back to the informant to ensure the accuracy of the data in the interview. Transferability in

qualitative research was un-generalized so that the researcher wrote in a clear, detailed, systematic and reliable way, by writing citations and comments. For dependability did by conducting data inquiry where done rare verification of research started from the raw data, data reduction results, and record of the research process. For external reviewers' feedback are conducted by consultation with qualitative phenomenology research experts. Confirmability was done by recording and taking note of the raw data systematically including field notes. The implementation of this qualitative research was using ethical principles of research.

## Results

### Characteristics of participants

All participants in the study have the same education background, which is Diploma III, with the average working period in ICU for 5 years with the maximum working period of 8 years and the minimum of 3 years. All participants have participated in various training related to life-saving and critical care.

### Themes

Four main themes emerged from the analysis include (1) Nurses' dilemma of their professionalism and personal issues/matters, (2) Contextual factor affects selection of nurses' communication technique, (3) Barriers in effective communication: difficulties in accompanying families to accept critical patient conditions, care and treatment procedures in the ICU which were complicated, and misunderstanding between nurse-patient and family, (4) Compassion and patience are required in nurse-patient communication in ICU.

### Theme 1: Nurses' dilemma of their professionalism and personal issues/matters

Nurses are aware that they must communicate effectively with patients and families, but as individuals sometimes they have personal issues such as problems with children or husbands at home. They are aware that the problem might affect the way

they communicate with patients. "… I ever forgot to smile… moreover, when I felt very tired and there were personal problems with family at home, I tried to keep smiling… though maybe my smile was different yea…" (P2). A similar opinion was expressed by another participant, who said "… also when I was sick of the jobs, there were a lot of patients in bad conditions, many problems at home… so, I was unable to communicate well, I could not focus," (P3).

As individuals, nurses also have problems at home, especially with families that may affect the nurses' emotional stability while working. On the other hand, the physical conditions of patients including fatigue and psychological of under pressure due to the situation of care services in the ICU both directly and indirectly affected their performance in communicating with patients and patient's families. They tried to put aside their feelings, fatigue, and emotion due to personal problems so that despite the problem, they can still perform well (smiling, being friendly, and answering questions).

### Theme 2. Contextual factor affects selection of nurses' communication technique

The condition of unconscious patients in the ICU causes their families to decide what medical and nursing interventions that patients will have. The situation makes the nurses in the ICU constantly communicate with the family. The nurses have to choose appropriate communication techniques based on the characteristics of the family such as talking slowly, using simple-repetitive language. A nurse said that "……. when communicating with the elderly, they should talk very slowly" (P4). While communicating with families with lower-secondary education, nurses used different communication approach.

"Families didn't understand the type of tools in the ICU, what the examination was done for, and if the results had been out they were also confused with the results. Although we explained in simple language, not using the medical term, it was not easy for them to understand. Most of them were from the village and only elementary and secondary school graduates" (P4).

Other nurses also expressed about communicating the interventions related

to services in the ICU simply for middle-educated families disclosud by 7 out 10 informants (P1, P2, P3, P5, P6, P7, P10).

In short, the age and education factors of the patient's families in the ICU affect the way nurses use communication techniques with them. The nurse chose to communicate slowly to the elderly patient's family. When communicating with families with low education level, nurses used a simple language and they had to repeat the information.

**Theme 3: Barriers in effective communication**

Nurses face various barriers when communicating with the patient's family. Constraints expressed by nurses include difficulties in accompanying families to accept critical patient conditions, care and treatment procedures in the ICU which were complicated, and misunderstanding between nurse-patient and family.

The hemodynamic conditions of patients in the ICU tend to be unstable and very fluctuating, which means that the patient's condition may suddenly improve or may even deteriorate which can cause organ failures, or even death. This situation can take place quickly and cause shock to the patient's family.

"When the patient's condition deteriorated and we informed to the family, they sometimes became hysterical and even fainted. If it happened, we waited for the family to be calm. Since it would be useless to communicate in such situation, they wouldn't accept what we say and sometimes they got back in anger" (P6).

Other nurses also expressed similar experiences "yes, it would be difficult to communicate with the families who were still less able to accept or in denial state" (P9). All nurses expressed the same opinion about the difficulty of families' acceptance of the patients' condition.

Further obstacles were related to the complexity of service and care in the ICU which family of patients usually face such as the tight hours of patients visit, and loads of medical and nursing interventions that had an impact on the number of complaints received by nurses from the family.

"… It's often… ICU is relatively closed, our patient visit time is restricted which is often complained and that the rule is, the family may enter during the visiting hour only or in certain conditions such as criticalness. And that's our culture, the only one ill person but all villages want to visit" (P2).

Opinions about family complaints were also related to ICU services "there are so many complaints, especially at the time of the emergency, why they (family) were not involved from the beginning" (P6). Nurses often received various service-related complaints from patient's families. Therefore they found it difficult to establish communication with the families.

Misconceptions often coloured the communication between the nurse and the patient/family. This was probably because Bandung is the capital of West Java Province with a high level of urbanization, diverse cultures, and the status of Al Islam Hospital as the first referral hospital of Puskesmas (Public Health Center) in various areas of West Java. This diversity impacts the way family and nurses communicate. "… Ah, I am from Batak, I talk with a loud voice, while the patients' families are Sundanese, So they might consider me angry when I speak to them with a loud voice (P4).

The opposite condition was expressed by the nurse (P7) "... I feel like often shouted by the patients, so sometimes I keep the distance from the family". The difference of communication styles sometimes became a hurdle in family-nurse communication.

**Theme 4: Compassion and patience are required in nurse-patient communication**

Patient's critical conditions such as unconscious, weak and totally dependent state on the health worker raised the nurses' compassion to the patients and their families. When performing interventions such as bathing, changing position and suctioning the nurses empathized the patient's condition. Thus, when the patients are unable to communicate verbally, the nurses may communicate non-verbally to the patient by showing compassion and patience while performing the treatment. "… so, yea… sometimes the patient looked tortured and in pain while suctioning, but they could not talk, I felt sorry, so tried to take action carefully,

fast and effective" (P5).

Nurses also expressed their compassion when they handle personal hygiene needs of the patients. "… While bathing an unconscious patient, I washed their bodies as if I helped to cleanse my own mother's, so I did it with affection and patience" (P1). The condition of a fully dependent patient requires the nurse to be careful and full of patience to carrying out actions.

## Discussion

The first theme in this study: The dilemma between nurse professionalism and inconvenience in nurse-patient/family communication is in accordance with the research findings of Fakhsianoor and Dewi (Fakhsinoor & Dewi, 2014) which stated that the unpleasant circumstances experienced by the nurses can cause stress that leads to the occurrence of burnout at work. The discomfort experienced by the nurses will have an impact on the services provided considering the nurse as the frontline of health services. Nonverbal communication such as smiling, physical contact and facial expression is very important in creating effective communication between nurses and patients and families especially in ICU (Xu, Staples, & Shen, 2012). Informants experienced other psychological and physical conflicts such as perceived fatigue and personal problems encountered impacted on their appearance as rarely smiling when conveying information to the patient's family. Loghmani, Borhani, and Abbaszadeh (2014) mentioned that personal problems occurred can interfere with the interaction between the nurse and the patient's family. In addition to the shortage of staff coupled with high workloads caused nurses did not have enough time for the patient's family so that there was a negative interaction between nurses and family (Loghmani et al., 2014).

Ideally intensive care unit has a 1:1 ratio where one nurse takes care of one patient. However, the reality revealed that sometimes they handled two patients in one shift so that it made them exhausted. The discrepancy between the number of nurses and patients required the nurse to adapt to the situation. The adaptation was more focused on visible physical needs indicator which can lead to deterioration of the patient or the worst. It could cause death, the nurse forgot to communicate with the patient's family. Recast the estimation of the nurse-patient ratio that should be in the ICU. In addition, pay attention to the balance between the workload and the rest time for the nurses become important to improve the services in the ICU, especially the quality of communication between the nurse with the patient and family.

Contextual factors influenced the selection of nurse communication techniques. The results of this study also showed that in the effective communication between nurses and patients' family, it was important to pay attention to factors such as age, educational background, and economic status. All three of these can affect the pattern and techniques of nurse-family communication. Age factor becomes a challenge in communicating also found in research conducted by Callinan and Brandt (2015). They mentioned that the nurse barrier in communicating with the elderly due to cognitive impairment. The impairment requires nurses to choose communication techniques that are appropriate to the conditions such as using simple language and talking slowly. In addition, the patient's family education background influences their understanding of the information provided by the nurse. It was as described in research by Suryani (Suryani, 2014) that the higher a person's education is, the easier it is for him or her to receive information provided by health workers and vice versa. For ICU where the family has an important role in the patient's service process, conducting the assessment in particular medical history and social support should not only focus on the patient but the assessment is also performed on the patient's companion. Thus, the nurses should know the patient's background clearly so that they can determine communication methods that suits the patient's companion characteristics, including the family.

Various barriers to effective communication were identified in this study. The nurse's communication skills have been a great concern but often overlooked. Communication is not only carried out to patients but also to families related to

the condition of family members who are critically ill. Nearly 100% of families stated that communication with nurses is important to them, especially if associated with agreement on procedures and interventions provided to patients (Redley, LeVasseur, Peters, & Bethune, 2003). It may need to delve the solution to minimize the barriers.

Patients/families frequently complain to nurses. Nurses are required to always be professional on duty. This is demonstrated in any situation and condition including when encountering both patient and family complaints. Frequent visit  of patient's relatives during the visit resulted in a negative interaction between the nurse and the patient's family member (Loghmani et al., 2014). On the other hand, difficulty in assisting the family to accept the condition of family members who are critically ill. Delivering information to the patient's family was increasingly difficult especially when the nurse has to deal with a denial patient's family. In accordance with research that conducted by Griffiths (Monden, Gentry, & Cox, 2016) stated that it is not easy to deliver bad news to patients or families. Moreover, sometimes they enter a phase where they cannot accept the situation. It needs nurse's social skills and ability to control the emotions of others. Someone who has social skills is able to control the emotions well when dealing with others, carefully figure out the situation, and interact smoothly, besides these skills can influence and lead, deliberate and finish the slaughter and it is required in teamwork, in this case, nurse-patient and their families.

The nurse has difficulty communicating with someone who has a different cultural and linguistic background. Research conducted by Savio and George (Naveen & Anice, 2013)  mentioned that nurses have difficulty talking to someone who has a distinct cultural and linguistic background. Another study conducted by Chittem and Butow (2015) stated that the language differences could lead to misunderstanding in interpreting the information provided. Therefore, in the nurse-family relationship mutual respect is needed to be able to minimize misunderstanding due to differences in cultural culture and language. Nurses also may need to improve clinical performance, knowledge skills,

and communication skills that are easily understood by patients and their families.

Compassion and patience are required in nurse-patient communication. . Patients treated in intensive care feel hopeless, helpless, hopeless, feeling of wanting to give up, uncertainty about the future and feel on the verge of death ( Bastian, Suryani, and Emaliyawati (2016); Emaliyawati, Sutini, Ibrahim, Trisyani, and Prawesti (2017) this creates its own anxiety for patients and can affect hemodynamic status, hypermetabolism that occurs in critically ill patients, and can reduce oxygen supply and perfusion to tissues(Shari, Suryani, & Emaliyawati, 2014). Compassion is needed to provide support to patients in critical condition. The results of this study indicated that communication between nurses with patients' families in ICU requires patience due to the unfavourable condition of the patients. Nurses' jobs are not easy because the nurses have to control anger and patience (Loghmani et al., 2014). According to Pandanwangi (Pandanwangi, 2009),   individuals with high emotional intelligence are individuals who are able to master emotional turmoil, manage stress and have good mental health, thus this individual will be able to establish good relationships with others. According to Rexhepi and Berisha (Rexhepi & Berisha, 2017), someone with good emotional intelligence will live his/her days and work with optimism, stay motivated, calm, focus, self-control, care and respect the environment. Nurses in the ICU must have a high caring attitude because this attitude is the condition for giving care. According to  Suryani (Suryani, 2014), nurse's knowledge about behavioural science is the substance to perform care, and nurse's ability to provide physical and psychological needs is the tool. The nurses should have the high self-awareness to bear patience and loving nature.

## Conclusion

The four themes found in this study (1) Nurses' dilemma of their professionalism and personal issues/matters, (2) Contextual factor affects selection of nurses' communication technique, (3) Barriers in effective communication;

difficulties in accompanying families to accept critical patient conditions, care and treatment procedures in the ICU which were complicated, and misunderstanding between nurse-patient and family (4) Compassion and patience are required in nurse-patient communication in ICU. The themes were new insights in the research related to nursing and patient communication in ICU. The themes are also important as knowledge of the nurses and family communication, especially health services in Indonesia which might be different from other countries. It is important for nurses to improve their clinical performance, knowledge, and effective communication skills to enhance the verbal communication effectiveness, as well as non-verbal communication between nurses and patients. Training and assistance in effective communication in the intensive care unit can be the way to improve nurses' communication skills.

**Conflict of interest**

No conflict of interest in this study

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# Relationship between Healthcare Provider's Perception about Patient Safety and Patient Safety Implementation in The Emergency Department

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**Abstract**

The Emergency Department (ED) is a hospital service unit that provides the first service for patients with disease conditions that threaten their lives or can cause disability for 24 hours. Implementation of patient safety in the ED should be applied to minimize the risk of error handling for the patient. ED staff perceptions related to the implementation of patient safety is a factor that directly-related to his behavior in applying the implementation of patient safety. This study aimed to analyze the relationship between perceptions of staff ED and patient safety by implementing patient safety at the Regional Hospital Emergency Department Cirebon. This study was a correlational study with the cross-sectional approach of 99 emergency staff with total sampling at Cirebon. Collecting data used questionnaires of patient safety. Based on the results of the univariate analysis showed that the majority (80%) of respondents either category on the implementation of the sub-variables of patient safety team collaboration and communication, only a small proportion of respondents less category (20%) on the implementation of the sub-variables of patient safety team collaboration and communication. In addition, less than half (49.5%) category lacking in implementing patient safety, only half (50.5%) categories, both in the implementation of patient safety. Based on the results of the bivariate analysis showed that the relationship implementation of patient safety with all the variables, namely teamwork (p-value = 0.000), communications (p-value = 0.005), the concept of patient safety (p-value = 0.005), and perception (p-value = 0.005). Based on the results of the study, the researchers concluded that the relationship between staff perceptions of the emergency department (ED) on patient safety by implementing patient safety at the Regional Hospital emergency department (RSD) Cirebon. IGD support staff perceptions of patient safety, but still found lacking in the category of health workers implementation of patient safety, so the need for patient safety education and training with simulation methods to illustrate the approach in the implementation of patient safety.

**Keywords**: Emergency staff, perception, the implementation of patient safety.

## Introduction

The Emergency Department (ED) is a hospital service providing services during the first 24 hours in patients with the threat of death and disability, Services provided interdisciplinary involving all health professions include doctors, nurses, energy analysts, and pharmacy staff. The medical profession in their service delivery to address the interdependence of health in order to improve health care for patients (Ministry of Health, 2011). Type of patients who need examination and immediate action especially in critical condition, both in acute cases of non-trauma, acute cases of trauma, patients with psychiatric disorders, patients with infectious diseases, and the patients were exposed to chemical or biological (Australian College for Emergency Medicine, 2014).

Pratama health services that have ED facilities and referral health services should have facilities and infrastructure that are equipped with emergency equipment. In addition, all ED staff should have sufficient competence and capability for handling emergency cases. Handling victims who are not immediately carried out can cause various problems such as increased risk of disability, complications and even the risk of death (Emaliyawati, Prawesti, Yosep, & Ibrahim, 2016). Patients are in an emergency condition and must be given immediate action at least will cause anxiety for both the patient or the health care staff themselves, especially nurses who handle (Shari, Suryani, & Emaliyawati, 2014).

Service to the emergency conditions often faced with an increasing number of patients and severity levels. Patients seeking treatment for primary and urgent complaints, any time day or night, so that frequent emergency conditions met by patients with various conditions and levels of severity. It is certainly need high skills of health personnel in the decision to prioritize services according to the level of severity. Conditions incoming emergency patients with a number of unexpected and different severity became one of the factors that make health workers are overwhelmed in dealing with patients. Therefore, it will be an imbalance that can have an impact on safety patient threat (Brenna, 2016).

Sherman et al. (2009) states that human and organizational factors are factors that contribute to patient safety, it affects the behavior of health staff in relation to safe patient care. Referring to the concept of patient safety, although the program of patient safety has been socialized in clinical areas, but problems in the field has found the tendency of various conditions such as crowding, lack of staff, the waiting time extends, the lack of major appliance, resulting in patient services that are safety becomes less than the maximum (Agency for Healthcare Research and Quality, 2013).

Complex services in the emergency department is closely related to various risk factors for patient safety that could potentially cause injury and harm to patients such as patient handling errors (Runciman et al., 2009). As the results of research Horwitz et al. (2009), about a common problem in the ED tends to lead to the risk of patient safety that include communication failures, lack of teamwork, and crowding. Other studies on patient safety in the emergency room mention that interruptions and multitasking are considered factors contributing to errors (Westbrook, 2014). Based on the description above, shows that the communication failure factors, lack of teamwork, crowding, interruptions, and multitasking is a factor that is very influential on patient safety in the emergency department.

Integral skills in managing multiple tasks at the same time required in the emergency room. According to the results of research Patel and Cohen (2008) that the work of doctors and nurses in the emergency room that is unique clinical environment tends to occurrence of multitasking. Activities most often performed by doctors and nurses while doing multitasking namely the exchange of information (Lena et al., 2012), Although the effect on the creation of a working memory load is higher (Guttmann et al., 2011). Two studies in Denmark is based on questionnaires to doctors and ED nurse's, that multitasking often as stress factors that can interfere with the performance. This has the effect of errors caused by the high cognitive demands on services multitasking (Sorra et al., 2009).

Implementation of patient safety is activity

intended reducing the possibility of side effects associated with health care (Shojania et al., 2001), The complexity inherent in the emergency services such as employment in the same time, uncertainty, change of plans, and a high workload. Interactive complexity in the emergency services often cause unfavorable attitude among staff in dealing with patients, so that errors often result from the behavior of health care in this unit (Peters & Peters, 2008). Behavior in health services cover all activities or activities of individuals both observable and unobservable relating to the maintenance and improvement of health influenced the perception of the individual (Sobur, 2011). For creating the perception that support the realization of the health service needs to be supported by the competence of health professional's patient safety (Jeffs et al., 2013). Consistent research Bovbjerg, Miller, and Shapiro (2001), which states that the services provided appropriate professional responsibility and discipline will affect the increase in perception and execution patient safety,

Perception is an individual view of something that will make a response and behave (Walgito, 2002). The theory states that the health belief model of individual plays a role in determining the attitude of doing or not doing health behavior (Conner, 2005). Appropriate research Rosenstoch (1974) in theory health belief model of states that individual behavior is influenced by individual perceptions about the threat of health problems and the corresponding value of actions aimed at reducing the threat. Perceptions of health workers leading to actions that affect patient safety, which is important for the hospital. Health workers are important resources for the hospital or health care provider to ensure patient safety (Aiken et al., 2002; Berney & Needleman, 2006). Given the important position in the provision of health services, it is necessary to understand the perception of health professionals on patient safety (Affonso et al., 2003). This study aimed to analyze the relationship between staff perceptions of the emergency department (ED) on patient safety by implementing patient safety at the Regional Hospital emergency department (RSD) Cirebon.

## Method

This research is a quantitative research using analytic descriptive study with cross sectional study design. The study was conducted from June to July 2018 at ED (RSD) Cirebon, West Java. The non-probability sampling technique was used with a total of ninety-nine (n=99) participants.

This study used three questionnaires namely demographic questionnaire, a questionnaire of perception, observation and questionnaires related to the implementation of patient safety healthcare provider's in the ED. Demograph questionnaire containing age, sex, length of employment, job position. Researchers used questionnaire adopted from Hospital Survey on Patient Safety Culture developed by The Agency for Healthcare Research and Quality (AHRQ) (2007) and observation using a questionnaire emergency assessment team measure (TEAM) according to the guidelines Cooper et al. (2010). Researchers conducted a back translation and the validity and reliability of the questionnaire on the ED staff of 40 people using the Pearson product moment correlation for validity and KR-20 and Cronbach's alpha reliability. All items on the questionnaire perception and implementation of patient safety are valid. The questionnaire is said to reliability because reliability coefficient greater than 0.7. Univariate analysis was used to determine the frequency of each variable. Analysis using a bivariate test with Kendal's Tau b test. Before collecting the data has been carried out ethical clearance from Universitas Padjadjaran Research Ethics Committee on May, 2018 No. 472 / UN6.KEP / EC / 2018.

## Results

**Table 1 Frequency Distribution Characteristics of Respondents and Number of Visits Patients at ED (RSD) Cirebon (n = 99)**

| Variables | Category | F | % |
|---|---|---|---|

| | | | |
|---|---|---|---|
| Age | 18–25 yr | 12 | 12.12 |
| | 26–30 yr | 46 | 46.46 |
| | 31–40 yr | 25 | 25.25 |
| | 41–50 yr | 16 | 16.16 |
| Gender | Man | 57 | 57.58 |
| | Woman | 42 | 42.42 |
| Years of Service | 6 mon–1 yr | 2 | 2.02 |
| | 1–3 yr | 35 | 35.35 |
| | 3–5 yr | 27 | 27.27 |
| | 5–10 yr | 16 | 16.16 |
| | > 10 yr | 19 | 26.26 |
| Profession | Doctor | 26 | 26.26 |
| | Nurse | 32 | 32.32 |
| | Midwife | 11 | 11.11 |
| | Pharmacy Personnel | 9 | 9.09 |
| | Power Analyst | 21 | 21.21 |
| Education | D3 | 48 | 48.48 |
| | D4 | 8 | 8.08 |
| | S1 Nurses | 15 | 15.15 |
| | S1 Doctor | 26 | 26.26 |
| | S1 Pharmacists | 1 | 1.01 |
| | Masters in Nursing | 1 | 1.01 |
| Average number of patient visits per month period from January to June 2018 | Triage | | |
| | Red | 335 | 11.88 |
| | Yellow | 1970 | 69.91 |
| | Green | 513 | 18.20 |

**Table 2 Distribution of Variable Frequency Category Item Implementing Patient Safety Sub (n = 99)**

| **Variables** | | | |
|---|---|---|---|
| Implementation of Patient Safety | **Category** | **F** | **%** |
| Sub variable teamwork | | | |
| Ask for help from the team needed | Good | 99 | 100 |
| | Less | 0 | 0 |
| Verbally asking for input team | Good | 66 | 66.7 |
| | Less | 33 | 33.3 |
| Receive Assertion and ideas | Good | 94 | 94.9 |
| | Less | 5 | 5.1 |
| Teams communicate effectively | Good | 93 | 93.9 |
| | Less | 6 | 6.1 |
| Teams work together to complete the task | Good | 88 | 88.9 |

| | | | |
|---|---|---|---|
| | Less | 11 | 11.1 |
| Tim act calmly and controlled | Good | 92 | 92.9 |
| | Less | 7 | 7.1 |
| Positive team morale | Good | 88 | 88.9 |
| | Less | 11 | 11.1 |
| Tim adapt to changing situations | Good | 57 | 57.6 |
| | Less | 42 | 42.4 |
| Monitor and review the situation | Good | 58 | 58.6 |
| | Less | 41 | 41.4 |
| The team anticipates the possibility of action | Good | 56 | 56.6 |
| | Less | 43 | 43.4 |
| **Sub communication variables** | | | |
| The emergency department staff to communicate openly | Good | 96 | 97 |
| | Less | 3 | 3 |
| Specific structured communication (SBAR) | Good | 86 | 86.9 |
| | Less | 13 | 13.1 |
| Declare perception, action plan | Good | 62 | 62.6 |
| | Less | 37 | 37.4 |
| When communicating introduce myself | Good | 57 | 57.6 |
| | Less | 42 | 42.4 |
| Communication and respond to patients | Good | 99 | 100 |
| | Less | 0 | 0 |
| Komunikasi calm voice tone | Good | 99 | 100 |
| | Less | 0 | 0 |

**Table 3 Distribution of Implementing Patient Safety (n = 99)**

| Variables | Category | F | % |
|---|---|---|---|
| Implementation of patient safety | Good | 50 | 50.5 |
| | Less | 49 | 49.5 |

**Table 4 Analysis of Perception Staff Relations IGD About Patient Safety and Implementation Patient Safety**

| Variable / Sub Variables | | Implementation | | | | R | P Value |
|---|---|---|---|---|---|---|---|
| | | Good | | Not Good | | | |
| | | f | % | f | % | | |
| Teamwork | Support | 37 | 67.3 | 18 | 32.7 | 0.375 | 0.000 |
| | Does not support | 13 | 29.5 | 31 | 70.5 | | |
| Communication | Support | 35 | 62.5 | 21 | 37.5 | 0.274 | 0.005 |
| | Does not support | 15 | 34.9 | 28 | 65.1 | | |
| Patient safety concept | Support | 33 | 63.5 | 19 | 36.5 | 0.273 | 0.005 |
| | Does not support | 17 | 36.2 | 30 | 63.8 | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Perception | Support | 39 | 67.2 | 19 | 32.8 | 0.394 | 0.000 |
| | Does not support | 11 | 26.8 | 30 | 73.2 | | |

Research results in Table 1 showed that more than half (57.58%) of respondents are male, most aged 26–30 years are at intervals of as many as 46.46%, the highest education level is Diploma (13 nurses, midwives 8, pharmaceuticals 6, the analyst 21), amounting to 48.48%, the highest working period at intervals of 1–3 years is 35.35% of respondents, while the average patient visit pebulan mostly in yellow triage is 69.91%.

Table 2 above indicates that the observation of the majority (80%) of respondents either category on implementation of patient safety sub-variables teamwork and communication. Only a small proportion of respondents less category (20%) on the implementation of patient safety sub-variables teamwork and communication in the ED (RSD) Cirebon.

Table 3 showed that less than half (49.5%) category lacking implementation of patient safety, only half (50.5%) categories, both in the implementation of patient safety in the ED (RSD) Cirebon.

Based on the results in Table 4, it shows the p-value <0.05, which means the existence of a positive correlation between the variables of the implementation of patient safety with teamwork variable (p-value = 0.000), communications (p-value = 0.005), the concept of patient safety (p-value = 0.005), and perception (p-value = 0.005).

**Discussion**

The analysis showed that no significant relationship between teamwork and implementation of patient safety with p value = 0.000. This is in line with several studies Manser (2009) revealed that teamwork can ensure patient safety in service in the emergency department. As well as research Kohn et al. (2000) stated that the multidisciplinary teamwork in the emergency services are essential in providing a safe service. Teamwork is defined as two or more individuals working together to achieve the goals that were set, has a special duty of competence and the role of specialized labor,

use of shared resources, and communicate to coordinate and adapt to change (Brannick et al., 1997).

The results also showed that 48.5% of respondents do not support the ED staff perceptions of patient safety, 44.4% of them do not support the perception of sub-variable domain barriers team teamwork and mutual support. Review questionnaire is known that the ED staff did not support the statement item include, things are often not pleasant to cooperate with other staff from the emergency department, ask for help from team members is a sign that an individual does not know how to do his job effectively, provide assistance to the team members is a sign that an individual currently does not have activities to do. These results will impact on the implementation of patient safety. This is in line with research Pronovost et al. (2006) team collaboration among service providers that are not effective are the factors that contribute to unexpected events.

This current study also has pointed out, a significant relationship between communication and implementation of patient safety with p value = 0.005. This is in line with research Woloshynowych et al. (2007) in the emergency department of London stating that communication between health workers is an essential prerequisite for ensuring that the complex clinical environments run effectively and efficiently. These results indicate that the most important objective in the communication activities related to the emergency department patient management. The study also found a significant relationship between communication with patient safety.

Other studies Redley et al. (2017) in the emergency department the city of Victoria reveals that effective interprofessional communication is essential for a comprehensive clinical handover in the ER, where health professionals from different disciplines to work independently but has a complementary role in providing services to patients. Collaborating with other team members in the discussion of handover supported collective wisdom

and responsibility for problem solving and decision making. Communication is important to provide information, ideas or feelings for work efficiency and work safety. It also provides knowledge, establish behavior patterns essential for leadership and teamwork in providing care for patients (WHO, 2009).

The results also showed a significant relationship between knowledge and patient safety in applying the concept of patient safety with a p-value = 0.005. Within the scope of the emergency department, health professionals must be able to manage patient safety risks by using their knowledge to maintain a safe level of patient care (Leape et al., 2009) This is in line with the results of Bawelle et al. (2013), that the level of knowledge of health professionals plays a role in support the implementation of patient safety. In addition, with increasing knowledge of health professionals about patient safety, clinical practice will be of high quality (Bagnasco et al., 2011).

The results also gained a significant relationship between the perception of the ED staff about patient safety and the implementation of patient safety with p-value = 0.005. In line with the results of Aboshaiqah and Baker's (2013) research at Saudi Arabian hospitals which stated that, more than half of health care workers (52%) showed support for the perception and implementation of patient safety. This was also supported by Robin, Stephen, and Judge (2007) who stated that, the perception of health workers about patient safety is the result of the interaction of individuals with environmental conditions influenced by the individual concerned, the purpose of perception and the situation. Other studies Agnew et al. (2013) state that climate patient safety the hospital is positively related to the behavior of the safety of health workers in health care.

Perception is integrated activity within the individual to provide an assessment of the views or opinions of an environmental condition (Sarwono, 2010). Perception is not just limited to the sensing in object or environment alone but the wider health personnel observe objects or environments that give the impression of him, so as to provide an assessment of the views or

opinions. Individual perceptions can change, for example, from negative to positive or vice versa. According to Affonso et al. (2003) which states that the perception of health professionals on patient safety influential in the provision of health care, because health workers can ensure safety of services provided for patients.

## Conclusion

The results of the study generally show that there is a relationship between the perception of ED staff about patient safety and the implementation of patient safety in ED (RSD) Cirebon.

ED staff support the perception of patient safety, but health workers are still found in the category of lack in the application of patient safety. It is hoped that this research can be input for those involved, especially the ED (RSD) Cirebon in the preparation of work programs and policies to support the improvement of perceptions about patient safety and the implementation of patient safety including training related to teamwork and communication, and developing clear guidelines for health workers. Patient safety education and training using simulation methods can provide an overview in the implementation of patient safety. So it must be a priority for health workers, in an effort to improve the application of patient safety in emergency departments.

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# Quality of Life among Patients Undergoing Haemodialysis in Bandung: A Mixed Methods Study

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## Abstract

Quality of life (QoL) has become one of important outcome measures of renal replacement therapy, including haemodialysis. However, the assessment of QoL is not comprehensively measured and most research about it use quantitative approach. Since QoL is subjective, assessing and understanding the qualitative evidence are very important. This study aimed to explore QoL in patients with end-stage renal disease (ESRD) undergoing haemodialysis. This research is a cross-sectional study used a mixed method approach. Patients undergoing dialysis were recruited from the dialysis unit in one private hospital in Bandung. They completed the Kidney Disease and Quality of Life (KDQOL-36™) questionnaire and then went on face to face interview. Quantitative data were analysed descriptively and qualitative data were analysed using thematic analysis with qualitative data analysis software. A total of 87 patients completed the questionnaires and 34 of them participated in 20-60 minutes interview. The symptom and problem list had the highest mean score (M= M=63.60), indicated that patients experienced lack of energy, mobility and physical appearance that further produced difficulties in their daily activities. Additionally, mental component summary showed a higher mean score (M=49.23) than the physical component (M=36.22) indicated that patients most likely had worse mental health condition than their general physical health. Worse mental health condition induced with negative feeling among patients. Patient's inability to do daily activity and change in physical appearance had impact on their confidence for social relationship. Conclusion: ESRD patients undergoing haemodialysis were bothered by the symptom of illness and worsen by the negative feelings.

**Keywords:** End-stage renal disease, haemodialysis, mixed method, quality of life.

## Introduction

Chronic kidney disease (CKD) is a serious global public health problem, affecting over 750 million persons worldwide (Bikboy, 2018). The number of patients with ESRD (End-stage renal disease) – the last and most serious stage (Pozzoni, 2014) – in Indonesia is continuously increasing. In 2017 the number of patients was 10,8723; rises to 19,8575 in 2018 and patients mostly (98%) underwent haemodialysis (HD) as their treatment regimen (Indonesian Renal Registry, 2018).

While, HD effectively improve patients' life expectancy and quality of life (QoL) (Lee & Bargman, 2016; Tannor et al, 2017; Dabrowska et al, 2018). It involves a complex procedure, requires them to frequently visit hospital or dialysis center, mainly two or three times a week, entails diet and fluid restrictions, and causes some HD related symptoms such as fatigue, decreased appetite, as well as muscle cramps that further lessen the patients' QoL (Avramovic & Stefanovic, 2012; Cavalli et al, 2010; Landreneau & Lee K, 2010). On the other hand, patients with ESRD had to adapt new lifestyle as results of the nature of the illness and the methods of its treatment.

Despite of the advancement of healthcare technologies, it is remains questionable whether or not patients who live longer always have a better QoL. QoL plays an important role in assessing patients' needs, setting the treatment goals, monitoring the disease progression, and developing plans of care that potentially improve patient care outcomes.

Some previous studies had attempted to explore QoL in patients with ESRD undergoing haemodialysis including in Indonesian setting. A study from Suwanti et al (2017) explains that more than half (61.0%) ESRD patients who undergo haemodialysis had a poor QoL. Other research conducted by Mulia et al (2018) shows that patients had moderately good QoL. They displayed higher score in enviromental and social domains of quality of life than in physical and psychological domains. Most of existing studies on QoL only provided a quantitative information and lack of qualitative exploration about patient's quality of life. Since, QoL is subjective and unique matter for each patient, the assessment and understanding of qualitative aspects of QoL are very important. Although it is expensive and time consuming, incorporating qualitative methods generates more through information. Qualitative data enable researchers to generate rich data from the perspective of patients about their QoL (Tonon, G, 2015; Kim, Sefcik & Bradway, 2017).

Mixed method is powerful approach when addressing complex, multifaceted issues, such as living with chronic illnesses (Nicca, 2012). This approach signifies both quantitative and qualitative data that then potentially provide more comprehensive explanation of a phenomenon. This mixed methods study designed to comprehensively investigate the QoL of patients with ESRD undergoing haemodialysis in Bandung.

## Method

We conducted a cross-sectional study using sequential explanatory model. This model consisted of two phase, first collecting quantitative data and then gather a qualitative data to help deepen the finding in quantitative phase (Cresswel, 2014). Patients undergoing haemodialysis were recruited from the dialysis unit of one private hospital in Bandung, Indonesia from June 2017 to March 2018. Samples who meet the inclusion criteria were selected by convenient sampling. The inclusion criteria were as follows: (1) confirmed diagnosis of ESRD from medical record (2) patients at least 18 years old, (3) on regular haemodialysis therapy for a minimum of 6 months. The patients were excluded if they lacked the physical and mental capacity to communicate with the interviewer.

Nephrologist and nurse screened patients who met the criteria and gave the list to the researcher. Then researcher approached the patients to explain the details of the current study and asked their willingness to participate. Once they agree to participate in this study, the researcher asked them to sign the informed consent form. Patients were also asked their willingness to be interviewed, and those who agreed were scheduled for interview.

The current study was approved by the Research Ethics Committee of Universitas Padjadjaran under the ethical certificate No. 349/UN6.KEP/EC/2018. Each participant was well informed of the content and the aim of the research.

The Kidney Disease and Quality of Life (KDQOL-36™), a self-reported questionnaire that combines the generic SF-36 Health Survey Instrument and disease-specific components for assessing the health-related QoL of patients with chronic kidney disease was used to measure QoL among ESRD patients in this study. We accesed the questionnaire from RAND health and downloaded it from RAND corporation website. KDQOL-36™ focused on the underlying health status during the preceding 4 weeks. It consists of 36-item survey with five subscales: (1) symptom and problem list (2) effects of kidney disease (3) burden of kidney disease (4) physical component summary (PCS) and (5) Mental component summary. There were 24 items asking about disease-specific cores: symptom and problems (12 items), burden of kidney disease (4 items), and effects of kidney disease (8 items). Additionally, there were 12 items of the generic core adopted from SF-12 instruments, which were divided into the physical component summary (PCS) (8 items) and the mental component summary (MCS) (4 items) (Hays et al, 1994).

The adaptation process used the forward and back translation by two bilingual psychologists to prepare the Indonesian version of KDQOL-36TM. The Cronbach Alpha coefficient was examined on the subscales to determine internal consistency. The Cronbach's alpha for each subscale of the Indonesian version of the KDQOL-36TM in the current sample is as follows: physical functioning = 0.743, mental functioning = 0.579, burden of kidney disease = 0.763, symptom/problems = 0.797 and effect of kidney disease = 0.801.

Validity based on content was provided by using Focus Group Discussion (FGD) with patients, nephrologist and nurse on haemodialysis unit to assess the clarity, relevance and interpretation of each item in KDQOL-36TM scale. Each proxy could give a feedback about the questionnaire until we achieved some degree of consensus and the Indonesian version of KDQOL-36TM scale was finalized.

The qualitative data were collected through 20–60 min interviews with 34 participants. A semi-structured interview technique was utilized to acquire information from the participants. The participants were interviewed on the following : (1) Exploration of how the illness symptoms affect patient's daily life and (2) The impacts of illness and treatment on patients' psychological conditions. Research assistant with background of psychology will conduct data collection. They are three master students from clinical psychology program who first received a 2-day training session by the researcher. The training covered information about (1) quality of life in patient who undergoing haemodialysis, (2) general interview techniques and (3) how to administer the data. Quantitative data were analysed descriptively; raw scores on KDQOL-36TM were transformed to a score ranging from 0 to 100 with higher score representing worse perceived QoL. Demographic data are presented as frequencies and percentages while score of QoL presented as mean and standard deviation (SD).

In qualitative phase, all interviews were audiotaped and transcribed verbatim in word document. Researcher and two coders with psychologist background analysed the data using thematic analysis (Bradley, 2007) with qualitative data analysis software to identify recurring patterns in the transcript (Vaismoradi M, 2013).

**Results**

**Table 1 Demographic and Clinical Characteristics of Study Participants**

| Variables | n | Percentage (%) |
|---|---|---|
| Gender | | |
| Male | 44 | 50.6 |
| Female | 43 | 49.4 |

| | | |
|---|---|---|
| Age Range | | |
| ≤ 35 | 28 | 32.2 |
| 36–50 | 29 | 33.3 |
| 51–65 | 24 | 27.6 |
| ≥ 65 | 6 | 6.9 |
| Marital Status | | |
| Single | 10 | 11.5 |
| Married | 74 | 85.1 |
| Widowed | 3 | 3.4 |
| Education | | |
| Junior High School | 6 | 6.8 |
| Senior High School | 45 | 51.7 |
| College | 36 | 41.4 |
| Employment | | |
| Housewife/unemployed | 46 | 52.9 |
| Employed | 36 | 41.4 |
| Retired | 5 | 3.7 |
| Duration on dialysis (months) | | |
| < 12 months | 21 | 24.1 |
| 1–3 years | 40 | 46 |
| 4–6 years | 16 | 18.4 |
| > 7 years | 10 | 11.5 |
| Frequency Dialysis per week | | |
| Once a week | 4 | 4.6 |
| Twice a week | 83 | 95.4 |
| Cause of kidney disease | | |
| Diabetes Mellitus | 10 | 11.5 |
| Hypertension | 55 | 63.2 |
| Any other causes (lupus, self-medications, unhealthy diet/drink, etc.) | 22 | 25.3 |

**Table 2. Scores for each Dimension of QoL in ESRD Patients**

| Dimensions | Score |
|---|---|
| Symptom/Problems List | 63.60±17.60 |
| Effect of Kidney Disease | 58.91±19.72 |
| Burden of Kidney Disease | 49.13±23.73 |
| Physical Component Summary | 36.22±8.02 |
| Mental Component Summary | 49.23±8.95 |

A total of 87 patients with ESRD were recruited from the haemodialysis unit of a private hospital. On the basis of the demographic and clinical characteristics, 44 patients were male and 43 patients were female, age ranged from 18 to 77 years old (M = 43.9, SD = 14.115), mostly married, finished high school, and unemployed or as a housewife. Majority of them were undergoing dialysis twice a week and the common causes

of kidney disease were hypertension and diabetes mellitus. An overview of the socio-demographic data and clinical characteristics of the study participants is presented in the table below.

### Quantitative data of QoL

The mean score and standard deviation for each dimension of QoL was listed in Table 2. The symptom and problem list had the highest mean score (M=63.60) of the 5 subscales on the KDQOL-36TM. It can be interpreted that ESRD patients reported feeling very bothered by the symptoms of kidney disease and problem related to the symptoms. They were aggravated by fatigue, sore muscles, chest pain, itchy, dry skin, shortness of breath, lack of appetite and problem with access to dialysis.

Patients were also displeased by the effect of kidney disease in their daily life; such as fluid and diet restriction, ability to travel, work and dependency on dialysis treatment. The lowest mean score found in burden of kidney disease subscale (M=49.13), which mean patients perceive that their illness cause interference in their daily life, frustration, takes up more time and makes them feel like a burden.

The assessment of patient's overall health, mental component summary (M=49.23) showed a higher score than the physical component (M=36.22). It can be said that patients most likely had worse mental health condition than their general physical health. Patients most likely have worse mental health condition which encompass feeling such as fear, sadness and frustration. In general physical health, even though the patient has decreased energy levels caused by the effect of the illness, the patients can still do some level of mild physical activity.

### Qualitative phase

A total of 34 participants (20 females and 14 males) took part in the interview session. The participants were selected conveniently according to their accessibility and willingness to participate in this study. Their mean age was 48.17 years (range 25–77 years). The mean duration of hemodialysis was 32.24 months (range 6–84 months), and all of them were undergoing dialysis twice a week. The result of this phase was summarized in three themes: (1) decrease energy levels and mobility, (2) social relationships, and (3) negative feeling. These themes will be elaborated in the remaining part of this section.

### Decreased energy levels and mobility

Decreased energy levels impacted the lives of patients. The majority of patients can only spend their time at home because they felt weak, fatique and less energized. Many female patients (52.9%) chose to be housewife and just worked on light house chores, such as sweeping and washing dishes. All male patients (50.6%) were unproductive to be at work and chose early retirement. This low working capacity is caused by many symptoms, such as breathlessness, itches, nausea, lack of appetite, and difficulties to walk because of edema. The interrelationship between decreased energy levels and mobility is illustrated:

"My stamina is almost 80% decrease compared to before I fell ill, now I couldn't go to work. I chose early retirement and spend my days at home every day. For 24 hours, my body feels bad, sitting is wrong and sleeping isn't good. I have frequent decline in health conditions, so I can't go anywhere" (M, 56 years).

"Since I was sick I applied for early retirement ... don't even go to work, for daily activities I often feel tired. I could not drive because I had passed out on the road. Now I'm just at home ... accompanied by oxygen tanks cylinders because of frequent shortness of breath too. Now I have difficulty walking ... swollen legs ... cause of excess drinking" (F,61 years)

Loss of energy and decline in mobility might explain the greater perceived symptom and problem related to kidney disease by the patients. This finding also suggested how kidney disease could severely impact patient's physical condition to the point they were unable to do things they used to do.

### Social relationships

Physical changes experienced by patients, such as blackened skin, weight loss, and scarring, affected the patient's level of confidence for social relationships.

"I'm embarrassed. People like to take selfies when they meet up nowadays. I feel ugly and unattractive. I look older than my age too. (I'm) skinny, pale, and I don't look good in photos. Others look good and happy in photos... I can't do that." (F, 29 years)

"Since I was ill, I've become very thin. My skin grew dry and darker. So, I have to wear long-sleeved clothes to cover the fistula. They are ugly, as big as eggs. I'm not confident in my appearance" (M,31 years)

**Negative feeling**

The patients in the beginning of undergoing dialysis had many negative feelings, such as fear, sadness, anxiety and frustration. Haemodialysis treatment was done because "there is no other choice." Although it is important, it has become a burden because the treatment is very painful.

"For me, what bothers me the most is that I have to undergo dialysis for the rest of my life. It makes me anxious and feel like an invalid because my life is supported by machine." (M, 27 years)

Depression was a common psychological response. Majority of the patients expressed feelings of depression, namely, thoughts about death and hopelessness, as described by one patient:

"If I remember how miserable is, I thought about wanting to die faster. But I'm very anxious…afraid of death, … afraid of the sins. Worries that always appear to me is if anytime 'I'm taken away'. If I remember how difficult it is to manage my health, I feel hopeless and I want everything to 'end'. But the thought that present time is 'waiting time' and there is 'empty seat' which ready to be 'filled' whenever God wills. It makes me often feel sad and doing a lot of daydreaming." (M, 29 years)

It is understandable if the patients experienced more negative feelings caused by their health condition. Physical conditions, which often decrease, made patients visit the hospital back and forth. This scenario raised negative comments from others on patients who made them feel sad. This following statement describes a patient's experience regarding this matter:

"I feel sad if I listen to other people comment about kidney disease is incurable illness, will get sick for the rest of my life. If my condition is dropping and need to be treated in emergency room, there is always someone commenting 'why are you always sick?'" (F, 36 years)

All patients were given social support by caregivers, including family member, spouse, and children. Although all patients found that family is a source of energy to live, the support given by the family has an ambiguous feeling. It was perceived as social support by the patients, but they felt guilty because they became a burden to the family on the other hand.

"Family, husband, children, and grandchildren are very supportive about getting treatment regularly. Even my nephew likes to remind me and offer a help to accompany to the hospital. But I always feel to be a burden on my family. Especially to my husband, his income always run out and spend on medication, we can't save money like we're used to, I also feel guilty about not being able to perform my duties as a wife and a mother due to the illness" (F, 43 years)

Patients need support from their family because they have regular schedule for hospital visit to do haemodialysis. The long treatment regimen and the constant need to be helped by caregivers could make them feel like burden. Other than that, patient's health condition often worsen over time so they need more attention from their family.

"I feel like I'm a burden to my family for always needing to be taken back and forth for hemodialysis session every twice a week. My son takes me even when he has work. Especially when I can't breathe, he must ready to take me to the E.R." (F,59 years)

**Discussion**

Studies show that dialysis is a life-saving treatment, but is often burdensome to ESRD patients, with potentially serious impacts on QoL (Wan et al., 2015). In this study, QoL was defined as a multiple-dimension concept that concerns an individual's usual or expected physical, emotional, and social well-being.

Regarding the domains of QoL, we found that the symptom and problem list had the highest mean score of the 5 subscales on the

KDQOL-36TM. Symptom and problem list described how bothered patients feels in daily life. ESRD patients reported feeling very bothered by the symptoms of kidney disease and problem related to the symptoms. Patients bothered by sore muscles, fatigue, chest pain, cramps, itchy or dry skin, shortness of breath, faintness/dizziness, lack of appetite, feeling washed out or drained, numbness in the hands or feet, nausea or problems with dialysis access (Veerappan et al, 2012).

From the results of the interview, we also discover that fatique emerged as one of the most persistent and debilitating symptoms. Fatique were expressesed as decrease stamina and low working capacity by the patients. Fatigue is a complex and subjective symptom characterised by extreme and persistent tiredness resistant to rest and recuperation. Forty-nine to 92% of dialysis patients suffer from fatigue (Al Mutary, 2013). This condition caused patients feel weak and less energized. It also restricted the ability of patients to perform many activities. They have a limitation in physical activity, especially work related activities that require physical strength and stamina. This result is in line with the previous findings that fatigue is one of the most common and disabling symptoms which can lead to deflation of daily physical activity and physical performance among patients undergoing haemodialysis (Kopple et al, 2015).

This study also showed that the effect of kidney disease bothered in daily life; patient should fluid limit, diet restriction and should attendance haemodialysis session every week. It can be interpreted that patients had to adapt new lifestyle as results of the nature of the illness. A typical haemodialysis patient will be required to attend dialysis sessions 2-3 times a week for 3–4 hours each time. (Mactier, Hoenich & Breen, 2009) and adherence to dietary recommendations, fluid restriction and prescribed medications, are essential for optimal and effective treatment of patients with ESRD undergoing haemodialysis (Kugler, Maeding & Russel, 2011). Patients need social support, especially from family, spouse and also friends (Mailani, 2015). Based on the interview results, we found that the new life style cause patients feel burdened and guilty toward their family who have to go back and forth to take them to the hospitals in order to get treatments.

The assessment of patients' general health, mental component showed that patients had many negative feeling such as fear, sadness, and also expressed anxiety feeling. Negative emotional state characterized by somatic and cognitive symptoms including feelings of sadness and worthlessness, those descriptions were typical mental symptoms in ESRD patients (Palmer et al, 2013). Research from Patimah et al (2015) and Alamsah et al (2018) explains that patients undergoing haemodialysis experience anxiety. Other research demonstrates that QoL of patients with ESRD is mostly affected by living in fear of dying and experiencing stress due to anxiety about the future and their families, disease outcome, and shortened life span (Xhulia et al, 2016). In this study, the patients also verbalized that negative feeling may related to the changes in their body thus make them have negative perception about their physical appearance. Patients expressed feeling bothered by the changes in their body image as a result of side effects from their treatment that affected their confidence in social relationship.

**Conclusion**

Our study found that QoL of ESRD patients who undergoing haemodialysis bothered physically and mentally because of their illness. Physically, patients disturbed by the symptoms of the illness, burden of living with thus illness and the effect of the kidney disease. All of them inhibited patients to do their daily activities. They also experienced psychological effect of the illness such as negative feelings. The finding from quantitative phase also explained by our finding from qualitative phase.

**Limitations**

This finding cannot be generalized to the larger population of ESRD patient due to the limited sample population examined. In this study clinical and laboratory parameters that related to QoL of patients were not measured. In next study, clinical studies are needed to assess clinical factors determining QoL, as they can serve as baseline data to develop

QoL intervention for improving the QoL related to patients' physical and psychological conditions.

**Acknowledgement**

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# Effect of Life Review and Cognitive Therapy on Depression in Patients with Chronic Renal Failure

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## Abstract

Patients with chronic renal failure suffer higher rates of depression because of psychological stress due to physical and social changes. Efforts to reduce depression level are needed. Cognitive therapy and life review therapy are believed to be effective in reducing depression. The aim of this study was to compare the effects of life review therapy alone and in combination with cognitive therapy on depression in patients with chronic renal failure. This study employed a quasi-experiment with a comparison group design. Fifty-six respondents were selected using a consecutive sampling, which thirty-six were assigned in the experiment and comparison group. Depression was measured using Beck Depression Inventory. Dependent and Independent t-test were used for data analyses. The results revealed that the combination of life review and cognitive therapy had a significant effect (p<.05) in reducing depression compared with the life review therapy alone. The average of depression score decreased in the experiment group from 27.04 (4.71) to 22.29 (4.24). But there was no significant change in the average of depression score in the comparison group from 26.54(4.18) to 26.71 (3.70). This therapy can be used as a complementary medicine to treat patients with chronic renal failure, specifically for those with depression, and it serves as a recommendation for nursing intervention in hemodialysis units.

**Keywords:** Chronic renal failure, cognitive therapy, depression, life review.

## Introduction

Chronic Renal Failure (CRF) is a disease in which the function of kidney organ decreases until it is no longer able to work in filtering the remnants of the body's metabolism and the disposal of body electrolytes, as well as in maintaining fluid balance and body chemicals such as sodium and potassium in the blood or urine production (Vaidya & Aeddula, 2019). In some serious cases, CRF patients are advised or given hemodialysis. However, the state of dependence of the patients on the hemodialysis can result in changes in bio-psycho-socio-spiritual aspects, which most likely make the patients become weak and are unable to carry out activities as usual and helpless. As a consequence, they will be reluctant to meet with others, and withdraw from the social environment (Finnegan-John & Thomas, 2012; Gerogianni & Babatsikou, 2014).

Majority of CRF patients with hemodialysis suffer from depression (Shirazian et al., 2016). Depression is a form of natural disruption characterized by symptoms related to dysfunction of affect, emotions, thoughts and general activities. Depression also refers to a feeling of sadness and loss of interest in everything (Khan et al., 2019; Nur'aeni et al., 2019). Patients with depression generally exhibit distinctive psychological, physical and social symptoms, such as moodiness, prolonged sadness, sensitivity, irritability, loss of morale, lack of confidence, and decreased endurance (Khan et al., 2019; World Health Organization, 2020). Consequently, depression can exacerbate the effects of chronic disease and increase functional disability, make the act of dialysis no longer effective, and reduce the quality of life (Shirazian et al., 2016).

Based on our preliminary study with thirty CRF patients in one hospital in Indonesia, there were three people (10%) had severe depression, six (20%) with moderate-severe depression, five (16.7%) with mild-moderate depression, 10 (33.3%) with mild depression, and 6 (20%) were normal. This indicates that the majority of CRF patients experienced mild to severe depression, which need immediate treatments. According to literature, depressed patients can be treated in the form of psychosocial therapy, such as cognitive therapy, interpersonal therapy, behavioral therapy, psychotherapy and group therapy, and life review therapy (American Psychological Association, 2020; Cuijpers et al., 2019). In this study, the author used cognitive therapy and life review therapy to reduce depression in CRF patients.

According to Sriwattanakomen et al. (2010), cognitive therapy is a therapy that identifies or recognizes negative and destructive thoughts. The therapy can help stop negative thought patterns and change them into positive ones as well as finding out the causes and controlling them (Derubeis et al., 2019; Skoog, 2011). Cognitive therapy is a form of psychotherapy that can train patients to change the way patients interpret and view things when the patients experience disappointment, so they feel better and can act more productively. It is given individually with the expectation that they are able to have healthy thoughts that can form adaptive coping in solving problems (Hayati et al., 2018; Skoog, 2011; Young et al., 2014). Previous studies have shown that the cognitive therapy is significant in reducing depression (Tanaka et al., 2011; Young et al., 2014).

Life review therapy, according to Wheeler (2013), is a retrospective review of existence, critical learning from a life or seeing for a person's past life by reawaking a life event into a more positive life story. Yi and Qunzhan (2019) said that life review therapy is an intervention related to the achievement of Erickson's psychosocial life stages with eight individual psychosocial stages, which individuals struggle to balance life conflicts to achieve successful life stages. This therapy makes individuals know how well they are to manage conflict and give meaning in each stage of life by integrating experiences in the present and the future. The result of this integration is self-acceptance, strong self-identity and meaningful life (Yi & Qunzhan, 2019). The process of life review consists of 4 interrelated parts, namely remembering, recalling, reviewing and rebuilding memory (Orozco et al., 2014). Several studies have examined the effectiveness of this therapy and proved significant in reducing depression (Ando et al., 2014; Lamers et al., 2015; Latorre et al., 2015; Townsend, 2014).

Given the impacts of both therapies, it is assumed that the combination of those would be much more effective than one therapy only. Our review suggested there is no single study that has been conducted in both nationally and internationally in related to the combination of both cognitive and life review therapy. Therefore, the aim of this study was to determine the effect of the combination of cognitive and life review therapy compared with the life review therapy alone in reducing depression among CRF patients.

This study is significant for nursing science because depression in CRF patients is one of nursing problems that nurses should take care of. Nurses are not only focusing on physical condition of the patients, but also psychological, social and spiritual aspects of them. The findings of this study would be benefit for the nurses in the implementation of nursing intervention specifically in the hemodialysis units.

**Method**

This study employed a quasi-experimental research design with pretest and posttest with a comparison group. The population in this study was all patients with CRF undergoing hemodialysis at Raden Mattaher Jambi Hospital. The participants were selected using a consecutive sampling technique. The author chose this technique because the participants were only able to be reached in the hemodialysis units. Therefore, the participants who met the author during data collection were selected based on inclusion criteria until the required sample size was achieved. The inclusion criteria of the participants were: 1) patients with CRF undergoing hemodialysis therapy in hemodialysis units, 2) aged 18–65 years, 3) patients with moderate-severe depression, 4) not experiencing a decrease in consciousness, communicative and cooperative (5) general conditions and vital signs before, during and after hemodialysis therapy showed stable conditions. There were 56 participants included in this study, which 28 were assigned in an experiment group and a comparison group.

To avoid bias, the two groups were selected from different units, which indicated that both

groups were totally different. The sample selection was done first for the experiment group. After all participants were fulfilled, the author then selected participants for the comparison group using a matching method according to the participants' characteristics including age, gender, working status, marital status, education, duration of illness, administration of antihypertensive drugs, and frequency of hemodialysis. The number of participants was calculated using G-power 3.1 analysis program (Faul et al., 2009) at effect size d .8, □ error probability .05, statistical test power .8, which resulted in a total sample of 52 as a minimum sample.

There were two instruments used in this study: 1) Instrument to collect demographic data, which consists of age, gender, working status, marital status, education, duration of illness, administration of antihypertensive drugs, and frequency of hemodialysis; 2) To measure depression, Beck Depression Inventory was used (Beck et al., 1988). The inventory consists of 21 questions. It is also available in the Indonesian version translated by Sakti (2009), with a validity and reliability of .748. However, for this study we also tested the validity with 30 respondents with r value of .514 greater than r table. The inventory uses Likert scale, which the type of negative questions (unfavorable) with a choice of answers that have a range of values from 0 to 3 were only known by the researchers. Depression is interpreted by adding up all the respondents' answers and analyzing the results, which is then classified into 4 categories: normal (0–9), mild depression (10–15), moderate depression (16–30), severe depression (> 30). The inventory was considered reliable using Cronbach's coefficient-alpha with a value of .710.

This study was conducted at Raden Mattaher Hospital in Jambi Indonesia for seven weeks, from April 21, 2017 to June 6, 2017. Data were collected by the researchers and assisted by four nurses in the hemodialysis units. Two nurses in the experiment group, and another two nurses in the comparison group. Prior to data collection, the author explained the research procedures to the nurses, and the author ensured that all nurses understood all processes. Pretest in each group was conducted right before the interventions were

begun, and posttest was done right after the interventions were completed. There was no break between interventions and pretest or posstest.

The experiment group received the combination of cognitive therapy and life review therapy, while the comparison group was only given life review therapy. There was no difference in life review therapy provided in both experiment and comparison groups. The time for cognitive therapy was completely different from life review therapy. The cognitive therapy was implemented first, then followed by the life review therapy. Each meeting was based on an agreement between the researchers and the respondents in consideration of the physical condition of the patients during hemodialysis therapy. The cognitive therapy consists of four sessions carried out in four to five meetings or patient visits to undergo hemodialysis therapy. One meeting was held for about 50 minutes in the hemodialysis unit. While life review therapy consisted of four sessions conducted for 25-30 minutes. This therapy was implemented every day in accordance with the agreed schedule. It was done in groups which were divided into four groups. Each group consisted of seven patients. The methods used in this therapy were discussion, question and answer, and instruction.

Descriptive statistics (mean, standard deviation) were used to describe demographic and depression data. As data were normally distributed, Dependent t-test was used to analyze the depression in each group before and after the intervention, and Independent t-test was used to analyze the difference in depression level after given intervention between the experiment group and the

comparison group. The normality of the data was examined using Kolmogorov-Smirnov test with a result of .93 (>.05). Chi-square test was also used to examine the difference of the participants' characteristics between both groups.

This study was ethically approved by the Research Ethics Committee of Jambi University with approval number of 104 / UN18.5 / LT / 2017 on May 10, 2017. Prior to study, the author provided an explanation of the goals, processes and expectations of this study to all participants. Each participant was asked to sign an informed consent if they were willing to participate. Each participant was also given the full right to approve or refuse to join the study or withdraw at any time without any penalties. This study was conducted by upholding the ethical principles including autonomy, confidentiality, justice, honesty, non-maleficence.

## Results

### Characteristics of Participants

As shown in Table 1, most of the participants were male (32, or 57%), unemployed (41, or 73.2%), having higher educational background (46, or 82,1%), and married (47, or 83.9%). Of the total participants, 35 or 62.5% of the participants were given anti-hypertensive drugs. Chi-square test showed that there was no significant difference between the experiment group and the comparison group based on the characteristics of gender, working status, educational background, marital status and administration of anti-hypertensive drugs.

Table 2 shows that the average age of

**Table 1 Characteristics of Participants According to Gender, Working Status, Educational Background, Marital Status, and Administration of Anti-Hypertension Drug**

| Characteristics | Experiment (n = 28) | | Comparison (n = 28) | | Total (n = 56) | | p-value |
|---|---|---|---|---|---|---|---|
| | **n** | **%** | **n** | **%** | **n** | **%** | |
| **Gender** | | | | | | | |
| **Male** | 16 | 57.1 | 16 | 57.1 | 32 | 57.1 | 1.000 |
| **Female** | 12 | 42.9 | 12 | 42.9 | 24 | 42.9 | |
| **Working Status** | | | | | | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Working** | 7 | 25 | 8 | 28.5 | 15 | 26.8 | 0.763 |
| **Not working** | 21 | 75 | 20 | 71.5 | 41 | 73.2 | |
| **Educational Background** | | | | | | | |
| **Elementary and Junior high** | 3 | 10.7 | 7 | 25 | 10 | 17.9 | 0.163 |
| **Senior high school and University level** | 25 | 89.3 | 21 | 75 | 46 | 82.1 | |
| **Marital Status** | | | | | | | |
| **Married** | 24 | 85.7 | 23 | 82.1 | 47 | 83.9 | 0.716 |
| **Not married** | 4 | 14.3 | 5 | 17.9 | 9 | 16.1 | |
| **Administration of Anti-Hypertension Drug** | | | | | | | |
| **Yes** | 19 | 67.9 | 16 | 57.1 | 35 | 62.5 | 0.408 |
| **No** | 9 | 32.1 | 12 | 42.9 | 21 | 37.5 | |

**Table 2 Characteristics of Participants Based on Age, Duration of Illness, and Frequency of Hemodialysis**

| Characteristics | Group | Mean | SD | Min-Max | 95%CI | t | P-Value |
|---|---|---|---|---|---|---|---|
| **Age (year)** | | 46.93 | 12.534 | 20–65 | 42.07–51.79 | -1.094 | 0.279 |
| Experiment Comparison | | 50.54 | 12.127 | 21–65 | 45.83–55.24 | | |
| | **Total** | 48.73 | 12.355 | 20–65 | 45.42–52.04 | | |
| **Duration of Illness (month)** | | 20.89 | 18.990 | 2–65 | 13.53 – 28.26 | -0.785 | 0.436 |
| Experiment Comparison | | 32.11 | 60.975 | 4–312 | 8.46 – 55.75 | | |
| | **Total** | 26.50 | 45.102 | 2–312 | 14.42 – 38.58 | | |
| **Frequency of Hemodialysis** | | 164.86 | 152.01 | 11–521 | 105.21 – 223.80 | -0.726 | 0.471 |
| Experiment Comparison | | 235.11 | 488.67 | 19–2496 | 45.62 – 424.60 | | |
| | **Total** | 199.98 | 360.32 | 11–2496 | 103.49 – 296.48 | | |

**Table 3 Level of Depression Before and After Given Intervention in the Experiment and Comparison Group**

| Group | Depression | | Mean difference (SD) | t | p-value |
|---|---|---|---|---|---|
| | **Pretest** | **Posttest** | | | |
| | **Mean (SD)** | **Mean (SD)** | | | |
| **Experiment** | 27.04 (4.71) | 22.29 (4.24) | 4.75 (.47) | 8.820 | <.001[a] |
| **Comparison** | 26.54 (4.18) | 26.71 (3.70) | -.17 (.35) | -0.708 | 0.485[a] |
| **p-value** | 0.175[b] | 0.001[b] | | | |

[a]Dependent t-test | [b]Independent t-test

the participants was 48.73 years with the youngest age of 20 years and the oldest age of 65 years. The average length of illness was 26.50 months, and the average frequency of hemodialysis was 199.98 times. Based on the results of the independent t-test, there were no significant differences between the two groups based on the characteristics of age, duration of illness and frequency of hemodialysis (p> .05).

**Level of Depression Before and After Given Intervention**

Table 3 shows that there was no significant difference in the depression level during pretest (p =.175), which indicated that both groups had the same baseline data. Based on the Dependent-t-test, there was a significant difference in the level of depression in the experiment group before and after the intervention (p <.01). But there was no significant difference in the level of depression before and after the intervention in the comparison group (p =.485). Based on the results of the Independent t-test, there was a significant difference in the level of depression after the intervention between both groups, which indicated that the therapy in the experimental group was significantly effective at reducing depression level than the therapy in the comparison group (p =.001).

**Discussion**

Findings of this study revealed that the combination of cognitive and life review therapy had a significant effect in reducing depression level compared with the life review therapy alone. The significant effect of the combination of cognitive and life review therapy in the experimental group could be seen from the difference of the average of depression level between pretest and posttest, with mean of 4.75 and standard deviation of .47 (p <.01). Contrarily, the life review therapy alone in the comparison group did not provide any effects on depression level (p = .485); in fact, there was a slight increase of depression level from 26.54 to 26.71 as indicated in our study. This might be due to the negative feelings during and after life

review therapy that might take time to heal among participants. Each participant might response differently after discussing their lives, which needs to be anticipated. This result however provides the new knowledge in alternative medicine and adult nursing.

Both therapies have different roles, which cognitive therapy focuses on identification of negative thoughts and their causes as well as controlling them to be positive (Derubeis et al., 2019; Skoog, 2011), while life review therapy focuses on changing the negative feelings by acceptance, restoration of self, and resolution of grief (Yi & Qunzhan, 2019). Thus, the combination of both are effective in reducing depression, as indicated in our study.

In addition, this result was in line with the theory outlined by Townsend (2015) who said that the process of implementing cognitive therapy and life experience review therapy is a therapy that is oriented towards the goal of solving patient problems. At the beginning of the meeting, the therapist must identify the problems facing the patient. Then together set goals and expected results in therapy. The process of discussion in solving problems faced by patients is needed when patients begin to recognize cognitive distortion and improve their thinking patterns.

Our results also indicated that the life review therapy alone had no significant effect on depression. This result against the findings from previous studies revealed that there was a significant effect of the single life review therapy on depression (Ando et al., 2014; Lamers et al., 2015; Latorre et al., 2015; Townsend, 2014). According to our study, the life review therapy will be effective if combined with cognitive therapy.

Our study has implications in nursing practice specifically in Indonesia. Most of nursing services especially in the hemodialysis units rarely address the psychosocial aspects of their patients. This can be seen from the format of nursing assessment that only covers physical aspects before, during and after the implementation of hemodialysis therapy. The results of our study suggest that the hemodialysis units should add one assessment dimension, namely the psychosocial aspect of the

patients along with the action plan in the form of nursing care standards. In addition, mental health services in the hemodialysis units can be developed with the intervention of mental nursing in CRF patients who undergo routine hemodialysis therapy. Additionally, this study also suggests that the roles of mental health nurses in the hemodialysis units are necessary in reducing depression of CRF patients, and the combination of cognitive and life review therapy serves as an input for nursing intervention in the units.

The limitation of this study might include the implementation of the interventions which varied among participants dependent on the physical condition of each participant after hemodialysis. Some participants might be strong enough to join, some might not, which might influence the outcomes of the findings. However, the use of the comparison group in this study might reduce the bias. In addition, the time for data collection, specifically for posttest might need little bit more time to adjust the feelings of each individual after the life review therapy. Future studies may need to focus on this factor for consideration. In addition, the results of this study were also limited to chronic renal failure patients undergoing hemodialysis therapy in one hospital which may not be generalized. However, this research can be a reference for conducting research in the same area. To understand depression in patients, different research methods, such as cohort or qualitative study need to be done. Also, to determine the effect of cognitive therapy alone is needed for comparison.

**Conclusion**

It is concluded that the combination of life review and cognitive therapy was significantly effective in reducing depression. Therefore, this therapy is recommended as a part of nursing interventions particularly for the treatment of depression among the patients with chronic renal failure undergoing hemodialysis. The use of life review and cognitive therapy as the additional components of the medical treatment will reflect such a holistic care for the patients in hemodialysis units.

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# The Relationship between Self-Efficacy and Subjective Well Being among Tobacco Farmers

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## Abstract

Tobacco is the main raw material for cigarette production, so it is a dilemma for farmers when choosing to plant it. Uncertain weather in Indonesia has an impact on the success of tobacco cultivation. This study aimed to analyze the relationship between self-efficacy and subjective well being in tobacco farmers in Jember Regency. This study used a cross sectional design with a proportional random sampling technique with a sample size of 422 tobacco farmers. The research instrument used the General Scale Efficacy questionnaire (α-Cronbach 0.76-0.9), Scale with Life Satisfaction (α-Cronbach 0.87), and Scale of Positive and Negative Experience (α-Cronbach 0.80-0, 84). This study uses Chi Square (CI = 95%). The results showed there was a relationship between self-efficacy and subjective well being in tobacco farmers ($p = 0.000$; OR = 4.856). The results of this study are tobacco farmers who have self-efficacy can face crop failure, and this is because of the experience of working as a tobacco farmer, which shows that tobacco farmers worked on average for 23 years with experience of crop failure as much as three times. If farmers have more experience, they can know the weaknesses and strengths of tobacco farming to overcome the problems in the scope of tobacco cultivation. Increased work experience, the farmer is getting bolder in making decisions and dare to bear the risk. This study are expected to help the public health office at the Primary Health Care Service to improve psychosocial health promotion efforts through a joint farmer group.

**Keywords**: Self efficacy, subjective well being, tobacco farmer.

## Introduction

Every job has problems that will impact the work, including tobacco farmers as well. The uncertain weather in Indonesia (Herminingsih, 2014), cheap tobacco selling price (Santoso et al., 2017) and the presence of the WHO (World Health Organization) to reduce smoking behavior and cigarette tobacco production (WHO, 2018) and the competition activities of anti-tobacco or cigarette campaigns (Ematia et al., 2012) is a vulnerability to farmer work stress. According to the research of Santoso et al. (2017) explained that farmers are still confused to manage tobacco results so that farmers are forced to sell their crop to the pressing of tobacco with a cheap selling price. It is undoubtedly detrimental to tobacco farmers. Farmers experiencing working stress will have an impact on declining health conditions due to high workloads. Therefore, it is crucial to know the psychological health as supporting welfare and increased productivity (Susanto et al., 2015).

Based on the results of the study of Septiani (2019) showed that tobacco farmers in Kalisat sub-district experience a key symptom including a sad feeling (68.1%) and loss of interest in any matter (59.3%). Tobacco farmers complained of stress due to irregular weather changes causing the crop to fail. Based on a qualitative study conducted by Susanto and Widayati (2018), farmers revealed that when the crop fails, it can have an impact on sleep quality and irritability. Farmers feel they have spent cost and expensed a lot of energy for tobacco planting. An irritable feeling is an indicator of the high negative emotions of subjective well-being. Besides, there is dissatisfaction due to an unpleasant crop failure experience also included in the subjective well-being. Farmers who have the satisfaction of their lives can control emotions and moods well. Diener et al., (1999) explains this individual happiness called the subjective well-being concept. Based on some research that has been explained, farmers have not been able to properly manage their emotions while facing tobacco farming problems. It can have an effect on subjective well-being on the farmer's self.

In the research of Yamin (2019) explain farmers often feel anxious and worried when conducting business in the field of agriculture such as ease to obtain the means of production of crops as desired, the occurrence of failed harvest flood, the presence of pests and diseases and the selling price of crops. In addition to the problems in tobacco farming, the problem related to the economy also affects the emotional condition of tobacco farmers (Septiani, 2019). Poor psychological conditions will result in a reduced sense of delight, comfort, and can reduce one's productivity.

In the problem mentioned above, tobacco farmers in the district Kalisat Jember District have an unstable emotional experience that is an indicator of subjective well being due to various problems during the planting of tobacco. Based on the above background, researchers to determine the level of self-efficacy with subjective well being in tobacco farmers in Kalisat District, Jember Regency.

## Method

Design research used observational analytic using a cross-sectional approach. The research samples are tobacco farmers who are incorporated in the farmer group in 12 villages in Kalisat subdistrict. The criteria of inclusion of research subjects include farmers as farm laborers, working only as tobacco farmers (during the tobacco planting season), aged 35–60 years (based on Diener's theory), already married, living with the family, have never experienced crop failure. The sampling technique uses proportionate random sampling, a large sample of 422 respondents taken using the Slovin formula.

The instruments used by the General Scale Efficacy. Questionnaire have ten statements with level indicators, strength, and generality. The Questionnaire was examined by Ralf Schwarzer and Matthias Jerusalem with the Alpha range of Cronbach 0.76-0.9 (Born, Schwarzer & Jerusalem, 1995). The measurement subjective well being with affective and cognitive indicators using two questionnaires, namely Scale with Life Satisfaction (α-Cronbach 0.87) developed by Diener, Larsen, Emmons & Griffin (1985).

A questionnaire for the Scale of Positive and Negative Experience (α-Cronbach 0.80-0.84) was scaled from Diener et al. (2009). This scale is a Likert scale that presents six lists of positive emotions, six lists of negative emotions. The statistical test used was Chi-Square (CI = 95%). It is given the

ethics commission of the Medical Research (KEPK) Faculty of the Dentistry University of Jember with the test number No. 684/UN 25.8/KEPK/DL/2019.

**Results**

**Table 1 A characteristic description of tobacco farmer respondents in Jember district**

| Variable | N | (%) |
|---|---|---|
| Age (median; min-max) | 47 | 35–60 year |
| length of working (median; min-max) | 23 | 2–49 year |
| The Experience of failed harvest (median; min-max) | 3 | 0–15 time |
| Income (Rupiah) (median; min-max) | 1000000 | 500000–2000000 |
| Gender | | |
| Male | 317 | 75.1 |
| Female | 105 | 24.9 |
| Education Level | | |
| Elementary School | 228 | 54.1 |
| Junior High School | 113 | 26.8 |
| Senior High School | 81 | 19.2 |

Source: Primary Data researcher, January 2020

**Table 2 Frequency of respondents in variable subjective well being**

| Indicator | Median | Min-Max |
|---|---|---|
| Subjective Well Being | 35 | 3–57 |
| Affective: Life Satisfaction | 26 | 12–33 |
| Cognitive: Emotional Experience | 9 | (-8)–32 |

Source: Primary Data researcher, January 2020

**Table 3 Distribution of respondents in variable subjective well being**

| Variable | Amount | Percentage |
|---|---|---|
| Subjective Well Being | | |
| High | 265 | 62.8 |
| Moderate | 157 | 37.2 |
| Low | 0 | 0 |
| Total | 422 | 100.0 |

Source: Primary Data researcher, January 2020

This study illustrates the demographic characteristics of tobacco farmers, subjective well-being, self-efficacy, and the relationship between self-efficacy and subjective well-being of tobacco farmers.

Demographic characteristics of tobacco farmers as follows (table. 1)

## Subjective Well Being of Tobacco Farmers

The depiction of subjective well being on tobacco farmer's Jember District includes life satisfaction and emotional experiences over the last four weeks (table 2).

Based on table 2. It indicates that the median value gained in the subjective well-being variable is 35, which means tobacco farmers have high subjective well being. The

median value of life satisfaction is 26, which means the average tobacco farmer is satisfied with his life, and an emotional experience indicator shows a median value of 9, which means tobacco farmers have a highly balanced emotional experience between positive and negative emotions.

## Self-efficacy of Tobacco Farmers

An overview of the self-efficacy of tobacco farmers Jember District includes levels (relating to the level of difficulty experienced by individuals), strength (referring to the experience of the individual) and generality (relating to how broadly the task field is determined).

**Table 4 Frequency of respondents to self-efficacy variables**

| Indicator | Median | Min-Max |
|---|---|---|
| Self-efficacy | 32 | 21–40 |
| Level | 9 | 5–12 |
| Strenght | 10 | 6–12 |
| Generality | 12.50 | 8–16 |

Source: Primary Data researcher, January 2020

**Tabel 5 Distribution of respondents in variable subjective well being**

| Variable | Amount | Percentage |
|---|---|---|
| Self-efficacy | | |
| High Self Efficacy | 281 | 66.6 |
| Moderate Self Efficacy | 141 | 33.4 |
| Low Self Efficacy | 0 | 0 |
| Total | 422 | 100.0 |

Source: Primary Data researcher, January 2020

**Table 6 Relation to self-efficacy with Subjective Well Being farmer Tobacco**

| Self Efficacy | Subjective Well Being | | | p Value | OR |
|---|---|---|---|---|---|
| | High | Medium | Total | | |
| High | 211 (75.1) | 70 (24.9) | 281 | 0.000 | 4.856 |
| Medium | 54 (38.3) | 87 (61.7) | 141 | | |
| Total | 256 | 157 | 422 | | |

Based on table 4 it indicates that tobacco farmers have high self-efficacy with a median value of 32. The scoring mentions that the higher the score shows, the higher the self-efficiency, the lower the score under 21 indicates low self-efficacy. The minimum score of research is 21, so it can be said that no tobacco farmer has no low self-efficacy. The generality indicator obtains the highest median value of 12.50, while the level indicator acquires the lowest median value of 9.

The results showed a link between the self-efficacy with subjective well being on tobacco farmers (p = 0.000; OR = 4.856). Tobacco farmers have a high self-efficacy then will have a chance of 4 to five times having a high subjective well being.

## Discussion

### Subjective Well Being of Tobacco Farmers

Subjective well being interpreted as life evaluation with the indicator is life satisfaction and emotional experience. The results of this research show that tobacco farmers have high subjective well being. The results of this study supported the previous research on the characteristic relationship of farmers with the well-being of rice farmers conducted by Yamin et al. (2018) in Palembang, which showed that subjective well-being farmers gained an average high overall score. This research differs from the research conducted by Sukowati (2019) about the relationship between positive thinking and subjective well-being on farmers, where the research explains that the level of subjective well-being is relatively low, which means the satisfaction of his life is lacking. The difference of opinion with Sukowati (2019) is due to the rise of the selling price of crops that make farmers can only be resigned to the government to stabilize the price of crops. The low selling price affects the income that farmers have earned to meet the needs of the family.

Several factors can affect the level of subjective well-being of tobacco farmers, both on the indicators of life satisfaction and emotional experiences such as age, education, income, great work, failed harvest experience, marital status, and social support. Among these factors that have the most considerable influence is income because it is related to the fulfillment of family needs. Lucas et al., (2007) explained that there is a relationship between income and subjective well being. Good financial condition will provide a good life for individuals.

### Self-efficacy of Tobacco Farmers

The results of self-efficacy research show that tobacco farmers in Jember district have high self-efficacy with a median value of 32 which is in the range 31-40. The results of this study were by previous research discussing the efficacy of self-associated with stress on tobacco farmers, in which individuals have self-efficacy in high category (Andriyani, 2019). Other studies that are consistent with this study are Puspita et al. (2019) which discusses the factors that influence the safety behavior of tobacco farmers, one of them self-efficacy shows that 66.7% of tobacco farmers have high self-efficacy. The study's results differed with the study discussing the relationship of self-efficacy with the use of Personal protective equipment (PPE) in farmers, where the research shows that farmers have a low category (Aji, 2015).

Self-efficacy has several indicators, such as levels, strength, and generality. The results of this research are known that tobacco farmers in Jember district have an indicator that shows the highest average value of the generality indicator. The generality indicator relates to the specified task field, how broadly with the abilities and beliefs possessed in completing the task (Bandura, 1997).

The strength indicator relates to the experience possessed by the individual. The increasingly long experience will increase the power of confidence and firmness in striving. This indicator can support the individual to encounter difficulties (Aji, 2018). Researchers argue several factors can influence the efficacy of self on indicator strength among others age, length of work over 23 years, experience failed to harvest. It can support farmers to create strength and confidence.

The results of self-efficacy research on the level indicators show the lowest average score. Level indicators relate to the level

of difficulty experienced by individuals. Different levels of individual stress will determine the ability to resolve the problem (Aji, 2015). Researchers argue that the educational factor is a significant factor in the level indicators. This indicator occupies the lowest value, so it needs to be improved in the required knowledge at the level of difficulty experienced. Knowledge enhancement can be done through educational activities or counseling in farmer groups.

Individuals have high self-efficacy so the individual is able to control the events and actions taken will be more effective because it can affect the mind, motivate and affect one's physical health when acting (Stuart, 2013).

**Relation to self-efficacy with Subjective Well Being farmer Tobacco**

This research showed there is a significant relationship between self-efficacy and subjective well-being on tobacco farmers in Jember District. It stated that people who have low self-efficacy would be at risk 4 to 5 times have a low level of subjective well being.

The research is in line with research conducted by Maujean and Davis (2013), which suggests that high individual self-efficacy can increase the individual's positive feelings and provide a positive relationship with life satisfaction. The study supported previous research conducted by Pramudita and Wiwien (2015) explaining that there was a connection between self-efficacy and subjective well being with a P-value of 0.000 and its correlate value of 0.341. The other studies explained that there is a positive relationship between self-efficacy and subjective well-being (Agustina and Afriyeni, 2016; Dearly & Sri, 2016). However, this study differed with the research of the Situmorang (2017), which examines the subjective well-being of the leader's contemplation reviewed from the role of optimism and self-efficacy, indicating that there is no correlation at all (p = 0.135 and r = 0.486).

Diener et al. (2009) Explaining someone is said to have a high subjective well when the individual has a life satisfaction, always feels joyful, and rarely feels negative

emotions such as sadness, anger, despair, etc. Individuals with high subjective well-being will feel more confident, friendly, and socially bonding, and can demonstrate better work performance.

Self-efficacy is the main source of the coping in the context of personal beliefs that can be used as an ability to organize and implement the set of actions needed to produce something that is wanted to be achieved, and It will ultimately provide life satisfaction an indicator of subjective well being. A person with high self-efficacy can see things positively, dare to face challenges, perform tough tasks, and consider problems as something to be solved rather than a threat to avoid (Ariyanto, 2016).

Individuals who have high self-efficacy can cope with deep pressure in life. In this research, tobacco farmers who have high self-efficacy capable of facing problems in the planting period of tobacco; this is because the experience of working as a tobacco farmer is shown that tobacco farmers work on average for 23 years. Work experience is required in tobacco farming activities that serve to take the opportunity of tobacco farmers to improve the optimal tobacco yield (Sari, 2017). If farmers have more experience, they can know the weakness and advantages of tobacco farming to overcome problems in the sphere of tobacco cultivation. According to Herminingsih (2014), Increasing work experience makes farmers increasingly brave in making decisions and dare to bear the risk. Knowledge of farming can indirectly affect a farmer's mindset. Farmers who have a long experience in the field of tobacco farming can plan and conduct better farming efforts due to understanding in all aspects of tobacco farming (Ariyanto, 2016).

Tobacco farmers who can plan and perform the actions needed to produce something that they want to achieve will ultimately give life satisfaction. Individuals who have high self-efficacies can see things positively, dare to face challenges, perform tough tasks, and consider problems to be solved rather than a threat to avoid. It will help the individual to evaluate his life thoroughly so that he is subjective well being. When individuals have low self-efficacy will be prone to depression, anxiety, and despair for fear of facing

challenges and fear of failure in tobacco farming efforts (Rachmah, 2017).

## Conclusion

There is a correlation between self-efficacies and subjective well-being on tobacco farmers in Kalisat district of Jember District. Tobacco farmers have a high self-efficacy then will have a chance of four to five times having a high subjective well being. This research aims to help Nurse improve psychosocial health promotive efforts through the combined farmer group. Farmers are expected to create high self-efficacy in the level indicators by increasing knowledge. In contrast, the family and social environment are expected to provide support and good attention so that the high subjective well being can be achieved.

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# Exploring of Nurses' Needs of New Design Intravenous System Device to Support Nursing Care Effectively

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## Abstract

Fluid control is important to support the success of therapy in the hospital. The existing features of the device currently do not fully support to ease the work of nurses. It is necessary to explore deeply the nurse's need for the features of a new device intravenous system. The purpose of this study was to explore the nurse's need for new design intravenous system devices to support nursing care effectively This was a qualitative study with thematic analysis methods. The participants were 20 nurses in Gotong Royong Hospital Surabaya taken by purposive sampling method. Data were collected by an in-depth interview. The instrument consists of structured questions. The interviews were recorded by a digital recorder. Ethical requirements are completed before data collection. This study found 4 themes consist of the economical price, multi-automatically system, flexible design, and simplicity. The nurse's needs for a new design intravenous system device was designed more economical than today's sophisticated device, and have more complete of automatic system, flexible and easy to use. These features match the needs expected by nurses and further assist in carrying out the nursing care process effectively and efficiently.

**Keywords:** Automatically, device, economical, intravenous system, nursing care.

## Introduction

Giving intravenous fluid therapy is a collaborative action between nurses and physicians. It is an important part of the nursing care plan because the management of fluid therapy has to administer appropriately. The infusion pump was an effective device to provide fluid, blood, and treatment to patients, it contributed to improving the quality of patient care because of the greater level and accuracy to reduce medication errors (Padmaja & Kalgal, 2013). If it could not running well, it causes a variety of adverse side effects to patients. Currently there are many medical devices to control intravenous fluids automatically, but these tools do not fully feature to help ease the work of nurses and each error often in its implementation. A study stated that even the automatic infusion pump program, there was still a large portion of programming that was done manually (Scott Evans et al., 2010). Another study stated that nurses made mistakes in administering drugs through smart pump infusions (58%), this was because the pump programming still used manual mathematical calculations performed by nurses (Trbovich et al., 2010). This was more complicated and can cause high risk of errors when the workload of nurses was high in every shift. Previous studies declared that 105 nurses at Nishtar Medical College and Multan Hospital in Pakistan experienced nurses' workload performance with high average consumption time in the implementation of nursing care activities in the morning shift (57.10%) and evening (52.1%), this is higher than the night shift that only has an average consumption time with non-nursing activities (Safdar et al., 2019).

A study of 634 patients with intravenous drug and infusion therapy found an error rate of 1.4 times. It showed that the human error towards therapeutic programming conducted by high health workers such as nurses (Morales-González & Galiano Gálvez, 2017). In a study to 40 nurses in charge of administering intravenous fluid therapy in an adult intensive care unit, several errors were found such as errors in the setting and programming of primary continuous intravenous infusion, errors in identifying veins for infusion therapy, flush rate errors after intravenous injection, errors in preparing secondary intravenous infusions, and errors in administering intravenous pump boluses (Pinkney et al., 2014). Another study reported that failure to use an intravenous smart pump in reducing intravenous medication error, due to inappropriate features (Nuckols et al., 2008).

Expensive costs are one of the problems that cause hospitals to only have a limited supply of smart pumps. A study stated that for the average patient's utility costs, continuous infusion pumps have a total cost of € 199,296 (Quitian et al., 2015). The operational costs of managing and maintaining the use of infusion pumps have very high costs, therefore most of the infusion pumps in hospitals are in storage and are rarely exchanged between departments, the maintenance process is not monitored so it is not clear whether the current level of care meets the infusion pump maintenance regulations or not (Kemper et al., 2009). Most hospitals only use infusion control devices in certain units such as the intensive care unit (ICU). Several studies stated that research on smart pumps was carried out in the ICU because the majority of the use of these devices is only done in critical units (Giuliano, 2018; Manrique-Rodríguez et al., 2013).

In previous study on intravenous therapy, it was stated that the technology used demands additional cognitive abilities from doctors and nurses, causing failure in the use of tools and obstacles that arise in the device are not easily detected (Cassano-Piché et al., 2012). A study of smart intravenous pumps implemented in academic hospitals stated that initially the use of only a few nurses had positive acceptance of the smart intravenous pump technology, and that over time there was no significant increase in nurse's acceptance (Carayon et al., 2010). This proves that the creation of new design devices that are not based on the needs of nurses will be able to cause a mismatch of features in the device. When will design a more effective device, further exploration is needed about the features of the device to facilitate the work of nurses. Almost all of the previous studies that have been described above do trials to health workers on the effectiveness

of infusion pump devices that are designed with a variety of technologies, but there was no research that explores further what exactly was needed by health workers, especially nurses on technology, a new device about smart infusion pump.

The purpose of this study was to explore the nurse's need for new design intravenous system devices to support effective nursing care effectively.

## Method

This study was a qualitative study used COREQ guideline to hold the research, with thematic analysis method. This method was used to obtain descriptions from participants by identifying patterns and finding themes through collected data.

The populations were 25 nurses in Gotong Royong Hospital Surabaya, to be able to provide a realistic description of the nurse's need for a new design of intravenous system device with expected features. Samples were selected from the population used purposive sampling through inclusion criteria consist of 1) nurses who had work experience at least 1 year, 2) nurses who had the minimum educational background was a diploma, 3) nurses who have done installation and monitoring of infusion more than 5 times, 4) nurses who have ever operated a manual infusion installation and automatic infusion pump. Nurses who appropriate with the inclusion criteria then approached by the researcher by explaining the objectives, benefits, and research procedures, and freedom of participation in this research. Nurses who were willing to be respondents then asked to sign an informed consent sheet as a form of consent. The sample size was 20 nurses based on inclusion criteria. Some 5 nurses were taken out as respondents because they just worked for less than 1 year.

Data were collected by an in-depth interview. The interview process did by the researcher. The researcher is female and worked as a lecturer and the researcher's relationship with the respondents before the research was conducted was a working relationship. This hospital is one of the hospitals which is used as a place for student practices area where researchers work and researcher as an academic preceptor in this hospital. The interviews were conducted in the nursing room, only the researcher and one nurse in this room and interview process recorded by a digital recorder. Researchers asked some questions to respondents based on structured question guidelines made by researchers, and respondents provide open answers. Each interview process lasted on average of 20 minutes and the researcher didn't make interruption during the interview process.

After the interview results were recorded, then it was transcribed verbatim by researchers and typed in Microsoft Word. The next step researcher did the coding process. The coding process method used was in vivo code that was the researcher wrote the code by the words used by participants. After all the code was completed, then continue to be evaluated again to find the code relevant to the research. When all the data has been coded, the codes that have the same meaning were made into groups. After that researcher selected the theme, the researcher reviews all the codes and groups that have been formed to ensure that the codes within each group have the same meaning. Groups that have a common meaning are collected into a theme. The last stage was to determine the conclusions/ verification of analysis results.
Ethics Approval and Consent to Respondents

This study has been carried out the ethical tests conducted by medical faculty of Widya Mandala Catholic University and stated ethical. Explanation of the research procedures, purposes, advantages, and risk-informed to participants and signing the informed consent who agreed as participants.

## Results

**Table 1 Demographic Characteristic**

| Demographic Data | Result |
|---|---|
| Age, year (mean + SD) | 30 + 6.3 |

| | |
|---|---|
| Gender | |
| Female | 19 (95%) |
| Male | 1 (5%) |
| Length of working | |
| 1 – 3 years | 8 (40%) |
| 4 – 6 years | 8 (40%) |
| More than 6 years | 4 (20%) |

**Table 2 Main Themes and Categories**

| Themes | Category |
|---|---|
| 1. Economical Price | Economical price for patients |
| | Economical price for hospitals |
| 2. Multi-Automatically System | Stops automatically |
| | Monitoring remaining intravenous fluids automatically |
| | Drops calculate automatically |
| | Alarm system automatically |
| | Internet monitoring |
| 3. Flexible design | Flexible for mobility |
| 4. Simplicity | Easy to use |

**Table 3 Participant's narratives**

| Themes/ Category | Participant's Narratives |
|---|---|
| **Theme 1: Economical price** | |
| **Category** | |
| Economical price for patients | Participant 4 said: "Other devices could not be used for patients with poor economic status, because of expensive hire costs, this new device should be cheaper to be used for all patients who receiving intravenous therapy with various economic status" |
| Economical price for hospitals | Participant 7 said: "This device should be marketed at an affordable price to be purchased by the manager of a hospital to the hospital has a lot of stock that could be used by all patients" |
| **Theme 2: Multi-Automatically System** | |
| **Category** | |
| Stops automatically | All participants expected that the device could stop automatically when the intravenous fluid runs out, to prevent air embolism. |
| Monitoring remaining intravenous fluids automatically | Participant 12 said: "During this time, nurses check the remaining fluid manually by looking at the infusion bottle, but the new device is expected to be monitored through the screen on the device" |

| | |
|---|---|
| Drops calculate automatically | Participant 3 said:<br>"To facilitate the work of nurses, so the new device must be able to automatically count the drip like an existing infusion pump" |
| Alarm system | All participants expected that the device equipped with an alarm system to be able to detect if the infusion fluid runs out or when there are an infusion flow obstacles, to that nurses could easily take immediate action to overcome it |
| Internet monitoring | Participant 12 said:<br>This new device should be able to monitor the intravenous fluids at the nurse station through the internet network |

**Theme 3: Flexible design**

**Category**

| | |
|---|---|
| Flexible for mobility | Participant 1 said:<br>"This device should be flexible and can be used by patients who have started learning wheelchair mobilization"<br>Participant 16 said:<br>"This device must have a quality battery so that if the light turn of or when the patient delivered to the radiology room/ physiotherapy room it can still be used without electricity" |

**Theme 4: Simplicity**

**Category**

| | |
|---|---|
| Easy to use | Participant 13 said:<br>"The device must be easily operated by new nurses without special training"<br>Participant 8 said:<br>"The device must be designed in a sophisticated yet simple way to operate" |

## Discussion

To create a new design intravenous system device, it was needed input from nurses about the various features expected. Based on the results in table 3 found that participants asked the economical price of the eco-smart intravenous device, they expected the device to be designed with quality materials but the selling price can be affordable to be programmed in patients and to be invested by hospitals. Currently the use of intravenous pumps has only been provided to patients who have special problems such as patients in the Intensive Care Unit. Even though in the inpatient ward the use of infusion pumps should also be done to improve patient safety. But in reality in the inpatient ward is never done because the cost of hiring the device to be paid by patients is very expensive, besides the sale price of the equipment is also expensive which causes the hospital does not have enough funds to provide infusion pump equipment in large quantities. A study stated that hospital financial resources are limited, it causing hospitals cannot be able to provide infusion pumps that have an automatic ability to calculate drugs and infusion rates, so as an alternative solution a simple formula is needed to calculate infusion droplets to prevent error rates (Wright, 2007). The use of smart pumps can reduce annual expenditure and it proved to be an alternative with lower costs compared to conventional infusion systems, this allows for savings, especially in services in the ICU (Palacios Rosas et al., 2019).

The result in table 3 also found that the majority of participants expected that the new design of the intravenous system device can be designed to stop automatically. A

study stated that the infusion pump must have the ability to stop the infusion fluid that runs out automatically (Doesburg et al., 2017). Other nurses in this study expected that the new design of the device also to be able to monitor the remaining intravenous fluid automatically through the screen of the device. A study explained that the infusion rate was adjusted to the flow rate needed with the help of display on accuflow. The flow rate as shown by the accuflow display is checked every 15 minutes until the end of one hour, simultaneous notes from the manual reading are also made (Shroff et al., 2007).

Drops calculate automatically was also one of the features expected by nurses. A prior study reported that manually calculating infusion drops often causes errors and failure in the programming of infusion fluid therapy to patients. A case study conducted at a large hospital obtained data that the lack of confidence level of nurses in performing mathematical calculations manually related to the calculation of infusion droplets (Lee, 2008). One of the most common nurse mistakes is an error in calculating the dose of the drug and the rate of drip solution (Toney-Butler & Wilcox, 2019).

The most participant in this study expected that the design of a new device intravenous system used an alarm to monitor any trouble effectively. From the nurse's point of view, alarm sounds from a device signify something wrong about the patient's condition and it needs to be followed up clinically so that the potential for detecting problems and improving better care increase (Cosper et al., 2017). The findings on this study contradicted the results of other studies which stated that the majority of nurses agree that infusion pump alarms interfere with patient care, but perceptions about these alarms are indeed different, so it is not appropriate to apply broadly the general alarm management recommendations for infusion pump alarms to this time (Vitoux et al., 2018). A study reports that alarms on infusion pumps arise because there is no flow or excess flow, slow flow, blocked intravenous lines (Shroff et al., 2007). To make the alarm effective for a device, it should refer to World Health Organization (WHO) regulations which recommend that hospital sound levels should

not exceed 30 decibels (dB) for continuous noise and 40 dB (for maximum sound). At the ICU patients who need constant monitoring and by using technological advances, the measured noise level exceeds WHO 40 dB standards and peaks at 45 dB, even during curfews when patients need rest (Ryan et al., 2016). An alarm at the infusion pump can be meaningful because it encourages timely responses from service providers or nurses, but the presence of an alarm can also cause problems such as noise because patients need a calm and peaceful environment to be able to rest (Graham & Cvach, 2010). Therefore we need a tool that has a warning alarm but also does not provide significant problems with noise.

Internet monitoring was a feature expected by nurses in the results of this study. So far no infusion pump can be monitored by nurses directly at the nurse station through internet network. A study conducted an internet-connected monitoring platform for IV infusion space, this device allows doctors and nursing staff to monitor the drip parameters wirelessly. The monitored data is transmitted to commercial cloud services using the HyperText Transfer Protocol Application Programming Interface. This data is saved and visualized for ease of readability for nurses and doctors (Sardana et al., 2019). Another study learned about the intravenous infusion system with automatic control, the sensor unit is designed to interact with a centralized server so that data can be uploaded directly to the cloud so that it can be easily accessed by end-users such as medicine, patient relatives (Kumar et al., 2020)

This study also found that nurses expected the new design of the intravenous system device to be flexible for a patient who was mobilizing in wheelchairs, or when a patient was being delivered to other units for treatment. It means that the device must be practical and easy to carry. This was contrary to the design of other smart pump devices which a form was not possible to carry anywhere and the patient feels uncomfortable on the indicators of position, lighting, noise, circulation, and shape (Arimbawa & Nugraha, 2018). One study assessed flexibility from another perspective that was a disposable infusion pump with characteristics that are

lightweight, small in size, easy to use, free of external power supplies, and disposable, but there are disadvantages namely the possibility of inaccurate flow rates, lack of facilities to change the flow rate and volume of bolus doses to provide analgesia which provides inadequacy, the inability to track a patient's history of analgesia requests (Skryabina & Dunn, 2006). Portable electronic infusion pumps are widely used by using a power source from the battery to power the pumping mechanism of the liquid that is connected to the infusion solution reservoir, but the accuracy of the infusion flow rate ranges from 5–8% (Oliver, 2016).

This study also found that nurses expected the new design of the intravenous system device will be easy to use for all nurses. Tools or device that were easy to use can trigger job satisfaction of nurses. This was consistent with a study which stated that one indicator of nurse job satisfaction was working conditions, namely the presence of adequate work equipment (Patrisia et al., 2018). It was supported by another study that Smart Pump Technology ambulatory can be implemented successfully in a Home Infusion Provider in small urban and rural areas. The user states that the pump is easy to use and the potential for patient safety increases. This study also shows that Smart Pump Technology can be used effectively by patients with high levels of satisfaction (Brown et al., 2018). Sometimes the use of smart pumps iv requires a little complicated programming method, so in fact, some strategies used by nurses working in busy and emergency areas are reluctant to use them because they are considered to be time-consuming, so nurses will program them manually even with alarm devices very undesirable because it makes the room noisier and increases psychological stress (McAlearney et al., 2007). A finding shows that smart pumps that are programmed by nurses require a mathematical conversion of a low secondary infusion success rate (55.6%), so that smart pump infusion does not have a significant effect in preventing dosage errors unless smart pumps are programmed hard that cannot be changed, they can prevent dosage errors, thereby increasing patient safety (Trbovich et al., 2010). Nurses have a responsibility for collaborative actions to

provide the intravenous fluid therapy, but the problem faced by nurses in conducting proper fluid therapy management is the lack of training in therapeutic management, therefore that infusion pumps are considered as the technological resources that most contribute to patient safety (Moreira et al., 2017). This is similar to the results of the previous study, which states that nurses receive positively the efficiency of the application of smart pumps intravenous although some performance of the device is considered still less effective (Carayon et al., 2010).

In this study there was a limitation that this study was only done in one hospital, it has not fully represented the whole opinion of nurses about the new design of device expectation for the intravenous system of therapy. The recommendation of this study is that a new intravenous system device that will be designed, will be tested at this hospital as well.

However based on the results of this study can provide significant implications about the features of the new intravenous system device needed by nurses, therefore this research can continue to create a new device about intravenous systems which useful for nurses to support the implementation of nursing care effectively.

## Conclusion

The new design of intravenous system device was expected have several important features and criteria based on nurse's need to support effective nursing care, this feature and criteria consist of having an economical price for patients and hospitals, have a multi-automatically system (stop automatically, monitoring remaining intravenous fluid automatically, drops calculate automatically, alarm system automatically, internet monitoring), the device must be flexible for mobility and easy to use.

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# Demographic Factors and Disease History Associated with Dementia among Elderly in Nursing Homes

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## Abstract

Dementia is increasing in the world which is a major cause of disability and dependence in the elderly. This causes the elderly can not do their daily activities so often live in a nursing home. It is important to know the factors associated with dementia to prevent and treat dementia with appropriate interventions. The objective of this study was to identify the demographic factors and disease history associated with dementia among elderly in nursing homes. The research method was cross sectional study. Sample were recruited from three nursing homes located in Bandung and Garut using purposive sampling technique for a-3 month period (n=163). Data were collected using questionnaire consisting of demographic data, disease history, and MMSE (Mini Mental State Examination). The analysis of data was performed using chi-square test, fisher test, and logistic regression analysis. In term of its association with dementia, low education had the higher odd ratio (OR: 5.90, 95% CI: 2.02-17.20, p=0.001) than unmarried status (OR: 4.78, 95% CI: 1.23-18.52, p=0.024) and stroke (OR: 0.23, 95% CI: 0.06-0.88, p=0.032). However, diabetes mellitus was identified as confounding variable (OR: 0.10, 95%CI: 0.01-1.01, p=0.051). In conclusion, low education, unmarried status, stroke, and diabetes mellitus were predictor factors of dementia among elderly in nursing homes. It is recommended to include effective treatment could be in the form of health education about management of stroke and diabetes, physical activity, improvement of nutritional adequate, and social activities to prevent loneliness.

**Keywords:** Dementia, diabetes mellitus, education, marital status, stroke.

## Introduction

Dementia is a clinical symptom that is indicated by the degradation of cognitive function progressively that burdens an individual's daily activities (Duong, Patel, & Chang, 2017). In 2015, there were around 46.8 million of people with dementia worldwide, which was predicted to increase up to 74.7 million in 2030 and 150 million in 2050 (Livingston et al., 2017; Baumgart et al., 2015). The estimated number of people with dementia in Indonesia in 2015 reached 1.2 million. That number is predicted to double by 2030, and to 4 million by 2050 (Kemenkes RI, 2016). This is related to higher life expectancy in people in developed countries, so that the elderly population and dementia people also increases.

Dementia globally is a health and social care problem that affects individuals, families and friends due to an increase in dependency, behavior change, and health financing (Livingston et al., 2017; Fitriana et al., 2019). In 2015 it was estimated that the cost for dementia management was USD 818 billion globally and was predicted to continue to increase along with the increase in dementia population (Livingston et al., 2017). Cognitive decline is one of the reasons for families to transfer the elderly to the institutional care in nursing homes, especially those with severe dementia, behavioral disorders, depression, and disturbances in carrying out daily activities (Dramé et al., 2012; Toot, Swinson, Devine, Challis, & Orrell, 2017). However, a study demonstrated that dementia patients is found 19 times higher in nursing home than in the community (Hoffmann et al., 2014).

The association of Alzheimer's reports that diabetes, obesity, smoking, and hypertension can increase the risk of dementia (Baumgart et al., 2015). Other factors related to dementia are age, ethnicity, gender, genetic, physical activity, drugs, education, alcohol, comorbidities, and the environment (J. H. Chen, Lin, & Chen, 2009). According to Perhimpunan Dokter Spesialis Saraf Indonesia (2016), risk factors of dementia involve unmodifiable risk (age, gender, genetic factors) and modifiable risk (hypertension, hypercholesterolemia, diabetic mellitus, stroke, diet, exercise, stress, heart disease, high homocysteine, and follicle acid deficiency).

A study in China involving 943 elderly in nursing homes revealed that the stroke history had risk 1.515 times becoming dementia (Xu et al., 2017). Meanwhile, a study in Taiwan show that increased dementia is found 1.42 times in the elderly with widowed or widowed status (Fan et al., 2015). Xu et al (2017) study show that age related to dementia among elderly in nursing homes (OR 1.029). The other study show that osteoarthritis had risk 1.25 times (Huang et al., 2015) and diabetes 1.18 times (Crane et al., 2013) becoming dementia. However, a study about disease history as modifiable risk of dementia in Indonesia is limited. The purpose of this study was to identify demographic factors and disease history associated with dementia among elderly in nursing homes.

## Method

A cross-sectional study was conducted from January to March 2019. The subject of the study was taken using purposive sampling technique from three nursing homes: Budi Pertiwi Bandung, Senjarawi Bandung, and Rehabilitasi Lansia Garut, West Java. Nursing homes provide residential care for elderly also reffered to as old people's homes, care homes, or long-term facilities. The subjects involved in this study had fulfill the age criteria (> 60 years), good hearing and vision, and were willing to become subject of the study. In total, 176 subjects aged 60 years and older were initially enrolled in the study, of whom 13 subjects were excluded for the following reasons: refusal to partisipate, language problems, and severe auditory and visual deficits. The elderly subjects or their caregiver signed the informed consent before the study was conducted. The study was conducted at the Ethic Committee of Universitas Padjadjaran (No.1266/UN6. KEP/EC/2018).

The instrument to collect the data was a questionnaire containing questions related to respondents' identity and anamnesis related to disease history according to the doctors or nurses. The dementia test used MMSE (Mini Mental State Examination) containing

30 questions related to orientation, memory, language, registration, and attention, with the score < 24 was set as criteria for dementia (Arevalo-Rodriguez et al., 2015). Data was collected by interviewing the elderly subjects and nursing home staffs, observing the ability to do daily activities, and physical assessment of the elderly subjects.

The elderly subjects were divided into two groups, dementia and non-dementia (including the MCI patient). Demographic data consists of age, sex, education, and marital status. Educational categorization divided the subjects into high and low levels of education. Low level education covered subjects who were education $\leq$ 9 years or never receive formal education, elementary school level, and junior high school level). Meanwhile, the subjects with educational background of senior high school and higher were considered having high level education. Marital status classified the subjects into married and unmarried (never married, widowed, or divorced). Meanwhile, disease history consist of hypertension, heart disease, stroke, diabetes mellitus, rheumatic, osteoarthritis, and uric acid.

The data were analyzed using statistical program for social sciences (SPSS) version 25. The elderly subjects were divided into two categories: dementia and non dementia. Univariate tests using mean and standard deviation, frequency, and percentage. Test of Normality used Kolmogorov smirnov. Mann-whitney used to compare numerical data (MMSE, BMI (body mass index), sistole, diastole) and chi-square test or fisher exact test to compare categorical data (age, sex, education, marital status, disease history). Multivariate tests used logistic regression to determine the final model of variables related to dementia (Nuraeni, Mirwanti, Anna, & Nurhidayah, 2019). Multivariate analysis revealed the result of calibration test of Hosmer-Lameshow with the value p=0.772. The Hosmer-Lameshow test to determine goodness of fit for logistic regression models. Differences were considered statistically significant for p values of less than 0.05.

**Results**

The research was conducted for three months from January to March 2019 on 176 elderlies in three nursing homes. On 163 elderlies who fulfilled the inclusion criteria consists of 110 elderlies gained the average score of MMSE was 12.78 ± 9.23 for dementia group and 53 elderlies gained the score was 26.85 ± 2.01 for non-dementia group (p<0.001). However, there were no significant comparison on body mass index, sistole, and diastole between dementia and non-dementia group (Table 1).

Most of the dementia elderly, 84 elderlies (69.4%) were in the ≥70 years age category; 81 elderlies (71.1%) were female; 104 elderlies (73.2%) had low education; 106 elderlies (69.3%) were unmarried; and 57 elderlies (64.8%) had hypertension history.

**Table 1 Characteristics of the elderly with and without dementia**

| Variable | Dementia (n=110) | Non-dementia (n=53) | p |
|---|---|---|---|
| MMSE (score), mean (sd) | 12.78 (9.23) | 26.85 (2.01) | <0.001* |
| BMI (score), mean (sd) | 21.62 (3.51) | 22.61 (3.92) | 0.070 |
| Sistole (score), mean (sd) | 131.59 (19.53) | 131.17 (15.98) | 0.843 |
| Diastole (score), mean (sd) | 78.11 (9.74) | 77.15 (7.87) | 0.451 |

*p<0.05; p-value were derived from Mann-whitney test*

**Table 2 Association of demographic profile and disease history with dementia**

| Variable | Dementia (n=110) | Non-dementia (n=53) | p | OR | (95%CI) |
|---|---|---|---|---|---|
| **Age (years), n (%)** | | | | | |
| 60–69 | 26 (61.9) | 16 (38.1) | 0.370 | 0.72 | 0.34–1.49 |

| | | | p | OR | (95%CI) |
|---|---|---|---|---|---|
| ≥70 | 84 (69.4) | 37 (30.6) | | | |
| Sex, n (%) | | | | | |
| Female | 81 (71.1) | 33 (28.9) | 0.138 | 1.69 | 0.4–1.49 |
| Male | 29 (59.2) | 20 (40.8) | | | |
| Education, n (%) | | | | | |
| Low | 104 (73.2) | 38 (26.8) | <0.001* | 6.84 | 2.48–18.92 |
| High | 6 (28.6) | 15 (71.4) | | | |
| Marital Status, n (%) | | | | | |
| Unmarried | 106 (69.3) | 47 (30.7) | 0.062 | 3.38 | 0.91–12.55 |
| Married | 4 (40) | 6 (60) | | | |
| Hypertension | | | | | |
| Yes | 57 (64.8) | 31 (35.2) | 0.423 | 0.77 | 0.39–1.48 |
| No | 53 (70.7) | 22 (29.3) | | | |
| Heart disease | | | | | |
| Yes | 4 (66.7) | 2 (33.3) | 0.636 | 0.96 | 0.17–5.43 |
| No | 106 (67.5) | 51 (32.5) | | | |
| Stroke | | | | | |
| Yes | 4 (36.4) | 7 (63.6) | 0.029* | 0.25 | 0.007–0.89 |
| No | 106 (69.7) | 46 (30.3) | | | |
| Diabetes mellitus | | | | | |
| Yes | 1 (16.7) | 5 (83.3) | 0.014* | 0.09 | 0.01–0.77 |
| No | 109 (69.4) | 48 (30.6) | | | |
| Rheumatic | | | | | |
| Yes | 19 (82.6) | 4 (17.4) | 0.095 | 2.56 | 0.82–7.94 |
| No | 91 (65.0) | 49 (35.0) | | | |
| Osteoarthritis | | | | | |
| Yes | 14 (77.8) | 4 (22.2) | 0.323 | 1.79 | 0.56–5.72 |
| No | 96 (66.2) | 49 (33.8) | | | |
| Uric Acid | | | | | |
| Yes | 3 (50) | 3 (50) | 0.301 | 0.47 | 0.09–2.40 |
| No | 107 (68.2) | 50 (31.8) | | | |

*p<0.05; p-value were derived from chi-square or fisher test

**Table 3 Final model factors associated with dementia**

| Variable | B | S.E. | Wald | df | p | OR | (95%CI) |
|---|---|---|---|---|---|---|---|
| Low education | 1.78 | 0.55 | 10.56 | 1 | 0.001 | 5.90 | 2.02–17.20 |
| Unmarried status | 1.57 | 0.69 | 5.13 | 1 | 0.024 | 4.78 | 1.23–18.52 |
| Stroke | -1.48 | 0.69 | 4.58 | 1 | 0.032 | 0.23 | 0.06–0.88 |
| Diabetes mellitus | -2.27 | 1.16 | 3.81 | 1 | 0.051 | 0.10 | 0.01–1.01 |

*p<0.05; B: beta; S.E.: standar error; OR:odd ratio; CI: confidence interval

Bivariate test showed that dementia was significantly related to education (p<0.001). Dementia was also shown to significantly correlated with stroke (p=0.023) and diabetes mellitus (p=0.007) (Table 2).

The logistic regression results showed that dementia was significantly related to low education (OR: 5.90, 95% CI: 2.02-17.20, p=0.001), marital status (OR: 4.78, 95% CI: 1.23-18.52, p=0.024), stroke (OR: 0.23, 95% CI: 0.06-0.88, p=0.032). However, diabetes mellitus was identified as confounding variable (OR: 0.10, 95%CI:0.01-1.01, p=0.051) (Table 3).

## Discussion

The results showed that demographic factor and disease history that associated with dementia among the elderly in nursing homes consists of low education (p=0.001), unmarried status (p=0.024), stroke (p=0.032), and diabetes mellitus (p=0.051). The study showed that the number of elderly subjects with dementia in the studied nursing homes was higher than those without dementia, and this had close correlation with the factors of age, sex, and education. A study in Europe involving 45,340 elderly demonstrated that the group of patients of < 75 years old had dementia score of 1%. This figure increased to 3.5% in the age group of 75-84 years and 10.4% in the age group of > 84 years (Ferreira, Brandão, & Cardoso, 2018). Although our results did not show relation with age, this factor is considered one of the determining factors for dementia (Qiu & Fratiglioni, 2018).

The higher percentage of female subjects in our study might be related to the longer life expectancy in female compared to male. In addition, the physiology of female individual is influenced by alteration of hormonal level. Thus, the decreased level of estradiol in menopause women compromises the protective function estrogen as an antitoxic agent that leads to neuronal death (Hestiantoro et al., 2019; Fitriana et al., 2019). Chêne et al (2015) study show that the risk of dementia in women is significantly higher than men after the age of 85 years. This finding is in line with a study in China show that sex not related with dementia (Xu et al., 2017). Chen et al (2016) study found that increased risk of dementia among older women associated with short sleep duration, that is ≤ 6 hours/ night (HR 1.36).

The results further showed that the lower the education level elderly had 5.9 times the risk of becoming dementia. This finding is in line with a study conducted in China, involving 943 subjects, showing a correlation of high level of education with low risk of dementia (OR 0.587) (Xu et al., 2017). Another study has demonstrated that high level of education could prevent dementia by maintaining cognitive function (Lamotte et al., 2016). A systematic literature review revealed contradictory results with regard to correlation between education and dementia. In 58% of the reference significant correlations were shown while in the rest 42% of no correlation was found. The data suggested, however, relationship between education and dementia was consistent in developing compared to the developed regions (Sharp & Gatz, 2011). Post mortem brain histology could further delineate the correlation between education level and dementia, as demonstrated by a study which showed that individuals with higher education had higher brain weight compared to those with lower education level. The study associated this finding with higher synaptodendritic development which eventually led to neurogenesis in individuals with higher education level (Brayne et al., 2010).

Marital and parental status were shown to play important role in the incidence of dementia as shown by a study result involving 354 dementia respondents that demonstrated widowed patients and those who had no children had higher risk of developing dementia (Sundström, Westerlund, Mousavi-Nasab, Adolfsson, & Nilsson, 2014). Different study recruiting 10,432 elderly that showed increased risk of dementia in individuals with widow or widowed status further corroborate the relation of marital status in dementia (Fan et al., 2015). The absence of partner was associated with stressful events leading to depression, and eventually lowered cognitive performance and dementia. Increased risk of dementia was also observed in unmarried subjects, especially in divorced and unmarried

at all, aged 50 to 64 compared to those who were married.

Several hypotheses have been put forward on the protective effects of marriage against dementia. Marriage is associated with increase social support that could prevent anxiety and depression (Holwerda et al., 2014). An aspect related to marriage is sexual activity, and in this respect a study involving 6,833 subjects of 50 to 89 years of age found that subjects who were sexually active for one year showed lower risk of dementia (Wright & Jenks, 2016).

In this study we found significant relationship between dementia and stroke (p=0.032). This is because stroke can cause vascular dementia (Xu et al., 2017). In line with our data, the results of a prospective cohort study from 22 hospitals and 8 studies in the community with 7,511 subjects revealed a higher prevalence of pre-stroke dementia. Furthermore, an earlier study showed that 10% of patients had dementia before the first stroke, 10% developed dementia soon after the first stroke, and one third of the subjects had dementia after multi strokes (Pendlebury & Rothwell, 2009). Studies investigating stroke has certain characteristics which may increased risk of dementia such as the presence of multiple lesion, the volume of infarcts and the location of stroke (e.g. left hemisphere). According to pathogenic mechanisms process in brain a neurodegenerative process triggered by stroke by disrupting amyloid clearance or by activating autoimmune responses to brain antigens produced post-stroke and its also related to accumulation of amyloid in arterial walls of cerebrovascular (Kuźma et al., 2018).

In this study we found the final model of factors that associated with dementia showed that diabetes mellitus is confounding variable (p=0.051). This is because causative relationship between diabetes and cognitive decline in patient with dementia has not yet been clearly established. Inadequate cerebral circulation and recurrent hypoglycemic episodes in diabetic vascular diseases have been suggested to cause subclinical brain damage and permanent cognitive impairment (Li, Cesari, Liu, Dong, & Vellas, 2017; Kurniawan & Yudianto, 2016). Besides that, type 2 diabetes mellitus could cause cognitive impairment due to neurogenesis damage, vascular dysfunction, brain-blood barrier dysfunction, inflammation, hyperglycemia, and insulin resistance that lead ischemia and accelerates the pathology of Alzheimer's disease (Umegaki, 2014). The other study showed that diabetic patients were 60% higher at risk of developing dementia than those without diabetes, and women with diabetes had 19% higher risk of developing vascular dementia than men (Chatterjee et al., 2016).

**Conclusion**

The results of the study showed that demographic factors and disease history that associated with dementia among elderly in nursing homes included low education, unmarried status, stroke, and diabetes mellitus. One of the consequence of these findings is that appropriate interventions are needed to prevent and treat dementia in the elderly staying in nursing homes. Health workers can prevent and slow the progression of dementia by providing health education about management of stroke and diabetes, physical activity, improvement of nutritional adequate, and social activities to prevent loneliness. Further studies can be conduct on the prevalence and risk factors of dementia with a greater number of respondent both in nursing homes and community in Indonesia.

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# Beta Binaural Beats and its effects on the Cognition of Nursing Students in a Private Higher Education Institution

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**Abstract**

Studying nursing comes with a certain expectation to work hard and take a certain amount of time. A promising method called beta binaural beats is thought to improve cognitive functions. This study aimed to determine whether listening to beta beats is an effective method for improving cognition among nursing students. A double-blinded experimental research design was utilized and measured the effects of the intervention towards memory, abstract reasoning and reading comprehension. A total of 89 subjects participated in this study. Only the score of reading comprehension showed a significant difference (t=2.38, p=.02). The findings suggest that beta beats is an effective way in enhancing reading comprehension. However, findings show that beats aren't effective in enhancing memory and abstract reasoning. Therefore, this may be used as a method to enhance learning.

**Keywords:** Abstract reasoning, beta binaural beats, cognition, memory, nursing students, reading comprehension.

## Introduction

A student carries a lot of responsibilities and one of the essential key responsibilities is to study. Many students enter college expecting good times, friendship and a good sense of direction. However, that is not always the case, students later figure out how challenging and struggling college life is. A study by Dy et al. (2015) entitled "Stressors and Stress Responses of Filipino College Students" stated that out of 258 students, 72% manifested cognitive stress responses due to academic stressors.

Moreover, studying nursing comes with a certain expectation to work harder on average than most other students. They deal with lectures and practical taking up a great deal of time. In addition, nursing is considered to be one of the most stressful career choices. It entails student to gain knowledge and skill through classroom lectures, long exam, return demonstration and rotating shift works in the hospital and participate in community programs.

A nurse is required to know anatomy and physiology, biology, pharmacology and other areas of nursing science. However, nursing students have difficulty in remembering too much information. A study conducted by Potter et al. (2005) stated that nurses who have lower working memory capacity are more likely to make medical errors.

Furthermore, usually most students read and highlight terms or definitions they don't even understand (Conca, 2010). Although remembering concepts are significant, it is highly important to be able to comprehend as well since nurses play a huge role in providing patient education. Contextualized learning experience and collaborative construction of knowledge is important in achieving positive outcomes for students' clinical- reasoning skills (Yauri et al., 2019).

As early as their first year, nursing students are taught to think outside the box. They are trained to develop critical thinking skills. Nurses are faced with decision-making situations in patient care, and each decision they make impacts patient outcomes. Nursing critical thinking skills drive the decision-making process and impact the quality of care provided (Vest as cited in Ericksen, 2017).

As students in the chosen profession for the present study, the researchers have witnessed the need for improving cognitive processes: memory, reading comprehension and abstract reasoning. Students often complain on how to attain memory retention while being able to comprehend medical terms and as to how to choose the best answer in situational questions during long exams.

Based on literature, there is a promising tool used to enhance cognitive functions called binaural beats. Binaural beats, discovered by Heinrich Wilhelm Dove, is the difference between two pure tones with different frequencies introduced to each ear separately that is perceived by the brain (Oster, 1973). It has shown to entrain brainwaves from one state to another. Binaural beats is thought to exert effect on cognitive functioning and mood (Lane et al., 1998) specifically beta binaural beats. A study conducted by Garcia-Argibay et al. (2017) revealed significant findings of beta frequency binaural beats amounting to 20 hertz to the subjects who performed free recall and recognition tasks. Exposure to beta frequency binaural beats yielded a great proportion of correctly recalled words and a higher index in recognition tasks. Another study on the effects of beta binaural beats conducted on college students showed a significant increase in their memory (Kennerly, 2013). This study test investigated whether listening to beta binaural beats is an effective method for improving cognition such as memory, reading comprehension and abstract reasoning among nursing students.

## Methods

An experimental research design was utilized in the study wherein an intervention or treatment was introduced. Experimental studies are designed to test causal relationships to test whether the intervention caused changes in or affected the dependent variable (Polit & Beck, 2017). The dependent variables are the quality of memory, reading comprehension, abstract reasoning and the independent variable is the use of binaural beats.

The study was performed in an institution in highly urbanized city in the Philippines

offering five programs of study: Nursing, Medical Technology, Physical and Occupational Therapy and Biology. The subjects were from the fourth-year nursing students. Experiment was done in one of the classrooms for two days. The room can accommodate up to 50 people and is air conditioned and well ventilated.

The researchers decided to utilize the total population of the fourth-year nursing students, which is a total of 100 subjects excluding the researchers. They are divided into two sections. Section A has 52 students while Section B has 48 students. Only 89 subjects participated (45 for experimental group, 44 for control group) in the study since eight of these students had another important school activity to attend to, two of the students had an important family event and one was excluded from the study due to a heart problem (premature ventricular contractions). Majority (83%) of the subjects were females (See Table 1). The study was approved by Velez College Ethics Review Committee prior to data collection. All eligible research subjects were informed through phone or personal contact that they were invited to participate in the study and should meet the researchers at the actual research venue for a short orientation. Eligible students were asked to read the consent form which contained the procedure, duration and sessions, possible risks and benefits of the study involved in the binaural beats music therapy. The subjects were randomly assigned to either experimental or control group. The subjects were screened first with a researcher made screening tool which required them to write their names and age. A yes or no question screening tool was given since there were certain conditions which were contraindicated with binaural beats such as seizure, individuals with pacemakers and heart problems and to know if the subjects had their own earphones and smartphones. The researchers lent smartphones and earphones for those who didn't have. The participants were blinded and did not know which group they were assigned. The study only took one session for each subject since the immediate psychological effects on memory, attention were shown to benefit from even a single session of brainwave entrainment (Huang &

Charyton, 2008). Brainwave Entrainment is a method of influencing or shifting brainwave patterns and binaural beats is type of audio brainwave entrainment. The binaural beats were done in the same room but in a different day for each section. To enhance attendance in the study the students were reminded personally or was contacted through their phone to remind them about the scheduled session. Each subject was required to bring their own earphones and phone to be used during the intervention. There were 2 audio files, one file contains the beta binaural beats (experimental) and the other has the delta binaural beats (control), one of the 2 files were blue toothed randomly by the researchers to each subject's smartphone. A pretest was given first followed by the intervention. During the intervention everyone followed the signal of the researchers as to when they would play and listen to the binaural beats. They were informed that they are not allowed to listen to any other music but only the binaural beats. The control group listened to delta binaural beats while the experimental group listened to beta binaural beats for 15 minutes. The beta binaural beats used is standardized already in which the difference between two ears is 20Hz since we are using beta beats it should be around 14-30 hertz and the volume was on what the subject is most comfortable with. Once everyone was done listening to the binaural beats, they immediately took the post test. The pretest and post test questions were not of the same content but had the same level of difficulty.

To test for memory, a researcher made tool was given in which 20 random medical-related words were mentioned for a maximum of five minutes and then the research subjects were asked to write as much as they can remember after they took the reading comprehension exam. For reading comprehension the International English Language Testing System will be the instrument used. It is the most appropriate instrument to measure the variable. The IELTS is an international standardized test of English language proficiency. IELTS has four parts which are the following: listening, reading, writing which are completed in one sitting and speaking. Only the reading part of the IELTS was utilized by the researchers. It

is composed of 13 items in which they have to answer questions regarding the story or article they have read. For abstract reasoning, the Non-Verbal Figurative Test by GetMyUni (n.d.) was used. It is composed of 15 items in which they were to choose from the choices on which figure was missing. The scores were interpreted by getting the mean score for each test and then standard deviation was used to measure how scores differ from the mean score.

Statistical analysis was done using SPSS with $p < 0.05$ as the significant value. Demographic data were processed using descriptive statistical analysis. In addition, the differences between and within groups were analyzed using the paired t-test, and independent t-test

## Results

A total of 89 subjects participated in this study. They were allocated into two groups. The control group (n=44) received the delta binaural beat while the experimental (n=45) received the beta binaural beat.

As observed in Table 1, in a total number of 89 subjects, they ranged from about 18-23 years old. The average age is 20 years old.

**Table 1 Demographic profile of fourth year nursing students**

| Profile | F | % |
|---|---|---|
| Age* | | |
| 18 | 1 | 1.12 |
| 19 | 37 | 41.57 |
| 20 | 39 | 43.82 |
| 21 | 7 | 7.87 |
| 22 | 4 | 4.50 |
| 23 | 1 | 1.12 |
| Gender | | |
| Male | 15 | 16.85 |
| Female | 74 | 83.15 |

Note: *Mean= 19.76; SD= 0.88

**Table 2 Pretest Scores of Experimental and Control Group**

| Variable | Control | | Experimental | | t | p | CI | |
|---|---|---|---|---|---|---|---|---|
| | M | SD | M | SD | | | LL | UL |
| Memory | 6.27 | 2.20 | 6.33 | 2.71 | 0.12 | 0.91 | -0.98 | 1.10 |
| Reading Comprehension | 5.95 | 2.01 | 6.04 | 2.24 | 0.20 | 0.84 | -0.81 | 0.99 |
| Abstract Reasoning | 9.18 | 2.04 | 8.73 | 2.30 | -0.97 | 0.33 | -1.36 | 0.47 |

Note: M=mean, SD=standard deviation, CI=confidence interval, LL=lower limit, UL=upper limit

**Table 3 Pre-test and Post-test Scores of Experimental and Control Group**

| Variable | Pretest | | Post-test | | t | p | CI | |
|---|---|---|---|---|---|---|---|---|
| | M | SD | M | SD | | | LL | UL |
| Experimental | | | | | | | | |
| Memory | 6.44 | 2.83 | 7.28 | 3.30 | -1.62 | 0.11 | -1.90 | 0.21 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Reading Comprehension | 5.95 | 2.35 | 6.95 | 2.19 | -2.33 | 0.03* | -1.87 | -0.13 |
| Abstract Reasoning | 8.82 | 2.32 | 8.69 | 2.37 | 0.30 | 0.76 | 1.73 | 0.99 |
| Control | | | | | | | | |
| Memory | 6.20 | 1.81 | 6.86 | 3.19 | -1.17 | 0.25 | -1.80 | 0.48 |
| Reading Comprehension | 6.03 | 2.08 | 5.71 | 1.71 | 0.75 | 0.46 | -0.53 | 1.16 |
| Abstract Reasoning | 9.40 | 2.05 | 8.66 | 2.93 | 1.37 | 0.18 | -0.36 | 1.85 |

Note: M=mean, SD=standard deviation, CI=confidence interval, LL=lower limit, UL=upper limit
*p<0.05

**Table 4 Post-test Scores of Experimental and Control Group**

| Variable | Control | | Experimental | | t | p | CI | |
|---|---|---|---|---|---|---|---|---|
| | M | SD | M | SD | | | LL | UL |
| Memory | 7.05 | 3.32 | 7.04 | 3.18 | 0.001 | 0.99 | -1.37 | 0.37 |
| Reading Comprehension | 6.00 | 1.84 | 7.00 | 2.11 | 2.38 | 0.02 | 0.16 | 1.84 |
| Abstract Reasoning | 8.59 | 2.67 | 8.51 | 2.31 | -0.15 | 0.88 | -1.13 | 0.97 |

Note: M=mean, SD=standard deviation, CI=confidence interval, LL=lower limit, UL=upper limit
*p<0.05

**Table 5 Adverse effects experienced by the research subjects**

| | Experimental | Control | Total |
|---|---|---|---|
| Headache | 2 | 4 | 6 |
| Ringing of ears | 2 | 3 | 5 |
| Both | 2 | 2 | 4 |
| None | 39 | 35 | 74 |
| Total | 45 | 44 | 89 |

Majority were females (83%).

An independent t-test further revealed that that there is no significant difference in pretest scores of both groups for memory (t =.12, p =.91), reading comprehension (t =.20, p =.84) and abstract reasoning (t =-.97, p =.33).

To test if there is a significant difference between the experimental and control group's pretest and post test scores, a paired t test was done. The paired t-test revealed that there is no significant difference in the control group in terms of memory (t =-1.17, p=.25), reading comprehension (t =.75, p =.46) and abstract reasoning (t =1.37, p = .18). On the other hand,

the experimental group showed a significant difference in reading comprehension (t =-2.33, p =.03).

An independent t-test further revealed that there was no significant difference in post-test scores of both groups for memory (t =.001, p =0.99) and abstract reasoning (t =-.15, p=.88). However, there is significant difference in the post test score for reading comprehension (t =2.38, p =.02).

As seen in Table 5, a total 15 people experienced adverse effects. Six people experienced headache, five people experienced ringing of the ears, and four people experienced both.

## Discussion

The pre-test scores between scores indicates that both, the experimental and control group, are more or less likely of the same level in terms of cognition specifically in memory, reading comprehension as well as abstract reasoning. This would reflect a successful randomization of subjects between the two groups. Randomization pertains to the random selection of each subject to a group of either experimental or control with its primary function to secure comparable groups for equality with respect to extraneous variables. It is considered to be the most effective method of controlling extraneous variables and eliminates selection bias in which the random selection of subjects to either the experimental or control group is not achieved (Polit & Beck, 2017).

Those in the experimental group had higher scores in reading comprehension compared to the control group. This suggests that the beta binaural beats is effective in reading comprehension. This is in line with the Helmholtz's theory which states that a frequency following response is made by the brain to match the frequency of the stimuli which entrains the brain into a beta brainwave pattern. Beta brainwaves is associated with attention. Moreover, it is said that the higher the attention span, the more likely it is for reading comprehension to increase (Yildiz & Çetinkaya, 2017). This suggests that the beta binaural beats is effective in reading comprehension. Furthermore, attention would influence information processing of complex information (Wulandari & Ismail, 2019).

Studies show that an enhanced reading comprehension skill improves reading fluency. It increases the accuracy of word recognition and would allow you to understand structured sentences clearly while skimming and scanning. These studies have also stated that reading comprehension is associated with attention. In line with that, studies have shown that beta binaural beats can increase attention (Garcia-Argibay et al., 2019; Kennel et al., 2010)

However, the paired t-test in the experimental group revealed that there is no significant difference for memory (t =1.62, p =.11) and abstract reasoning (t =.30, p =.76). This is contradicting to several studies which stated that beta binaural beats is an effective method in facilitating memory. (Garcia-Argibay et al., 2019; Huang & Charyton 2008; Kennerly, 2013). No studies have been found with regards to the effects of beta binaural beats on abstract reasoning.

After the intervention was done, the scores of the experimental group in terms of reading comprehension improved. Improving reading skills will reduce unnecessary reading time and enable a person to read in a more focused and selective manner. The person will also be able to increase their levels of understanding and concentration. Among other studies, an effective result in memory was shown after using beta binaural beats as an intervention (Garcia-Argibay et al., 2019; Huang and Charyton, 2008; Kennerly, 2013). On the other hand, no studies were found about the effects of beta binaural beats on abstract reasoning. Ringing of the ears was a side effect based on experience by the subjects. For the subjects who experienced these effects, they were given the choice whether they would want to continue to participate in the study. All 15 subjects who experienced these effects claimed that they were relieved after resting or sleeping.

There may be some potential limitations to this study. Only the 4th year nursing students were included in the study since there were no enrollees for the lower year levels due to a recent shift in the basic education system during data collection. Therefore, a larger population may increase the possibility of obtaining a significant relationship. The study was conducted in the afternoon wherein the subject was already exhausted due to their morning classes. Lastly, there are unavoidable external noises that may have altered the result of the study.

## Conclusion

Nursing students had improved their reading comprehension while using beta binaural beats. It is effective in reading comprehension, but not in memory and abstract reasoning. Therefore, beta binaural beats may use as a way of boosting cognition specifically

reading comprehension.

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# The Effect of Combination Pranayama Yoga and Endurance Training Exercise on Peak Expiratory Flow (PEF) in Adult Asthmatic Patients

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**Abstract**

Pranayama Yoga can help improve breathing, and improve calm and also relieve stress. Endurance training can increase lung capacity, improve fitness, and relax the body. However, the combination of pranayama yoga and endurance exercises has never been done in asthma patients. The purpose of this study was to analyze the combination of pranayama yoga exercises and endurance exercises for Increased Peak Forced Expiration Flow. The design of this study was Quasy Experiment with a pretest-posttest control group design, the location of the study was in the pulmonary clinic of Universitas Airlangga Hospital and Haji General Hospital in Surabaya, East java. Respondents were selected by purposive sampling techniques in accordance with inclusion criteria with a total of 72 respondents. Peak Expiration Flow is measured from forced vital capacity or The peak expiratory flow (PEF) is the maximum flow obtained within the first 200 milliseconds of a forced expiratory maneuver after inhalation to total lung capacity (TLC). The intervention group was given a combination exercise by doing pranayama yoga and endurance exercise for 6 weeks, 2x per week, 51 minutes for each training session. Pranayama yoga combination exercises and endurance exercise using trainer instructors and modules. FPEF and asthma control were measured every week for 6 weeks. The results showed a significant difference in the level of FPEF and asthma control before and after 6 weeks of interventions combination of pranayama yoga and endurance exercise in the intervention group obtained significance values ($p < 0.05$) with $p = 0.000$ and asthma control in the intervention group ($p < 0, 05$) with $p = 0.000$ the results of the research shows that by practicing pranayama yoga and endurance exercise can improve FPEF and asthma control. Pranayama yoga and endurance exercise can be used as an complementary therapy in supporting pharmacological therapy to improve FPEF and control asthma.

**Keywords:** Asthma, endurance exercise, PEF, pranayama yoga.

## Introduction

Asthma is a chronic airway disease that is a public health problem in various countries. Asthma can be mild and does not interfere with activities, but can be sedentary and disrupt activities and even daily activities. The prevalence of asthma has risen sharply and asthma is now known as the most frequent cause of disability, requires large costs and preventable illness (Atmoko, Faisal, Bobian, Adisworo, & Yunus Faisal, 2011; Yang ZY, Zhong HB, Mao C, Yuan JQ, Huang YF, Wu XY, Gao YM, 2016).

Asthma was once thought to be a disease caused by smooth muscle spasm, now asthma is a complex inflammation that controls clinical and physiological changes. Asthma sufferers are people who are dependent on drugs and breathing aids that require expensive costs. As a heterogeneous disease, asthma is usually characterized by chronic airway inflammation. Typical symptoms of asthma are wheezing, shortness of breath, chest tightness, and coughing that vary from time to time and experience limited expiratory airflow (GINA, 2018).

According to the World Health Organization (WHO, 2018), asthma sufferers of 235 million people, the death rate from asthma in Indonesia reached 24,773 people or about 1.77% of the total population of the population, this data also puts Indonesia at number 19 in the world regarding asthma deaths. GINA (GINA, 2018), an estimated 300 million people suffer from asthma. The average global prevalence of asthma ranges from 1% to 18% of the population of various countries. The number of asthma sufferers in the world reaches 300 million people. This number is expected to continue to increase to 400 million by 2025. The prevalence of asthma sufferers in Indonesia is 4.5% with the highest incidence occurring in women at 4.6%. The highest prevalence of asthma sufferers was found in Central Sulawesi (7.8%), followed by East Nusa Tenggara (7.3%), in Yogyakarta (6.9%), and East Java with an asthma prevalence of (5.1%) (Badan Penelitian dan Pengembangan Kesehatan, 2013).

Efforts made by health workers at Universitas Airlangga Hospital and Haji General Hospital in Surabaya, provide information about asthma such as avoiding stress, cold weather, dust, cigarettes, and other allergens and providing asthma medication but still do not show an increase in PEF and control asthma.

Asthma symptoms can be controlled by pharmacological and non-pharmacological therapies, pharmacological therapies, for example, administering lozenges and inhalation therapy. Providing pharmacological therapy aims to relax bronchial smooth muscle, increase mucociliary cleansing and modulate the release of allergen mediators from mast cells, but even though the patient has taken asthma treatment, there are still 50% of patients with the uncontrolled state, 30% partially controlled, 20% fully controlled (20% controlled) (Julvainda Eka Priya Utama, 2018; Quirt, Hildebrand, Mazza, Noya, & Kim, 2018). This shows that most patients are not controlled, despite asthma treatment. Until now, health workers continue to conduct research related to pharmacological and non-pharmacological therapies. Non-pharmacological therapy is used as a support for pharmacological therapy to increase peak expiratory flow (PEF) and the degree of asthma control. One of the non-pharmacological therapies that can increase the peak flow of forced expiration and asthma control is pranayama yoga practice and endurance exercise.

One of the non-pharmacological therapies that can increase Peak expiratory flow (PEF) and asthma control is yoga pranayama and Endurance training exercise. Yoga has been recommended for pulmonary rehabilitation programs and in addition to physical therapy in rehabilitation programs and has been shown to improve mind and body coordination. Yoga is called a "low-impact" sport that can be tailored to the needs and abilities of its practitioners so that it is suitable for anyone including asthmatics through asanas (yoga postures) and pranayama (breathing techniques). Short-term studies on yoga practice have reported an increase in pulmonary physiological parameters, increased diffusion capacity, reduced rates of stress due to tightness and improved quality of life (Cramer, Posadzki, Dobos, & Langhorst, 2014; Liu et al., 2014).

Breathing exercises in yoga can activate the hypothalamus part of the brain's response which can affect good emotions and have an effect on asthmatics (Chandra, 1994; Liu et al., 2014; William Fernando Benavides-Pinzón, 2017). In addition to Pranayama Yoga that can be given to asthma patients, there are epidemiological studies that endurance exercise can extend life expectancy and reduce the risk of chronic diseases. The effects of endurance exercise in addition to enlargement of muscle fibers, mitochondria which will increase the source of muscle energy, makes the muscles not easily tired. This is by the needs of asthma patients who tend to get tired quickly, causing shortness resulting in reduced life activities. This adaptation results in better health reduce the risk of morbidity and mortality and improve the quality of life (Abirami & Raj, 2013; Khotimah, 2013; Nizet et al., 2009; Safdar et al., 2011).

Exercise activity can be done by anyone, including asthmatics. Many asthmatics may feel afraid of doing exercise activity because exercise is also one of the triggers of an asthma attack, Rogger Catz of the University of California states that about 80% of asthma sufferers are caused by allergies and 40% fever, including asthma caused by exercise-induced asthma (EIA). However, EIA sufferers do not give up doing sports because doing good exercise can reduce the relapse and dependence of asthma medication (Côté, Turmel, & Boulet, 2018; Wijaya, 2015). Several studies have proven several interventions given to asthmatics including asthma exercises, deep breathing, Buteyko, upper body exercises, and yoga pranayama as one type of intervention that can be done to protect and improve respiratory health helps to improve asthma and increase peak expiratory flow (PEF). However, it is not yet known the effectiveness of the combination of pranayama yoga exercises and endurance training exercise in increasing the Peak Expiratory Flow (PEF).

The combination of pranayama yoga practice and endurance exercise is expected to increase the peak flow of forced expiration and asthma control through bronchial smooth muscle relaxation and decreased respiratory frequency (Eichenberger, Diener, Kofmehl, & Spengler, 2013; Putra, Sriyono, & Yasmara, 2017). At present there is still limited research on this matter, so researchers are interested in analyzing the effect of a combination of pranayama yoga exercises and endurance exercise on increasing the Peak Expiratory Flow (PEF) and asthma control. Observing the high morbidity and mortality due to asthma that increases from year to year is a special concern from the world of health, one of which is in nursing that can provide independent intervention as a companion to pharmacological therapy. The objective of the study is to analize the effect of a combination of yoga pranayama and endurance exercise on Peak Forced Expiration Flow and control asthma.

**Method**

The design of the research was quasi-experimental with pretest-posttest control group design. This study uses a sampling technique in which samples are taken based on purposive sampling. This study uses respondents from 2 hospitals, for the intervention group conducted at Airlangga University Hospital and the control group was conducted at the Haji General Hospital in Surabaya. This was done so that respondents in the intervention group and the control group did not meet each other and did not tell each other about the interventions that had been given during the research process so that the research was not biased.

The target population in this study were adult patients who were diagnosed with asthma in the pulmonary clinic at Universitas Airlangga Hospital and Haji General Hospital in Surabaya, using history taking, physical examination, and spirometry examinations that had undergone outpatient treatment. In this study, 2 were excluded and 1 person refused to participate in this study. A total of 76 subjects consisting of 20 men and 56 women, 4 subjects in the control group who had dropped out of school because they could not follow the exercise regularly on a schedule. So that the total sample used in this study was 72 subjects.

Inclusion criteria in this study were asthma patients aged 17–60 years, good

oral communication, asthmatics were stable and able to sit and stand without the help of others and tools. While the exclusion criteria are, asthma sufferers in attacks, patients with shortness of breath due to complications of other diseases, patients with permanent physical disorders of the neck, chest, and upper extremities.

Peak Expiratory Flow measured from forced vital capacity or The peak expiratory flow (PEF) is the maximum flow obtained within the first 200 milliseconds of a forced expiratory maneuver after inhalation to total lung capacity (TLC). Peak Expiratory Flow was measured using a peak flow meter performed 3 times and the highest value was taken in each measurement while asthma control was measured using an asthma control test conducted before and after pranayama yoga practice and endurance training exercise for 6 weeks. The intervention group was given a combination exercise by doing pranayama yoga and endurance exercise for 6 weeks, 2x per week for 51 minutes for each training session. One-time joint training using the instructor and one time self-training at home using the module while still being monitored by family members and researchers by recording pranayama yoga exercises and endurance training exercises that have been done and each participant sends videos and documentation images to the group Whatsapp has been made by researchers. Pranayama yoga combination exercises and endurance exercise using instructor trainers and modules. The control group was conducted at the Haji General Hospital, by continuing to follow the treatment by the standard operational procedures (SOP) at the pulmonary clinic of the Haji General Hospital in Surabaya and was not allowed to practice yoga pranayama and endurance exercise while participating in the study. After the research is completed, the control group is given a module and exercises together with both the control group and the intervention group conducted at the Lake of Airlangga University or the Airlangga University Hospital.

The steps of the Pranayama yoga and Endurance Training Exercise technique: 1) The pose of sukhasana, 2) Padmasana, 3) Sidhasana, 4) Vajrasana. Next to do pranayama breathing consisting of; 1) Dhirgaswasam 5 minutes 2) Ujjayi 5 minutes 3) Kapalabhati 5 minutes 4) Anuloma viloma 5 minutes 5) Sitali 5 minutes 6) Sitkari 5 minutes. After doing yoga exercises for about 30 minutes, participants are encouraged to take a 5-minute break before doing Fartlek exercises for 21 minutes, by way of; warm-up exercises consisting of 20 seconds lunges, side lunges 20 seconds, squat 5 seconds, high knee 10 seconds. Then continue the exercise for 5 minutes, jogging 2 minutes, walking 5 minutes, jogging 2 minutes. Walk for 5 minutes. After ending the exercise it is recommended not to sit down immediately but to do the cooling consisting of; Hamstring stretch 20 seconds, Calf stretch 20 seconds, Forward bend 20 seconds. To prevent/overcome the recurrence of subjects during pranayama yoga practice and endurance exercise or exercise-induced asthma (EIA), the researchers first coordinated with the supervisor and the responsible physician at the Hospital Universitas Airlangga and Haji General Hospital in Surabaya to prepare for inhaler drug therapy, oxygen, and warm-up before exercise and conditioning after doing the exercise. Subjects who experienced a recurrence during exercise then it is recommended not to continue training. In this study using pranayama yoga practice instruments and endurance exercise using informed consent sheets, Standard Operating Procedures (SPO), instructors, training modules and respondent characteristics sheets. In the measurement of the Peak Expiratory Flow Rate (PEFR) using, Peak Flow Meter, the respondent characteristic sheet that contains questions about the respondent's identity, including the initial name, gender, age, level of education, height, length of time suffering from asthma and the value of Forced Peak Expiratory Flow ( PEFR ) while for the assessment of the level of asthma control using ACT (Asthma Control Test) there are several things that are assessed namely the intensity of asthma recurrence in doing daily work, experiencing shortness of breath, waking up at night, the use of drugs and the level of asthma control which includes controlled asthma, partially controlled and uncontrolled. This study will evaluate the Pre-Post Forced Peak Expiratory Flow (FPEF) and asthma control by using

the achievement sheet of the Forced Peak Expiratory Flow (PEFR) asthma control observation sheets before and after pranayama yoga practice and endurance exercise.

Statistical test using the Wilcoxon test in the Peak Expiratory Flow Rate (PEFR) where the treatment group showed a significant difference between the PEFR. in the control group showed that there was no significant difference between the pre-test and post-test PEFR. In Prediction Peak Expiratory Flow (PEF) (%) using paired T-test where the treatment group showed a significant difference between PEFR (% predicted) before and after pranayama yoga combination training and endurance training exercise in the control group showed no significant difference between APE (% predicted) before and after. For the analysis of asthma control using the Wilcoxon test where the treatment group showed a significant difference

between asthma control before and after the practice of pranayama yoga combination and endurance exercise. Paired T-test results in the control group showed no significant difference between asthma control before and after. MANOVA test results obtained a significance which indicates that there are differences in the average PEFR and asthma control values in the treatment and control groups. This shows that there is an effect of pranayama yoga combination training and endurance exercise in asthma patients.

Ethical approval was issued by the Airlangga University Hospital Research Ethics Commission with Number: 197 / KEH / 2018 on December 11, 2018, and the Haji General Hospital with Number:. 073/07 / KOM.ETIK / 2019 on 7 February 2019.

**Results**

**Table 1 Respondent's Characteristic**

| Characteristic | Treatment Group (n = 34) | | Control Group (n = 38) | | P |
|---|---|---|---|---|---|
| | f | % | f | % | |
| Age years | | | | | |
| 18–25 | 3 | 8.8 | 1 | 2.9 | 0.001 |
| 26–35 | 5 | 14.7 | | 14.7 | |
| 36–45 | 11 | 32.4 | 5 | | |
| 46–60 | 15 | 44.1 | 32 | 68.1 | |
| Education | | | | | |
| No school | 1 | 2.9 | 1 | 2.9 | 0.331 |
| Junior High School | 6 | 17.6 | 19 | 50.0 | |
| High School | 14 | 41.2 | 11 | 34.2 | |
| College | 13 | 38.2 | 7 | 18.4 | |
| Occupation | | | | | |
| PNS | 3 | 8.8 | 3 | 8.8 | 0.393 |
| Enterpreneur | 5 | 14.7 | 11 | 28.9 | |
| Others IRT | 26 | 76.5 | 24 | 63.2 | |
| sex | | | | | |
| Male | 5 | 14.7 | 11 | 68.8 | 0.210 |
| Fimale | 29 | 85.3 | 27 | 79.4 | |
| Genetik | | | | | |
| No | 10 | 29.4 | 10 | 26.3 | 0.567 |
| Yes | 24 | 70.6 | 28 | 73.7 | |

**Table 2 The value of the PEFR, APE (%) prediction, asthma control in the treatment groups and the control groups**

| variabel | Groups | Pre-Test (Mean ± SD) | Post-Test (Mean ± SD) | Delta (Δ) | P Value |
|---|---|---|---|---|---|
| PEFR (L) | Treatment | 280.00±56,622 | 350.88±44.064 | 70.88 | 0.0001 |
| | control | 241.05±43.483 | 240.79±47.555 | 0.26 | 0.813 |
| APE (%) PREDIKSI | Treatment | 64.85±16373 | 82.68±11422 | 17.83 | 0.000 |
| | Control | 57.61±15559 | 57.42±15742 | 0.019 | 0.868 |
| Asthma Control | Treatment | 15.38±3.574 | 21.32±1,249 | 5.94 | 0.0001 |
| | control | 14.68±2.451 | 15.61±2.521 | 0.93 | 0.013 |

**Table 3 Distribution of Asthma Control Levels in the Treatment groups and Control Groups**

| Asthma Control | Treatment Groups | | | | Control Groups | | | |
|---|---|---|---|---|---|---|---|---|
| | Pre-test | % | Post-test | % | Pre-test | % | Post-test | % |
| Not controlled | 29 | 85,3 | 1 | 2,9 | 38 | 100 | 36 | 94,7 |
| Partially Controlled | 5 | 14,7 | 33 | 97,1 | 0 | 0 | 2 | 5.3 |
| Fully Controlled | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

**Table 4 Results of multivariate analysis of a combination of pranayama yoga exercises and endurance exercise in the treatment groups and the control groups**

| Variable | N | Box Test | | | | P value | |
|---|---|---|---|---|---|---|---|
| | | Box M | F | df 1 | df 2 | Lavene | pillai's trace |
| PEFR | 72 | 0.000 | 6.091 | 6 | 3.430 | 0.373 | 0,0001 |
| Asthma Control | | | | | | 0,001 | |

Table 1 shows that the age characteristics of respondents by age, the majority of respondents in the treatment group and the majority of the control group were in the age range 46-60 years are 15 (44.1%) in the treatment group and 32 (68.1%) in the control group which is the age category early elderly and late elderly. Age demographic data of respondents from both groups showed variants of inhomogeneous data with a value of p = 0.001. this is because the age distribution in the two groups is not normally distributed and also the age factor affects lung function in a person. Regression test results obtained an R Square value of 0.06 meaning 0.6% PEFR and asthma control is influenced by age with a value of p = 0.526 so it can be concluded that the age group of respondents did not have a significant relationship. On the characteristics of the education level of respondents in the treatment group, the majority were middle educated 14 (41.2%) and in the control group, the majority were elementary education as many as 19 subjects (50.0%). The characteristics of work in the treatment and control group were mostly as IRT / other, in the treatment group were 26 subjects (76.5%) and the control group was 24 (63.2%). Sex characteristics in the two groups were majority female, in the treatment group were 29 (85.3%) women while in the control group were 27 (79.4%). Characteristics of respondents based on family history of asthma (genetic) in the treatment group were 24 subjects (70.6%) and the control group was 25 subjects (73.5%) who had a family / genetic history of asthma.

Table 2 After a combination of pranayama yoga exercises and endurance exercise for 6 weeks, the mean PEFR value of the post-test 350.88 ± 44.064 in the treatment group obtained a delta value of 70.88 (L). Wilcoxon

test results in the treatment group showed that there were significant differences between the PEFR before and after the pranayama yoga combination exercise and endurance exercise with a value of 0.001 (p <0.05). After being evaluated for 6 weeks, the mean post-test score was $240.79 \pm 47.555$ in the control group, the delta value was 0.26 (L). Wilcoxon test results in the control group showed that there was no significant difference between the APE pre-test and post-test with a value of 0.813 (p <0.05). In PEFR (% prediction) in the treatment group, the mean PEFR prediction value was $64.85 \pm 16373\%$ and post-test $82.68 \pm 11422\%$ and delta value of 17.83%. Paired T-test results in the treatment group showed that there was a significant difference between PEFR (% prediction) before and after the combination practice of pranayama yoga and endurance exercise with a value of 0,000 (p <0.05). In the control group PEFR mean (% predicted) pre-test $57.61 \pm 15559\%$ while post-test $57.42 \pm 15742\%$ delta value 0.019%. The results of the paired T-test in the control group showed no significant difference between PEFR (% predicted) before and after with a value of 0.868 (p <0.05). In the control group, the mean pre-test value was $15.38 \pm 3,574$ asthma control and after a combination of pranayama yoga exercises and endurance exercise for 6 weeks the post-test value was $21.32 \pm 1,249$ delta value of 5.94. Wilcoxon test results in the treatment group showed that there were significant differences between asthma control before and after the combination practice of pranayama yoga and endurance exercise with a value of 0,000 (p <0.05). In the control group, the mean value of asthma pre-test control was $14.68 \pm 2.451$ while in the post-test $15.61 \pm 2.521$. the control group obtained a delta value of 0.93%. Paired T-test results in the control group showed no significant difference between asthma control before and after with a value of 0.013 (p <0.05).

Table 3 shows that in the treatment group, the total pre-asthma control scores of subjects in the uncontrolled category were 29 (85.3%) subjects. At post asthma control, it showed that the subjects were partially controlled by 33 (97.1%) subjects and there were no subjects whose asthma was fully controlled

(0%). In the control group, all pre-asthma control values were in the uncontrolled category 38 subjects (100%) in the post-asthma control were only 2 (5.3%) partially controlled subjects and 36 (94.7) subjects were still in the uncontrolled asthma criterion.

Table 4 shows that testing the variance-covariance similarity individually for each variable shows a Box test value of 0.000, which means that the variance-covariance in all variables is not the same for each group. So that in making decisions statistical test results can be seen in Pillai's trace. Manova test results obtained a significance value of P <0.0001 (α 0.05) which indicates that there are differences in the average PEFR and asthma control values in the treatment and control groups. This shows that there is an effect of pranayama yoga combination training and endurance exercise in asthma patients.

## Discussion

### Peak Expiratory Flow (PEF)

The peak flow of forced expiration is the highest point that can be reached during maximum expiration. In the event of asthma, there is great resistance to airflow, especially during expiration, when a person expires to reach a maximum flow where the flow cannot be increased even with a maximum increase in power (Moore & Castro, 2017).

Airways that have decreased space cause the maximum expiratory flow to also be reduced. Maximum expiration can be achieved if there is no worsening of breath and reduction of space in the respiratory tract (Hall, 2015). In the treatment group, the majority of subjects experienced an increase in the post- PEF score.PEF value measurement is done once every week after doing a combination of pranayama yoga exercises and endurance exercise for 6 weeks, performed 3 (three) times the examination and the highest value was taken in each measurement. In the treatment group, some subjects during the initial PEFR assessment until week 3 had not yet seen an increase in FPEF . This is in line with the research presented by (Begum & Hussain, 2013; Maya Kurnia, 2013; Eleckuvan, 2014; Parmar &

Nagarwala, 2014).

States that yoga interventions and effective end endurance training exercise are given at least 6 weeks of intervention with a frequency of exercise 3 times a week. So that in the 4th and 5th week, there was an increase in FPEF value. The increase in FPEF occurred significantly until the end of week 6. The increase in the peak flow of forced expiration shows that the pranayama yoga practice and endurance exercise that is done can affect the increase in FPEF value. The increase in FPEF in the treatment group occurred at all ages but the majority of the increase in FPEF occurred in the 4th to 6th week of the intervention. Characteristics of subjects who experience an increase in PEF are relatively diverse ranging from the level of education, age, occupation, gender, and genetic / family history of asthma.

This is due to the APE (% predictions) of the control group The difference in the median PEF and PEF predictions of the intervention group is greater when compared to the control group. All subjects experienced an increase in PEFR and FPEF scores (% predicted) in the intervention group. This is because RSUA doctors and nurses provide pharmacological therapy and health education to asthma patients undergoing outpatient therapy at RSUA Lung Poly. In addition, subjects also received an intensive assistance program that is a combination of pranayama yoga and endurance exercise. So it can be concluded that procedural treatments at the polyclinic of pulmonary disease and interventions combination of pranayama yoga exercises and endurance exercise show more improvement in one pulmonary function, namely an increase in forced expiratory peak flow (FPEF) and APE (% predicted).

Increased PEFR and PEF values (% predicted) in asthma patients indicate the patient has a good prognosis. This is due to lung repair. Improved pulmonary physiology shows the achievement of one of the outcomes in the implementation of nursing care. In this case, the patient is able to perform self-care by doing pranayama yoga exercises and endurance exercise independently so that an increase in the value of PEF.

In this study, a combination of pranayama yoga exercises and endurance exercise is carried out for 6 weeks and done 2 times a week, pranayama yoga exercises and endurance exercises are done 1 (one) time with group/group exercises using instructors (trainers) and 1 (one) time carried out independently at home with the duration of exercise required, namely; pranayama yoga exercises were carried out for 35 minutes and endurance exercises were carried out for 21 minutes.

The results of this study are in line with other studies which show that pulmonary rehabilitation will get very optimal results if done as early as possible (after the patient has been diagnosed with asthma by a doctor), one form of pulmonary rehabilitation in asthma patients is by giving pranayama yoga breathing exercises. Pranayama Yoga is a breathing exercise with slow and deep breathing techniques, using diaphragm muscles, allowing the abdomen to rise slowly and the chest to fully expand. Yoga is a method of physical and mental training for all ages. Yoga provides relaxation to the body, blood circulation, and control of breathing. Yoga is very good for asthmatics (Agnihotri, Kant, Kumar, Mishra, & Mishra, 2016; Agnihotri, Kant, Mishra, & Singh, 2016; Kristina Zaičenkovienė1,Roma Aleksandravičienė1, Stasiulevičienė1, & Lithuanian, 2013).

Yoga shows beneficial effects for people with chronic asthma such as reducing asthma medication, increasing exercise capacity, increasing FEV1, functional capacity and asthma control (Cebrià I Iranzo, Arnall, Camacho, & Tomás, 2014). Research conducted on asthma patients shows highly statistically significant results on all pulmonary physiology parameters. Pranayama yoga given to the yoga group for 6 weeks of practice showed a significant increase in FEV1 and PEFR in the pulmonary physiology tests of asthmatics who had performed pranayama yoga (Parmar & Nagarwala, 2014; Shyam Karthik, Chandrasekhar, Ambareesha, & Nikhil, 2014).

The effect of yoga obtained in this study is related to deep breathing techniques (pranayama) and meditation which causes a reduction in the frequency of breathing. This can modulate airway reactivity, increase breathing sensation through regulation of breathing patterns, reduce oxygen

consumption, reduce the incidence of hypoxia and hypercapnia so that blood oxygenation is better without increasing ventilation, increase respiratory endurance and muscle strength and modulate autonomic function with decreased heart rate when resting and sympathetic activity (Bonura, 2007; Sindhu, 2015).

Pranayama is a breathing technique in ancient yoga. Pranayama integrates the mind and body and is focused on bodily sensations. Pranayama directly provides benefits to various body functions positively. Pranayama consists of (1) regular, slow and strong inspiration for a longer duration during exercise, which causes the strengthening of the breathing muscles, (2) increases expiratory power and decreases resistance to airflow in the lungs (3) increases holding time breath according to the ability of participants (Fulambarker et al., 2012; Shankarappa, Prashanth, Annamalai, & Varunmalhotra, 2012).

In addition to pranayama yoga that can be given to asthma patients, epidemiological studies are stating that endurance exercises prolong life expectancy and reduce the risk of chronic diseases. The effect of endurance exercise besides enlargement of muscle fibers, mitochondrial enlargement also occurs which will increase the energy source of muscle work, so the muscles do not get tired easily. This is following the needs of asthma patients who tend to get tired quickly, causing shortness resulting in reduced life activities. This adaptation results in better health reduce the risk of morbidity and mortality and increase the quality of life (Chen, Tsai, Liou, & Chan, 2017; Khotimah, 2013; Nizet et al., 2009).

Exercise is a very good way to increase the vitality of lung physiology. Exercise stimulates deep breathing and causes the lungs to expand so that the input of oxygen released into the blood increases and more carbon dioxide is released. If a person has more oxygen volume, the blood circulation is better, so that the muscles get more oxygen and can do activities without feeling tired (Ahmed, Mohamed, & Hashem, 2011; Maya Kurnia, 2013a; MuthEffectivenessu Eleckuvan, 2014).

In this study, the treatment group was given a combination of pranayama yoga exercises and endurance exercise. In this case, endurance exercise is given by doing jogging fartlek for 21 minutes consisting of; 1-minute warm-up exercise, walk 15 minutes, jogging 4 minutes and cool down 1 minute. By doing fartlek exercises by walking and jogging, the principle of fartlek training is running with various variations. This means that it can measure the desired running speed while doing the exercise as desired and also adjusted the conditions / practical abilities according to Sukardiyanto in the study (Maya Kurnia, 2013b). Fartlek training is a part of endurance exercise that can increase lung capacity and increase respiratory muscles so that lung elasticity can be maintained. These conditions can open up lung space that can be used by alveoli in gas exchange. Fartlek can also stimulate sympathetic nerves in the respiratory muscles to excrete norepinephrine and epinephrine to bind to α receptors that cause the respiratory muscles to contract (Suryantoro, Isworo, & Upoyo, 2017; Udayani & Amin, 2019).

**Asthma Control Level**

Assessment of the level of asthma control using the ACT (Asthma Control Test), several things are assessed namely the intensity of recurrence of asthma in doing daily work, experiencing shortness of breath, waking up at night, the use of drugs and the level of asthma control. In some questions on ACT related to exacerbation/recurrence of asthma, which is a process of repeated attacks due to hyper-responsive immune cells such as mast cells, eosinophils and T lymphocytes, mast cells, macrophages, dendritic cells, and myofibroblasts to certain stimuli causing symptoms of shortness of breath, wheezing and coughing as a result of narrowing of the airway (Ghebre et al., 2015; Grzela et al., 2015). The results of this study indicate that pranayama yoga exercises and endurance training exercise are effective in asthma patients to improve asthma control. Asthma cannot be cured but can be controlled with proper management and management. This study is in line with other studies that show that the goal of asthma control is to reduce the frequency of asthma attacks, improve inflammation of the respiratory tract and

increase physical activity and pulmonary physiology (Baines et al., 2014).

Asthma control is generally divided into 2 namely controlled and uncontrolled. In the ACT (Asthma Control Test) assessment the classification of asthma control was divided into 3, which were fully controlled with a score of 25, partially controlled 20-24 and uncontrolled with a score of <19. In the category of partially controlled asthma control levels included in the classification of controlled asthma, it is related to individual efforts to achieve optimal asthma control that is fully controlled (Atmoko et al., 2011; Cramer, Lauche, & Dobos, 2014; Katerine, Medison, & Rustam, 2014).

The goal of asthma control is to reduce the frequency of asthma attacks, improve inflammation of the respiratory tract and increase physical activity and pulmonary physiology and also improve the quality of life which is also an important component in the management of asthma (Cramer, Lauche, et al., 2014; Shyam Karthik et al., 2014). Yoga exercises given for 2 months to asthma patients have an increase in forced vital capacity (FVC), forced expiratory volume in 1 second (FEV1), peak expiratory flow rate (PEF) (Agnihotri, Kant, Mishra, et al., 2016; Soni, Munish, Singh, & Singh, 2012).

If people with asthma are very unfit, then the exercise program can be started by walking, because this exercise has lower asthma and prepares the muscles, for training with a higher intensity in the future. If the level of fitness increases, especially in the case of the musculoskeletal system, then the intensity of the exercise can be increased by conducting a low-level interval training consisting of walking and jogging (Wijaya, 2015). Endurance training exercise aims to improve the efficiency and capacity of the oxygen transport system. Endurance training which means to build, restore, or maintain the condition of one's body so that it is very good for asthmatics (Khotimah, 2013).

In addition to the above statement by (Indrayana, 2013), fartlek is slow running which is then varied with intensive short sprints from medium distance running with a fairly high constant speed then interspersed with sprint running and jogging and sprinting again and so on, so variations in temp running

can be played depending on the practical conditions. Nursing diagnosis of activity intolerance is a major problem that occurs in asthma patients. Activity intolerance is the inadequacy of psychological or physiological energy to carry out or complete activities that must / have been carried out.

One outcome that must be achieved in solving this problem is activity tolerance, with the limitation of respiratory status characteristics. In this research, the process of nursing care with Calista Roy's theoretical approach the results of the study showed an increase in the value of the Peak Expiratory Flow and Asthma Control Test (ACT) showed that the goal of nursing care was achieved.

According to Roy, as an open system, humans receive input or stimulus either from the environment or from within themselves, the level of adaptation is determined by a combination of focal, contextual, and residual effects. Adaptation occurs when someone responds positively to environmental changes. This adaptive response enhances the integrity of a person who will lead him to be healthy (Agnihotri, Kant, Mishra, et al., 2016; Soni et al., 2012).

When the body gets an external stimulus in the form of yoga breathing and Endurance Exercise, the body responds. The nurse is the key to ensuring the achievement of the client's adaptation goals. Nursing actions aim to enhance the adaptation of individuals and groups so that they contribute to improving health, quality of life.

**Conclusion**

The combination of pranayama yoga practice and endurance training exercise can increase the Peak Expiratory Flow (PEF) and Asthma Control Test (ACT). Based on the results of statistical tests, the combination of pranayama yoga exercises and endurance exercise can increase the peak force of forced exhalation (PEF) by 70,881 (L) and predictive peak flow prediction (% prediction) by 17.83% asthma control intervals by 38% and based on the results of Asthma Control Test (ACT) subjects who experienced an increase in control (partially controlled) asthma were 33 (97.1%), respondents. Pranayama yoga

and endurance training exercise can be used as an alternative choice in supporting pharmacological therapy to improve PEF and control asthma.

**Research Limitations**

In this study subjects used different doses of the drug so that it could affect the value of the Peak Expiratory Flow (PEF) and Asthma Control Test (ACT). Researchers also cannot control all respondent activities and trigger the occurrence of disturbances such as air pollution and irritants as well as the subject's uniformity of age.

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# An Investigation of the Interests and Reasons of Diploma Nurses Undertake a RN-BSN Bridging Program in United Arab Emirates

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**Abstract**

The nursing programs across United Arab Emirates are in the process to inform students about RN-BSN bridging program. The study purpose was to determine the interests and reasons of nurses in enrolling to a RN –BSN bridging program. An online survey was conducted among diploma students to explore their interest and perspective regarding pursuing bridging program. One hundreds thirty-five RNs participated. The questionnaire used for survey had seventeen items, which included questions to elicit information or clarification of their perspectives. We performed the data analysis in SPSS by computing descriptive and inferential statistics. The findings showed that a majority of nurses were interested in returning to RN-BSN program. The students' reasons were both personal and career related, with personal reasons being more dominant. Most of participants held a diploma and midwifery and they had more than 2 years working experience since they completed diploma. There appears to be a need for a RN-BSN bridging program because most of study respondents are potential candidates for this program. This study provides information to nursing schools' management to provide opportunities and develop curriculums to meet the needs of these nurses. Nurses need to reflect on various strategies for incorporating their new knowledge into clinical practice.

**Keywords**: Bridging program, interests, nurses, nursing, university, United Arab Emirates.

## Introduction

Around the world, RN-to-BSN programs have grown dramatically and many diploma nurses return to school for a BSN program. However, there is a concern among nurse leaders about lack of ideal nursing standardization and skill competencies. In the United Sates, for example, the Institute of Medicine outline the important of essential components in nursing education to prepare the future nurses (Conner and Thielemann, 2013). It is essential that nursing faculty members ensure that all program graduates are well prepared for practice in health care system and settings. It is also important to consider how to enhance RN-to-BSN programs and to evaluate their congruence with traditional BSN programs (McEwen, 2015). In addition, faculty members need to encourage and promote the success of the RN-to-BSN student (Hewitt 2016). Many research findings indicated that nurses with higher education experience improved patient outcomes, job satisfaction, less errors in medication treatments and low mortality rates in healthcare settings. For example, Aiken, (2014) and American Nurses Credentialing Center (2015) found that there would be better patient outcomes when BSN - prepared nurses are fully responsible for patient care. Their findings provide strong motivation for academic nursing programs at college or university levels to collaborate for creating a more highly educated workforce. For many years, the leaders in the field of nursing have encouraged Diploma, or Associate level nurses to pursue a Bachelor's of Science in Nursing (BSN) degree. Earning the BSN prepares nurses to offer patients a higher level of knowledge and skills. Within the last few years, the push to hire Bachelor's educated registered nurses has really gained momentum.

The nursing programs in the United Arab Emirates (UAE) are in the process of trying to inform prospective students about their RN-BSN bridging program. In the near future, the Bachelor's degree will be minimum level of education requirement for registered nurses (RNs). Other words, it is required by the Ministry of Health and Prevention (MoHaP) is emphasizing on a Bachelor degree as a minimal qualification for nurses

to practice in UAE healthcare settings. The rationale is that entry to practice in UAE will be baccalaureate (BSN) degree because RN-BSN programs build on nursing knowledge and skills by providing education on research-based science, leadership and a liberal arts foundation. Becker (2017) indicated that a BSN program provides a stronger foundation in the humanities and sciences education. In addition, one of important factors for motivating nursing education is to increase the number of BSNs is that nurses with bachelor diploma degree are associated with patient outcomes and improvements (Aiken, 2014; Yakusheva, Lindrooth, & Weiss, 2014).

The United Arab Emirates (UAE) is a country located in Western Asia at the northeast end of the Persian Gulf and on the Arabian Peninsula. UAE is a federation of seven emirates of Abu Dhabi, Sharjah, Ajman, Dubai, Fujairah, Ras Al Khaimah (RAK), and Umm Al Quwain. In 2013, UAE's population was 9.2 million; 1.4 million are Emirati citizens and 7.8 million are expatriates (Malit & Youha, 2013). In UAE, a ruler governs each emirate and these emirates joint form the Federal Supreme Council. In addition, one of these rulers is the President of the UAE. According to data from 2016, 34.5% of adults in the UAE are clinically obese, with a Body mass index (BMI) score of 30 or more (World Health Organization [WHO], 2017). The life expectancy at birth is at 76.96 years. The main cause of death is cardiovascular disease, constituting 28% of total deaths in the UAE.

In the United Arab Emirates, the Ministry of Health and Prevention (MoHaP) is emphasizing on a Bachelor degree as a minimal qualification for nurses to practice in UAE. The RN-BSN program is designed pace the change demands of the global health care services and to align with international standards of nursing education. Therefore, this program will provide an opportunity to enhance nursing professional development and prepare future nurses for a broader scope of practice. This program will also provide the graduates to undergo higher education in nursing. The proposed bridge program in Nursing is a 60-credit program for registered nurses who have passed Diploma in Nursing and have a minimum of two years of clinical

experience. In addition, the curriculum of this RN-BSN program will bridge the gap between already acquired knowledge and skills in core nursing courses with the latest trends and advances in healthcare practice to improve the competencies essential for practicing as a professional nurse. A study conducted in the United States indicated that approximately 60 percent of RNs still practice with diploma or an associate's degree (The Institute of Medicine, 2010). From leading health care institutions and nursing organizations, propose entry to nursing practice should be at BSN degree (McEwen, White, Pullis, & Krawtz, 2012). Some studies indicate that RNs have problems in enrolling to a RN-BSN program. For example, many RNs have difficulty to join in an RN-BSN program related to negotiating multiple roles of work and study (Alonzo, 2009; Megginson, 2008). Understanding RNs' interest and reasons to join a RN-BSN bridging program will help determine ways to foster positive attitudes toward educational learning among nurses, and allow us to entice nurses to return to school (Altmann, 2011). By providing curriculums that are flexible and cater to the needs of students who are returning to study after a long time. In addition, it may identify steps to ensure the provision of education and quality nursing care. For these reasons, we conducted a survey of prospective RNs students seeking their opinion regarding pursuing a RN-BSN program as their further education.

An intensive literature review indicates that no study had been conducted to know the interests and reasons of diploma RNs undertake a RN-BSN bridging program in United Arab Emirates. The purpose of this study was to examine RNs interests and reasons of choosing a RN-BSN bridging program. More specifically, this study was to determine selected variables that influence the interest and the reasons for a RN-BSN bridging program and identify the most appropriate learning methods and mode for nurses who are interested in attending a RN-BSN bridging program. In addition, leaders in nursing education and service need to work collaboratively to support non-redundant pathways that lead to the baccalaureate nursing degree.

**Method**

We used a quantitative descriptive design to determine perceptions of interests and reasons of prospective nursing students (RNs) who will be enrolled in a RN-BSN program. The setting for the study was in some hospitals and clinics across UAE. The target population for the study was registered nurses who are working in different hospitals, clinics and community based healthcare in five different areas in the United Arab Emirates. They were from emirates of Ajman, Dubai, Fujairah, Ras Al Khaimah, Sharjah, and Umm Al Quwain.

This study has been approved by the Research Ethics Committee of GMU Ajman before study implementation. We realize that protection of the participants was essential to be maintained throughout the study.

There are several ways of conducting a survey. The questionnaire used for survey had seventeen items, which included questions to elicit information or clarification of their perspectives. In our study, data was collected through web-based or online survey. Online surveys are becoming an essential research tool for a variety of research fields, including social, health, education and other researches. We found that a web-based survey is simpler, faster and cheaper. For data collection, an online survey tool was used to identify interest and reasons for prospective RN-BSN nursing students.

The practice nurse leaders collaborated with researchers identified potential diploma nurses who would be willing to return to school at a RN-BSN program during the recruitment period. During our online information, these nurse leaders help us to pass the information to the participants. In addition, all questionnaires used for survey distributed with potential nurse participants via personal email address. Online surveys were best suited for this study because the respondents were RNs who worked in different hospitals across UAE. An electronic inform consent with a link to the survey emailed to prospective respondents. Two hundred fifty of the surveys were distributed to potential respondents of which 135 questioners were returned.

In this study, we calculate the response rate that is 68 percent. All respondents

were required to have access to an internet connection in their computer. The research questions aligned with the utilization of a descriptive, design to identify their interests and reasons of joining in a RN-BSN bridging program. Online surveys are a reputable, efficient, and cost effective method for reaching participants at different areas or locations (George and Mallery, 2011). However, internet access was a possible limitation for online surveys. Hence inclusion criteria for this study required participants to be working in the hospital, thus the likelihood of limited access to internet was minimized. The RN-BSN interest survey consisted of open and close-ended questions including demographic information, checklists, rating and free response. In this study, our data entry process consisted of coding surveys and data entry and a member was responsible for the data entry and analysis. Once that was completed, this person has forwarded it to the team leaders for the final report and for compilation. One advantage of a web-based survey was the elimination of human coding errors because of automatic data coding by most programs used for online surveys. Quantitative data analysis was not performed in SPSS. We analyze the data manually by using excel sheet computing program. Since the data analysis did not use statistics, we only provide percentage and average in our findings. Microsoft Excel is often used by researchers to collect and analyze data. In addition, data management techniques can be implemented in Excel (Elliott, Hynan, Reisch, & Smith, 2006).

## Results

One hundred thirty-five (n=135) registered nurses worked in the hospitals and other health care setting across United Arab Emirates consented to participate in this study. This section presents the detailed survey findings from respondents (n=135) that were entered in database. Descriptive findings for each question follow, including bar charts. In our study, missing data are excluded from the graphs. All respondents' additional suggestions and comments are reported under question 17.

### Respondents' characteristics

We found in our respondents' characteristics survey questions that the majority of nurse respondents identified themselves as female (92 percent) and only (7.40 percent) of respondents identified that they were men. This characteristic is not a surprising statistic because as anticipated, more women enter into the field of nursing profession than do men.

Our survey findings also indicate that the majority of those responding (79.25 percent) identified themselves as being Indian nationality. The other major ethnicity of the respondents declared was Jordan at 4.44 percent; Filipino and Pakistan were at 2.96 percent each: Nigerian nationality were (2.22 percent) and Yemen (1.48 percent). In addition, other nationalities of respondents were Bangladesh, British (UK), Cameroonian, Comoros, Emirati, Somali Sudanese and Syria at (0.74 percent) each. The vast of respondents are Indian group account for (79.25 percent) of all ethnicities.
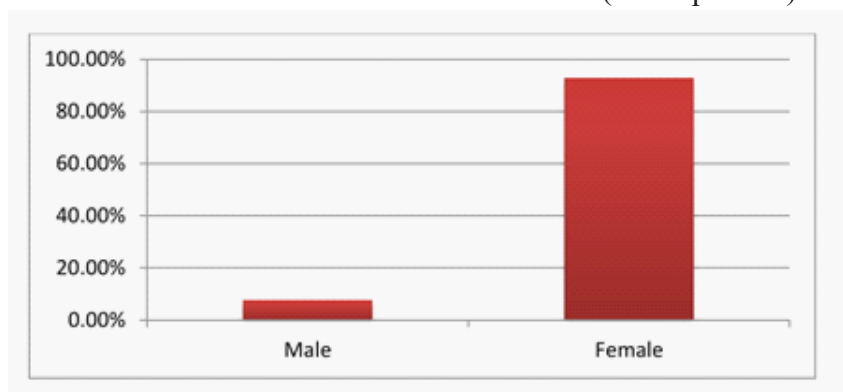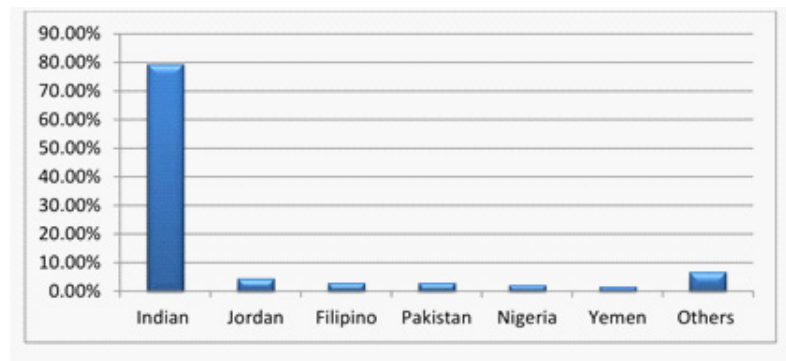
**The diploma/certificate in nursing**

When study respondent were asked: "name of the diploma/certificate in nursing that they have", a larger percentage of study participants (72.59 percent) held a Diploma in Nursing + Midwifery. This data is followed by (23.70 percent) who earned a diploma in nursing. In addition, respondents with Diploma in Midwife were (1.48 percent).

Others, Dental hygienist was at (0.74 percent) and Lab technician was at (0.74 percent). One respondent (0.74 percent) did not provide any response. From this finding, the majority of RNs respondents (72.59 percent) held a Diploma in Nursing or/and Midwifery. This finding also indicates that it would be easy for them to transition and pursuing RN-BSN bridging program.
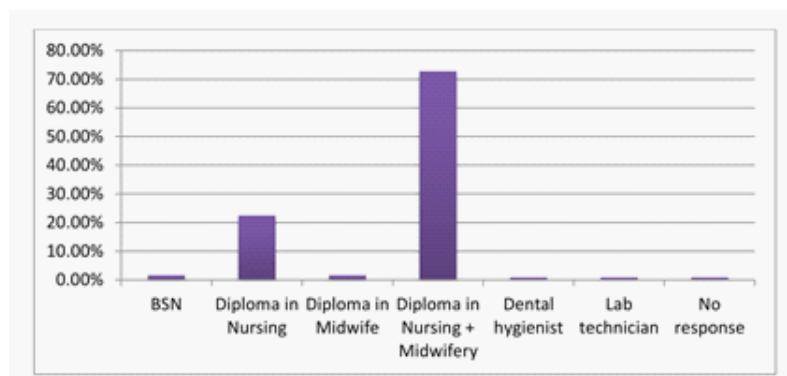


**Number of years since completed Diploma and years of experience in nursing profession**

In this number of years since completed diploma and years of experience in nursing section, we divide the number of years since completed diploma in 0–2, >2–5, >5–10, and >10. Our survey indicates that (65.92 percent) respondents have number of years since completed diploma more than 10 years. Respondent >2-5 were at (20.00 percent), >5-10 (9.62 percent), and (3.70 percent) of RN students reporting 0–2 years of years since completed Diploma. One respondent (0.74 percent) did not respond. There appears to be a need for a RN-BSN program as a majority of the RNs respondents would be potential feeders into the BSN bridging program.

Another question in this survey addressed years of the nurses had been practicing as a registered nurse in UAE. This section was also divided in 0–2, >2–5, >5–10, and >10 of number of years of experience in nursing. Survey findings indicate that (71.85 percent) respondents have number of years of experience in nursing more than 10 years, followed by respondent with >5–10 were at (20.00 percent), >2-5 at (2.22 percent). From total respondents, 4.44 percent of respondents have 0–2 years nursing experience. One respondent (0.74 percent) did not provide response. There appears to be a need for a RN-BSN program as a majority of the respondents would be potential candidates into the RN-BSN bridging program.
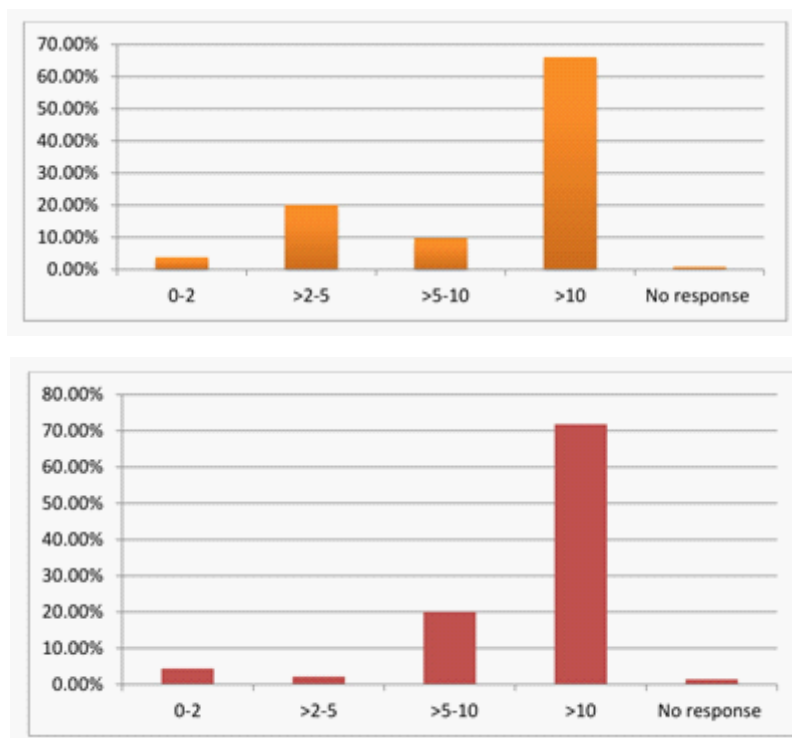
## Nursing License and Working Place in the UAE

Our survey also asked about nursing license and working place in the United Arab Emirates. The survey finding shows that the majority of the respondents (87.40 percent) are currently pursuing Ministry of Health (MOH) RN license and only 5.18 of the participants hold DHA license. One respondent (0.74 percent) has both Ministry of Health (MOH) and Dubai Health Authority (DHA) licenses, and 6.67 percent respondents are without RN license. One respondent (0.74 percent) did not provide response. Finding indicates that the majority of respondents (93.32 percent) are eligible in pursuing a RN-BSN program

When study participants were asked about their working place in health settings currently, survey finding shows that (57.78 percent) of these nurse practicing with ministry of health care settings. Those who identified themselves work in private facilities were (39.25 percent). Another four (2.96 percent) did not respond the survey question. Between respondents who are working with ministry of health and private health care facilities are almost equal. Other words, percentages of both health settings are comparable.
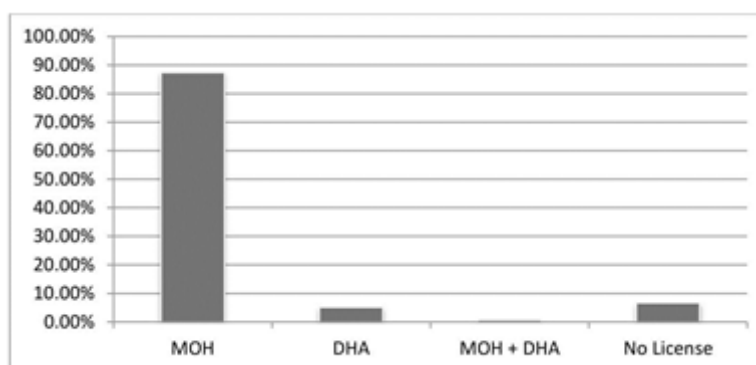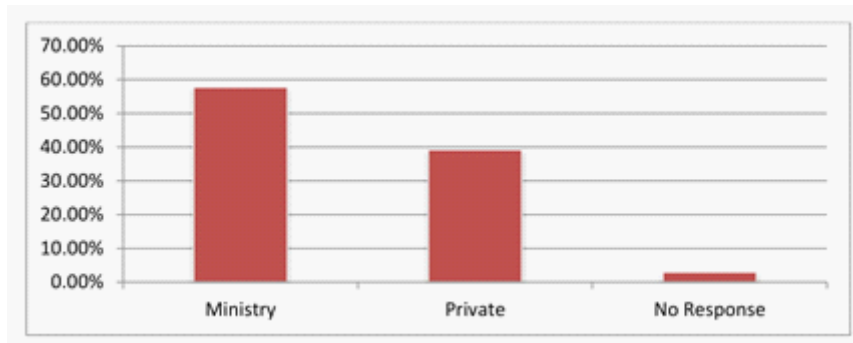
### Interest in joining a bridging program in nursing

When participants were asked if they would be interested in pursuing or joining a RN-BSN bridging program, almost all or majority (99.26 percent) respondents said yes, they would be interested in joining a bridge RN-BSN. Only 0.74 percent respondents said no. From the surveys, majority of nurses stated they had interested in a RN-BSN bridging program.

Survey also asked the level of interest in enrolling for the bridge program in nursing. Of the responses from RN participants, (69.62 percent) indicated have very high interest in joining the bridge program in nursing. 28.14 percent respondents said have high interest and (2.22 percent) said considerable in their level of interest. No respondent indicated that they had no or low interest in joining the program. This finding indicates that respondents have high to very high interest to transition in pursuing RN-BSN bridging program.
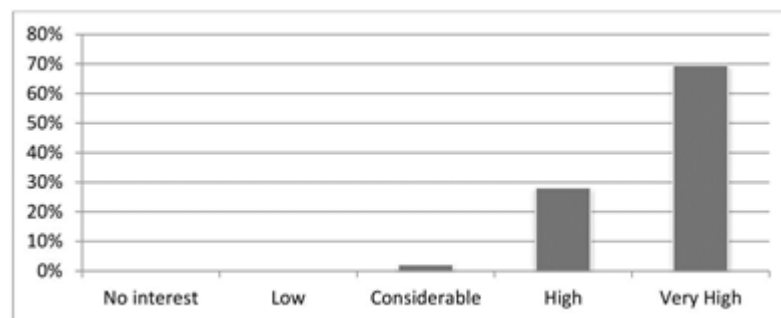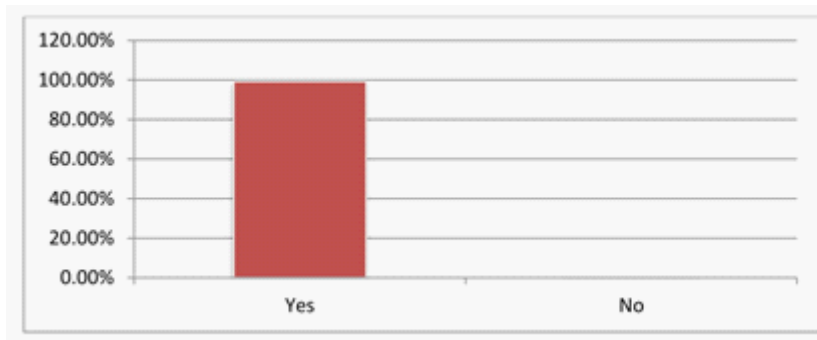




### The reason for nurses to join RN-BSN bridge program

When we asked the reason to join RN-BSN bridge program: "Why do you wish to join the bridge program? 53.33 percent respondents said that BSN degree is becoming mandatory to work as RN. Respondents who said that they interest in learning were 34.07 percent. In addition, other respondents 12.59 percent said that BSN degree is required for their promotion.
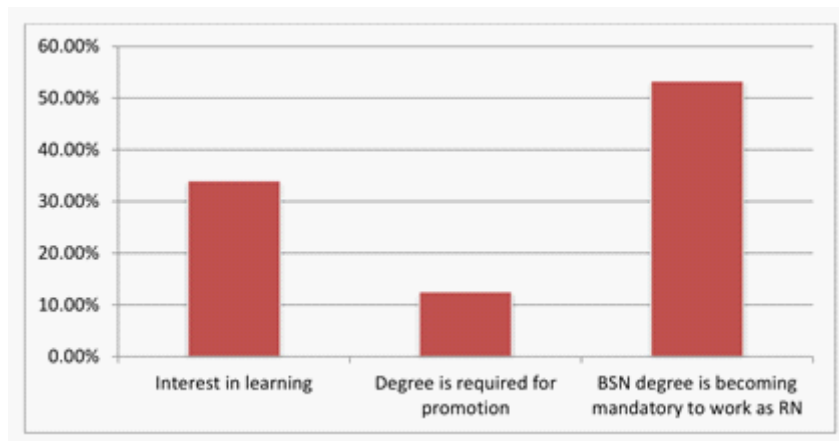
## Plan regarding in attending the BSN-RN program

When in survey we asked "What is your plan regarding attending the program?" The majority of respondents (97.03 percent) stated they plan to attend work and study. Only (2.96 percent) respondents will take a leave from work to study RN-BSN bridging program.
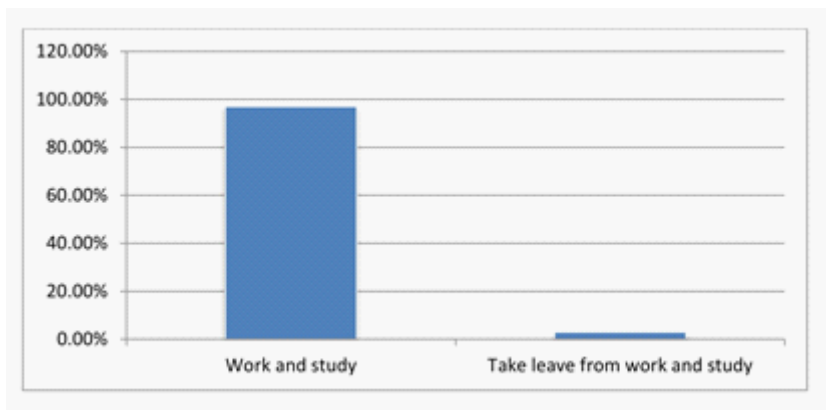


## Time preference for attending classes

When participants were asked to rank of time preference or how they would like to attend RN-BSN, findings indicate that respondents preferred daytime (20.00 percent), in evening (34.07 percent), and in weekend (45.92 percent) to attend the program. The three percentages of time preferred are almost equal (daytime, evening, and weekends).
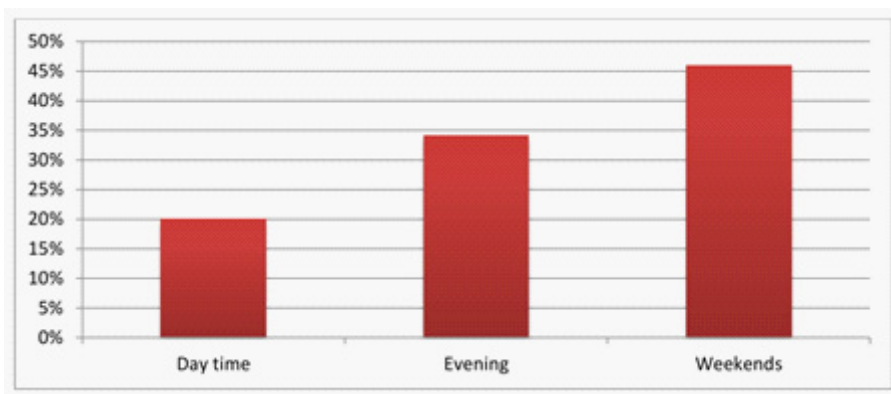
In addition, 46.67 percent respondents are interested in a combination of 8.30 am to 4.30 pm on weekends and 3.30pm to 9.30 pm on weekdays to attend. It was followed by 30.37 percent of respondents who like to attend classes between 3.30 pm to 9.30 pm on weekdays. Only (19.25 percent) preferred their attendance between 8.30 am to 4.30 pm on weekdays. There were (3.70 percent) respondents did not respond. Time slot for attending the classes are almost equal to take their RN-BSN program the classes.
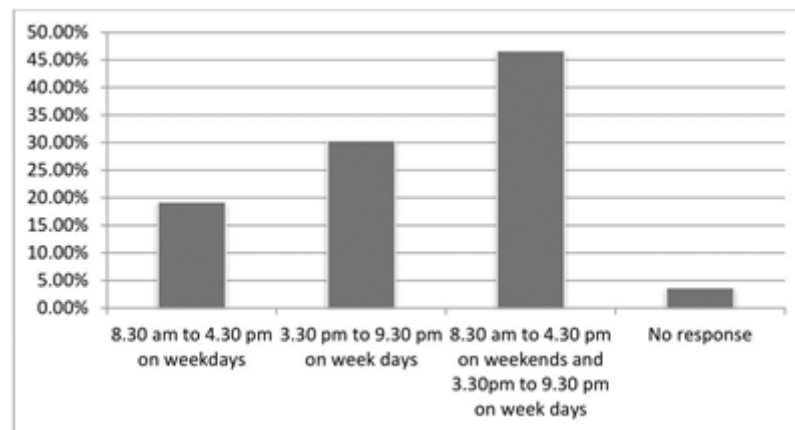


### Tuition fees payment

When come to question, "Who will pay your fees? The majority of respondents (92.59 percent) said that they would pay their tuition fees themselves. Only (7.40 percent) of respondents said that their family will pay their tuition fees at RN-BSN program.
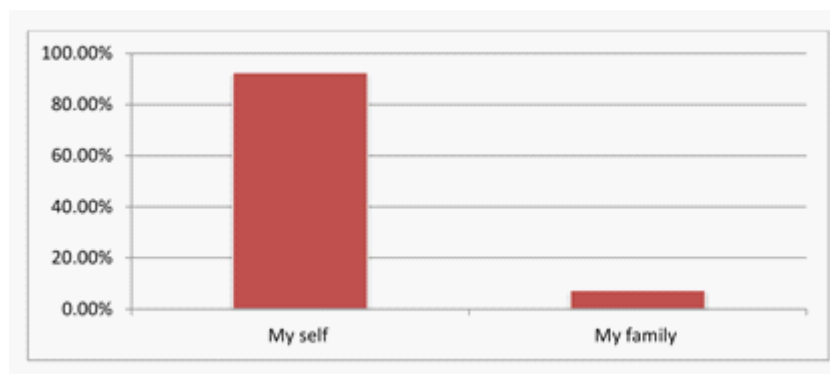


### Time preferences to join RN-BSN bridging program

Survey question asked three aspects of joining time: as early as possible, next academic year, at any time. The majority of respondents (77.03 percent) said that they would join the RN-BSN program as early as possible. Both who responded next academic year and at any time were equal: next academic year (11.11 percent) and at any time (11.85 percent). This finding indicates that they will join RN-BSN program as early as possible.

### The reason of choosing university for your further studies

Respondents were asked the reason of choosing or joining University, and nearly half (36.29 percent) stated that about nearness to place of work/home. A similar percentage was accounted for university hospitals/health care units (34.07 percent) and university reputation (29.62 percent). Three of these percentages are comparable. Respondents not only live close to the university from work/home but they also have the reason because of university hospitals/health care units and the reputation of the university.
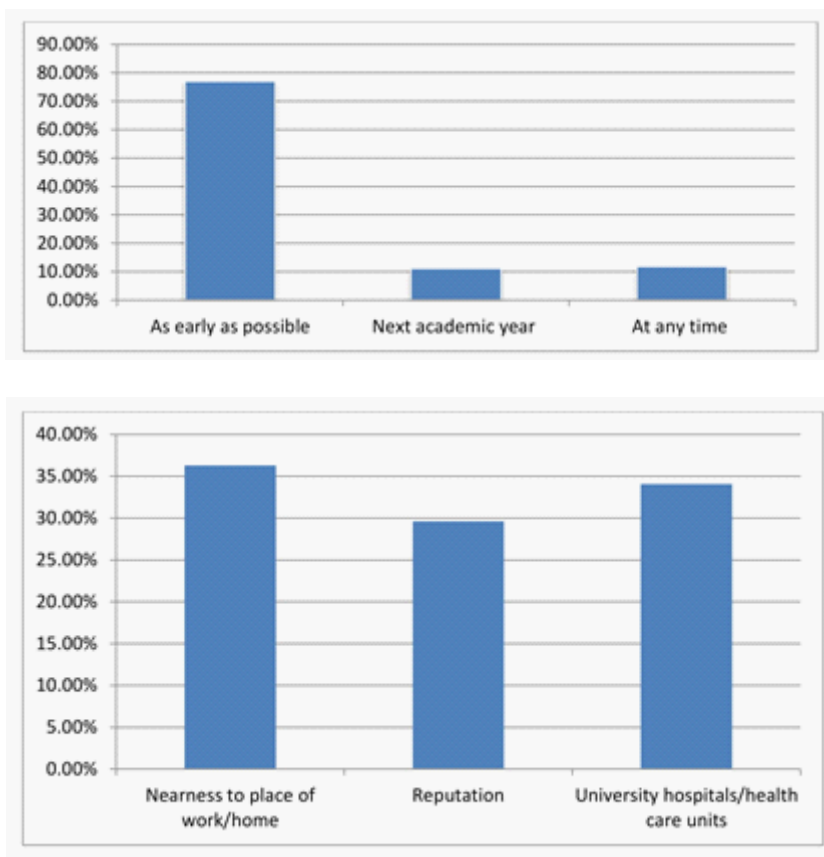
## Discussion

Registered Nurses (RNs) wishing to return to school would be valuable for professional nursing education (Sarver, Cichra, & Kline, 2015). Much has been reported regarding the need for a nursing education transition program in nursing profession (American Association of Colleges of Nursing, 2013); from a diploma nursing to the BSN program (Kumm et al., 2014; Pittman, Kurtzman, & Johnson, 2014). RN-BSN educational programs build upon foundational skills obtained in a diploma or an associate degree in nursing because both program aptly cover the provider of care role of the registered nurse. The RN who returns to school (BSN) has unique characteristics that need be considered if the educational experience is to be positive. Allen and Armstrong (2013) highlight that the main values of the RN-BSN program reveal a nursing faculty member who is concerned to development of education to transition the diploma or associate degree graduate to professional nursing practice without repetition of content

and learning activities. In the united states, the proportion of RNs with a BSN increase to 80 percent by 2020 (The Institute of Medicine, 2011) and registered nurses (RNs) with an associate's degree or diploma are among the fastest growing groups of Bachelor of Science in nursing (BSN) students (Leonard, 2003). However, a current study indicated that RN-BSN programs hold the second lowest average graduation rate of US nursing programs (Perfetto, 2019). Sarver, Cichra, and Kline (2015) indicated that the opportunity for Registered Nurses to identify challenges, benefits, and motivators to return to a school is an example of nurse leaders advocating for RNs who seek a higher educational nursing program.

Responding to a current healthcare demand, the nursing profession is actively seeking to increase the number of prepared nurses with BSN holders. Our study findings indicate that the majority of respondents identified themselves as women and only few of respondents are men. This is not a surprising finding because more female nurses are working in the field of nursing than

do male in health care settings in the United Arab Emirates. More women enter into the field of nursing than do men. The vast of respondents are Indian group account of all nationalities. The other major ethnicities were Jordan, Filipino and Pakistan. Other nationalities were as Nigeria, Yemen, Bangladesh, British (UK), Cameroonian, Comoros, United Arab Emirati, Somali Sudanese and Syria. In addition, the majority of respondents or a larger percentage of participants held a Diploma in Nursing plus Midwifery. Respondents who earned a diploma in nursing alone follow it. Our findings indicate that there is a need for a RN-BSN bridging program as a majority of respondents would be potential candidates into this RN-BSN program. Survey findings also indicate that more than half percentage of total respondents have more than 10 years since they completed diploma. This finding indicates also that it would be easy for them to transition and pursuing RN-BSN bridging program. Majority of RNs as survey respondents have more than two years of experience in nursing. From them, also the majority of them have more than 10 years working as nurses that respondents are eligible in pursuing a RN-BSN program. Also, the majority of the respondents are currently pursuing MOH RN license. It is followed by some participants hold DHA license and one respondent has both MOH and DHA licenses. Half of survey respondents were practicing or working with ministry health care settings and half those who identified themselves work in private facilities. Between respondents who are working with ministry and private health care facilities are almost equal or both percentages are comparable. According to the Institute of Medicine (2010), the willingness of RNs to increase their education will be an important component of successfully increasing the percentage of BSN degree. According to Cipher, Mancini, and Shrestha (2017), younger students who received financial aid and had a previous BSN degree reflected the demographic profile associated with the highest likelihood of graduating and graduating sooner.

Most of respondents had planned to attend work and study. Very less of respondents will take a leave from work to study RN-BSN bridging program. This indicates that RNs will stay working during attending RN-BSN bridging program. If it is related to preferred time for attending classes, the three percentages of time preferred (day time, evening, and weekends) are almost equal to. Respondents like attend RN-BSN bridging program at daytime, in evening, and in weekend were almost the same percentage. Percentage of convenient time slot for attending the classes are almost equal among three time slots to attend RN-BSN program the classes. Almost half of respondents are interested in a combination of 8.30 am to 4.30 pm on weekends and 3.30pm to 9.30 pm on weekdays to attend. Some respondents like to attend between 3.30 pm to 9.30 pm on weekdays and less of them preferred their attendance between 8.30 am to 4.30 pm on weekdays. Some barriers for RNs who return to school (BSN) program include scheduling of coursework and fear of failure (Davidson, Metzger, Lindgren, 2011). In addition, the stress an RN feels when returning to school can be addressed by using a combined approach that involves faculty and student working together (Davidhizar, Gigen, & Reed, 1993).

For tuition fees, the majority of RNs will pay their tuition fees themselves. The second, they said that their family would pay their tuition fees at RN-BSN program. Some respondents concerned about this tuition fees and asked that tuition fees will be affordable for them. If it is related to joining time, the majority of nurse respondents indicated that they preferred to join the RN-BSN program as early as possible. This indicates that RNs prospective students wanted to join RN-BSN program as early as possible if programs are available to them. Primary RN-BSN completion barriers and challenges were work-life balance and economic issues (Duffy et al., 2014). According to Anbari (2015), illustrating what the RN-BSN transition looks like is important as organizations move forward to increase the number of employed BSNs and schools of nursing move to improve their RN-BSN programs.

The majority of nurses in this survey stated they had interested in a RN-BSN bridging program. They would be interested in pursuing or joining a RN-BSN bridging

program, almost all of respondents agreed that they would be interested in joining a bridge RN-BSN. The level of interest in enrolling for the bridge program in nursing is between very high and high. The majority of respondents indicated that they have very high and high interest in joining the bridge program in nursing. It indicates that respondents have high to very high interest to transition in pursuing RN-BSN bridging program. Some reasons for RNs to join the RN-BSN bridge program. Almost half of them indicated that BSN degree is becoming mandatory to work as registered nurse. Similarly, they have interest in learning and other respondents said that BSN degree is required for their promotion in the hospitals. RN–BSN students described their pursuit of a BSN as a journey of being and becoming a professional. In addition, the reason of choosing or joining University, nearly half stated that about nearness to place of work or home. A similar percentage was accounted for university hospitals or health care units and university reputation. Three of these percentages are comparable and RNs respondents not only live close to the university from work/home but they also have the reason because of university hospitals/health care units and the reputation of the University.

Our findings indicated that nursing profession remains a career of choice for young RNs entering university in the UAE. The study findings could help university recruiters and deans, or head of nursing department to keep the nursing viable and creative that it will be implemented and evaluated in recruitment process. We need to focus on this issue as we develop a BSN program with a current generation where multiple changes appear inevitable during their career. Nursing program in universities must focus on this as they develop programs for a generation where multiple changes of career appear inevitable during their lifetime. The nursing profession needs to look at career pathways after graduation that provides these challenges within nursing profession. Some nursing scholars have recommended important ways and methods regarding RN-BSN bridging program. As prospective diploma students return to school to obtain a BSN degree, innovative ways

need to be found to support them. According to Davidson, Metzger, and Lindgren (2011), with input from nursing leaders and nurses in the community, data showed that support related to program, technology, and social from other peers encouraged the RNs to 'stay the course,' and completed the requirements to graduate. With United Arab Emirates emphasis on increasing BSN nurses, the role of administrative staff and nurse educator is essential of promoting lifelong learning. Therefore, it is an ideal to provide a way for advising and mentoring nurses to return to BSN programs (Romp et al., 2014). According to Gillespie and Langston (2014), Bachelor Science in nursing progression is closely related to a relationship among several factors such as personal, work, and educational issue. Therefore, determining the best ways to inspire RNs to pursue a Bachelor Science in Nursing (BSN) is the challenge for nursing educational programs.

## Conclusion

To conclude, there appears to be a need for a RN-BSN program as a majority of the RNs respondents would be potential feeders into the BSN. Based on our research findings, prospective students of RN-BSN program are encouraged to assess their interest and reasons as well as their motivation to return to nursing school. They also need to be aware of the importance of the right program, the right time and the right place to attend a BSN program. Nursing institutions and academicians need to evaluate their nursing programs to address the possible barriers faced by these students to make this nursing educational transition more success. Describing what it looks like RN's transition to BSN is important as the organization moves forward to increase the number of BSNs workers and the School of nursing movements to improve RN's to BSN programs. These studies can provide an implementation of institutional strategies, such as curriculum improvement, academic collaboration as well as tuition reimbursement.

It is essential that nursing schools, deans, head, recruiters, and entire faculties need to provide opportunities for RNs students

to develop skills in problem solving and their therapeutic communication. One of limitations of this study is that situational and busy working days of prospective RNs who will be potential students attend a RN to BSN program is limited. Another limitation is that samples of this study is only limited. Therefore, a study with larger samples from several and multiple working areas of the RNs would increase the reliability and validity of the results.

In addition, BSN programs and faculty members are encouraged to evaluate their programs annually to address the barriers and facilitators experienced by students during their studies. This regular program evaluation will also make their BSN education transitions more successful and meaningful. Further studies are needed to explore RNs barriers or challenges and facilitators for RN-BSN bridging program completion. In addition, qualitative research of the future that can define factors that support and restrict the retention of RN-BSN students is required. Opinions and perceptions of students can be explored through interviews and conversations and it may provide more results that are comprehensive.

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# The Effect of Slow Deep Breathing Exercise on Headache and Vital Sign in Hypertension Patients

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## Abstract

Prevalence hypertension was estimated 1.13 billion people in the world and 2.027.006 (20.0%) people in DKI Jakarta. Headache was a common symptom related to high blood pressure levels. Slow Deep Breathing Exercise was non pharmacological therapy to reduce consumption of oxygen, metabolism, frequency of respiration, frequency of heart, muscle tension and blood pressure. This research was a pre-experimental one group pre-test post-test design and the respondents performed slow deep breathing exercise fourth time in one day during fourth days. Before and after intervention, the respondents measured vital sign and assessed headache scale with subjective and objective (a numerical scale 1-10). The number of samples in this study were 30 respondents who were selected by probability random sampling and were included in the inclusion and exclusion criteria. Research time December 2019-January 2020 at UKI General Hospital and Cawang District Health Center, East Jakarta. The results showed differences before and after Slow Deep Breathing Exercise on the decrease in headache scale with p-value = 0.000 and on the decrease in blood pressure with p-value = 0.000 and on the pulse rate of 0.014, breathing frequency 0.008 and temperature 0.000 (<0.001). Before intervention, patients feels headache on 7 scale and after intervention, respondents felt no headache on 0 scale. Conclusion are Slow Deep Breathing Exercise have an effect to reduce headache scale and vital sign for four days . The suggestion for the nurse teachs Slow Deep Breathing Exercise to hypertensive patients so that patients can do these exercises at home as an independent exercise.

**Keywords:** Headache, hypertension patients, slow deep breathing exercise, vital signs.

## Introduction

Non-communicable diseases are the leading cause of death globally and one of the major health challenges of the 21st century (WHO, 2018). Non-communicable disease are estimated to account for 71% of the 57 million global death which consisting of cardiovascular disease (31%), cancers (16%) and chronic respiratory diseases (7%) and diabetes (3%) (WHO, 2018).

Cardiovascular disease is the number one cause of death globally (AHA, 2019). In 2012, Cardiovascular disease killed 17,5 million people and the equivalent of every 3 in 10 deaths. One of these 17 million deaths of a year, over half 9,4 million are caused by complications in hypertension. Hypertension is a risk factor for coronary heart disease and the single most important risk factor for stroke. It is responsible for at least 45% of deaths due to heart disease and the least 51% of the deaths due to stroke (IFPMA, 2016). Hypertension is a persistent elevation of systolic blood pressure (TDS) at a level of 140 mmHg or more and diastolic blood pressure (TDD) at a level of 90 mmHg or more (Black & Hawks, 2014).

Prevelence hypertension was estimated 1.13 billion people worldwide and living in low-and middle-income countries (WHO, 2019). One of the chronic diseases in the world that causes 9.4 million deaths annually (WHO, 2013 in Dendy, Helwiyah, & Urip, 2018). Asia is the world's largest and most populous continent with approximately 4.3 billion people, hosting 60% of the world's current human population, and has a high growth rate (Chun et al., 2013). In 2013 there were 65.048.110 (25.8%) people suffering from hypertension with an Indonesian population more than 252 million people where the elderly age group had more hypertension with a prevalence of 57.6% compared to other age groups (RISKESDAS, 2013). The prevalence of hypertension sufferers in DKI Jakarta province is 2.027.006 (20.0%) of people affected by hypertension (RISKESDAS, 2013).

Hypertension that is not handled properly can lead to coronary heart disease, heart failure, stroke, kidney failure, hypertension retinopathy and blindness so that patients open a nursing management that can deal with hypertension (Wijaya & Putri, 2013).

In a sample of 11.710 hypertensive patients, reported that headache was a common symptom related to high blood pressure levels. 31% of patients with untreated severe hypertension complained of headache compared with 15% of treated hypertensive patients and controls without hypertension (Cortelli et al., 2016).

Non pharmacological therapy that must be carried out by hypertension sufferers is controlling food intake and sodium, losing weight, limiting alcohol and tobacco consumption, doing sports training, foot reflexology therapy and Slow Deep Breathing Exercise (Smeltzer & Bare, 2011; Liota, Dwi, & Tulus, 2018). Slow Deep Breathing Exercise is breathing technique with frequency of respiration less than 10 time per minute and long inhalation phase (Tarwoto, 2012). Benefits of Slow Deep Breathing Exercise are reduce level of pain and stress, to control of tension and fear. Slow deep breathing exercise can reduce consumption of oxygen, metabolism, frequency of respiration, frequency of heart, muscle tension and blood pressure (Kozier et al., 2010). Pain is a condition that affects a person whose existence is known only if that person has experienced it (Aziz & Musrifatul, 2014).

The results of research conducted by Mulyadi, Supratman, and Yuni (2015) of 36 respondents of hypertension in Puskesmas Baki Sukoharjo found a significant influence in the administration of Slow Deep Breathing Exercise therapy on reducing the intensity of headache in hypertensive patients with p-value = 0.001 (<0.5) . This is evidenced by the intervention of headache intensity before being on a medium scale and headache intensity intervention was done on a mild scale (Mulyadi, Supratman, & Yuni, 2015).

The results of another study conducted by Putu, Ayu, and Ketut (2016) on 28 respondents of hypertension in Puskesmas I East Denpasar found significant influence in the administration of Slow Deep Breathing Exercise therapy in reducing systolic blood pressure and diatolic blood pressure in patients with p-value = 0.000 (<0.001).

The different between privous study and

this study that privous study show short term to perform slow deep breathing exercise. But this study show long term to perform slow deep breathing exercise so that more accurate for the results. Privous study showed a little respondent but this study show many respondent to do this study so that the results more accurate and variated.

This research was conducted at East Jakarta UKI General Hospital and Cawang Village Health Center, East Jakarta. Researchers conducted a study at the Jakarta Public Hospital because of the phenomenon of a high incidence of 1,066 patients (January-December 2018). The study was also conducted with the Cawang Village Health Center in East Jakarta because the incidence of hypertensive patients who visited was 778 (November 2019-January 2020).

This research was conducted with 30 respondents of hypertension patients who experience headaches. The respondents were taught slow deep exercise four times a day for four consecutive days. Data were taken on a scale of headache and vital signs (blood pressure, pulse, respiration and temperature) before and after the intervention.

The phenomenon of researcher observations that occur in UKI public hospitals and Cawang UKI health centers is the treatment of hypertensive elderly patients using only hypertension medication and analgesic medication so that headaches reappear when patients do not use these drugs. Therefore, researchers are interested in conducting research on Reduce The Scale Of Headache And Vital Signs With Slow Deep Breathing Exercise In Hypertension Patients In East Jakarta. The purpose of this study was to determine efforts to administer Slow Deep Breathing Exercise to reduce the scale of headache and vital signs in hypertensive patients in East Jakarta.

**Method**

This research is a pre-experimental research with one group pre test design and post test design. This research was conducted by measuring vital signs (blood pressure, pulse, respiration and temperature) and assessing the headache scale subjectively and objectively

(using a numerical scale 1–10) in hypertensive patients before being given a Slow Deep Breathing Exercise and comparing it with a scale pain and the results of vital signs (blood pressure, pulse, respiration, temperature) hypertensive patients after the Slow Deep Breathing Exercise for 4 days. Research respondents conducted slowly in training four times a day. This research was conducted for 4 days when inpatients at the RSU UKI East Jakarta and outpatients in Puskesmas Kelurahan Cawang, East Jakarta were then visited at the patient's home for 4 days. After the data is collected, the researcher enters the data into the master table and then tests the normality of the data. For univariate analysis using SPSS frequency and bivariate analysis pre-test & post-test using the Wilxocon test. For analysis data to show before and after intervention for headache scale, blood pressure, pulses, respiration frequency and temperature.

The population of this study was 1,844 hypertensive patients who experienced headaches who visited the UKI General Hospital and the Cawang District Health Center in East Jakarta. The sampling technique in this study is probability random sampling which the researcher took responden randomly. The inclusion criteria were only hypertension patients who experienced headaches, patients who were hospitalized in UKI General Hospital and patients who visited the health center at Cawang Village Health Center. Exclusion criteria were patients who were not willing to do Slow Deep Breathing Exercise 4 times a day in 4 days and and patients who did not routinely take hypertension medication. The sample size in this study used a paired hypothesis test formula of average difference, totaling 30 hypertension patients who experienced headaches. The formula to get 30 hypertension patients from the rule of thumb (Sastroasmoro & Ismail, 2011) which between 5–50 times the number of independents.

The first day of the study respondents will be asked to scale the headache and taken vital signs (blood pressure, pulse, respiration and temperature). After that, respondents were taught slow deep exercise techniques. Then the respondent again took a headache scale

and vital signs. The first day, respondents performed slow deep breathing exercise 4 times in a day.

Steps The slow deep exercise technique consists of adjusting the position of the patient by sitting or sleeping, the patient's hands are placed above the stomach, the patient inhales through the nose while developing the stomach, hold breath for three seconds then the breath is released slowly through the mouth while feeling the stomach move down (deflate the stomach).

The second to fourth day, respondents did the same thing accompanied by the researcher and the headache and vital signs data before and after the intervention was still taken by the researcher. The second day to fourth day, respondents performed slow deep breathing exercise 4 times in a day.

The fourth day, researchers still took the scale of the level of headaches and vital signs before the intervention. After that, respondents do slow deep breathing exercises. Then, the researchers took data on the headache level scale and vital signs after intervention as a post test.

To measure the headache scale, researchers used a 0–10 headache scale. Level 0–1 if there is no headache. Level 2–3 if the respondent feels mild headache. Level 4–5 if the respondent feels moderate headache. Level 6–7 if the respondent feels severe headache. level 8–9 if the respondent feels very severe headaches. Level 10 respondents felt unbearable headache. Headache scale data is taken subjectively and objectively. Subjective data is taken when the respondent mentions a headache level scale. Objective data taken from data on blood pressure, pulse, respiration and temperature and facial expression of the respondent. If the respondent's blood pressure is below 90/60 mmHg, the respondent's is hypotensive. Blood pressure below 120/80 mmHg, it is said to be normal blood pressure. When systolic blood pressure between 120–139 and diastolic between 80–89 mmHg, it is said prehypertension. If systolic blood pressure is between 140–159 mmHg and diastolic between 90–99 mmHg, it is said to be grade 1 hypertension. If systolic blood pressure is more than and equal to 160 mmHg and diastolic is more than and equal to 100

mmHg, it is said to be grade 2 hypertension.

If the pulse is less than 60 times per minute, it is said bradycardia. If the pulse rate is between 60–100 times per minute, it is said to be normal. If the increase in pulse rate exceeds 100 times per minute, it is said tachycardia.

If the respiratory frequency is less than 12 times per minute, it is said bradiapnea. If the respiratory frequency is 12–20 times per minute, it is said to be normal. If the respiratory frequency is more than 20 times per minute, then say takiapnea. When the body temperature between 36–37.4, it is said to be normal body temperature. If the body temperature is above or equal to 37.5, it is said to be fever or hyperthermia. The variables studied in this study were headache scale and vital signs including systolic and diastolic blood pressure, pulse, respiration and temperature as the dependent variable and deep breathing relaxation techniques as independent variables. The instrument used in this study was the mercury blood pressure meter as a tool to measure blood pressure, a wristwatch to measure pulse and pain scale 1–10 and an observation sheet to collect characteristic data along with the results of blood pressure measurements of respondents. Respondents measured their vital signs in a seated position and then were given exercises to breathe relaxation techniques for 15 minutes.

Slow Deep Breathing Exercise is done four times a day for 4 days. The last day of slow deep breathing exercise measurements of vital signs and assessing the scale of headache to assess the scale of headache after exercising deep breathing relaxation techniques in the afternoon. After the data is collected, the researcher enters the data into the master table and then tests the normality of the data.

For univariate analysis using SPSS frequency and bivariate analysis pre-test & post-test using the Wilxocon test. Univariate analysis consists age, gender job, blood pressure systolic and diastolic, pulses, respiratory and temperature. Bivariate analysis consists p-value before and after intervention for scale headache, blood pressure systolic and dyastolic, pulses, respiratory, temperature and the meaning of Slow Deep Breathing

Exercise in Hypertension Patients From Day 1 to Day 4.

**Results**

**Tabel 1 Demographic Characteristic (n=30)**

| Characteristic | Frequency | % |
|---|---|---|
| 1. Age | | |
| 26–45 | 8 | 26.7 |
| 46–65 | 17 | 56.7 |
| Above 65 | 5 | 16.6 |
| 2. Gender | | |
| Man | 11 | 63.3 |
| Woman | 19 | 36.7 |
| 3. Job | | |
| Working | 9 | 30 |
| Does not work | 21 | 70 |

**Tabel 2 Clinical Information**

| Hypertension Characteristics | Before Slow Deeep Breathing Intervention | | After Slow Deeep Breathing Intervention | |
|---|---|---|---|---|
| | Frequency | % | Frequency | % |
| 1. Systolic | | | | |
| Normal | - | - | 17 | 56.7 |
| Prehypertension | 3 | 10 | 11 | 36.7 |
| Hypertension Stage 1 | 10 | 33.3 | 2 | 6.6 |
| Hypertension Stage 2 | 17 | 56.7 | - | - |
| 2. Dyastolic | | | | |
| Hypotension | - | - | 1 | 3.3 |
| Normal | 1 | 3.3 | 23 | 76.7 |
| Prehypertension | 8 | 26.7 | 4 | 13.3 |
| Hypertension Stage 1 | 11 | 36.7 | 2 | 6.7 |
| Hypertension Stage 2 | 10 | 33.3 | - | - |
| 3. Pulse | | | | |
| Normal | 22 | 73.3 | 29 | 96.7 |
| Tachycardia | 8 | 26.7 | 1 | 3.3 |
| 4. Respiratory Rate | | | | |
| Normal | 22 | 73.3 | 27 | 90 |
| Tachyapnea | 8 | 26.7 | 3 | 10 |
| 5. Temperature | | | | |
| Normal | 27 | 90 | 30 | 100 |
| Hyperthermia | 3 | 10 | - | - |
| 6. Scale of Headache | | | | |
| Scale 0 (No pain) | - | - | 16 | 53.3 |
| Scale 1 (No pain) | - | - | 10 | 3.3 |

| | | | | |
|---|---|---|---|---|
| Scale 2 (Mild Pain) | - | - | 3 | 1 |
| Scale 3 (Mild Pain) | 3 | 10 | 1 | 3.3 |
| Scale 4 (Moderate Pain) | 5 | 16.7 | - | - |
| Scale 5 (Moderate Pain) | 4 | 13.3 | - | - |
| Scale 6 (Great pain) | 5 | 16.7 | - | - |
| Scale 7 (Great pain) | 8 | 26.7 | - | - |
| Scale 8 (Very great pain) | 4 | 13.3 | - | - |
| Scale 9 (Very great pain) | 1 | 3.3 | - | - |
| Scale 10 (The most intense pain) | - | - | - | - |

**Table 3 Headache And Vital Sign Score Before And After Intervention**

| Variable | P-Value |
|---|---|
| 1. Difference in Scale of Headache Before and After Slow Deep Breathing Exercise Interventions | 0.000 |
| 2. Systolic Blood Pressure Differences Before and After Slow Deep Breathing Exercise Interventions | 0.000 |
| 3. Diastolic Blood Pressure Differences Before and After Slow Deep Breathing Exercise Interventions | 0.000 |
| 4. Difference in pulse rate before and after the intervention of Slow Deep Breathing Exercise | 0.014 |
| 5. Difference in the Frequency of Breathing Before and After Intervention of Slow Deep Breathing Exercise | 0.008 |
| 6. Temperature Difference Before and After Slow Deep Breathing Exercise Intervention | 0.000 |

**Table 4 Meaning of Slow Deep Breathing Exercise in Hypertension Patients From Day 1 to Day 4**

| | Hari 1 | Hari 2 | Hari 3 | Hari 4 |
|---|---|---|---|---|
| Subjective data: | | | | |
| Scale of Headache After Slow Deep Breathing Exercise | 0.000 | 0.000 | 0.000 | 0.000 |
| Objective Data: | | | | |
| Systolic Blood Pressure After Slow Deep Breathing Exercise | 0.007 | 0.007 | 0.001 | 0.000 |
| Diastolic Blood Pressure After Slow Deep Breathing Exercise | 0.012 | 0.180 | 0.005 | 0.000 |

1. Univariate Analysis

Based on table 1, the majority of respondents aged 46–65 years were 17 people (56.7%) and the minority of respondents aged over 65 years were 5 people (16.6%). For the majority of the sexes there were 19 female respondents (36.7%) and the minority of the male sex were 11 people (63.3%). For job characteristics, the majority of hypertensive respondents do not work as many as 21 people (70%) and the minority of respondents work as many as 9 people (30%).

According to Table 2, it was found that before the Slow Deep Exercise intervention the majority of systolic blood pressure in stage 2 hypertension were 17 respondents (56.7%), diastolic blood pressure in stage 1 hypertension were 11 respondents (36.7%), the majority of normal pulse was 27 respondents (73.3 ), the majority of normal respiratory frequency was 22 respondents (73.3%), the majority temperature was normal as many as 27 people (90%) and the majority of headache scales on a scale of 7 (severe pain scale) were 8 people (26.7%). After the Slow Deep Exercise intervention, the majority of

systolic blood pressure in normal was 17 respondents (56.7%), the majority of diastolic blood pressure was normal in 23 respondents (76.7%), the majority of normal pulse was 29 respondents (96.7%), the frequency of breathing was majority in as many as 27 respondents (90%), the majority of normal temperatures were 30 people (100%) and the majority of the headache scale was on a scale of 0 (no headache) of 16 respondents (53.3%).

2. Bivariate Analysis

Bivariate analysis consists p-value before and after intervention for scale headache, blood pressure systolic and dyastolic, pulses, respiratory, temperature and the meaning of Slow Deep Breathing Exercise in Hypertension Patients From Day 1 to Day 4 using the Wilxocon test.

Based on Table 3, there are differences in the scale of headache before and after the Slow Deep Breathing Exercise intervention with a p-value of 0.000 (<0.001). Based on Table 4, there are differences in systolic and dyastolic blood pressure before and after the intervention of Slow Deep Breathing Exercise with a p-value of 0.000 (<0.001). There is a difference in the pulse rate before and after the Slow Deep Breathing Exercise intervention with a p-value of 0.014 (<0.001). There is a difference in the respiratory rate before and after the Slow Deep Breathing Exercise intervention with a p-value of 0.008 (<0.001). There is a temperature difference before and after the Slow Deep Breathing Exercise intervention with a p-value of 0.000 (<0.001).

Based on table 5 showed that the significance of the Slow Deep Breathing Exercise intervention is on the third day where from the subjective data the headache scale p-value = 0.000 (<0.001) and objective data on systolic blood pressure p-value = 0.0001 (<0.001) and diastolic blood pressure with p-value = 0.005 (<0.001).

**Discussion**

This study found that slow deep breathing exercise could decreased headache scale. The Researcher assume slow deep exercise can reduce the scale of headache because slow deep exercise can reduce blood pressure, relax tense muscles around the neck and head, diverting attention from headaches so that patients can calm down and not grimace in pain in the head.

This is evidenced by the Slow Deep Breathing Exercise widely used to reduce chronic pain. Inhale deeply can relax a group of toto in sequence and focus attention on the differences in feelings experienced between when the muscle groups relax and when the muscles are tense (Kozier et al., 2010).

This was consistent with previous study conducted by Mulyadi, Supratman, and Yuni (2015) on 36 respondents of hypertension in Puskesmas Baki Sukoharjo found a significant influence in the administration of Slow Deep Breathing Exercise therapy on reducing the intensity of headache in hypertensive patients with p-value = 0.001 (< 0.001). This is evidenced by the intervention of headache intensity before being on a medium scale and headache intensity intervention was done on a mild scale (Mulyadi, Supratman, & Yuni, 2015).

The different between privous study and this study that privous study show short term (only one day) to perform slow deep breathing exercise. But this study show long term (fourth day) to perform slow deep breathing exercise so that this study produced the results more accurate than provious study. This study found that slow deep breathing exercise could decreased systolic and diastolic blood pressure. Researchers argue that slow deep breathing exercises make the heart work optimally so that there is no decrease in cardiac output and blood pressure returns to normal.

This was consistent with previous study conducted by Putu, Ayu, and Ketut (2016) on 28 hypertension respondents at the East Denpasar Health Center I found a significant influence in the administration of Slow Deep Breathing Exercise therapy to decrease systolic and diatolic blood pressure in hypertensive patients with p-value = 0.000 (<0.001).

This study found that slow deep breathing exercise could decreased pulses. researchers believe that slow deep breathing exercise can reduce blood pressure back to normal so

that the pulse returns to normal too. This was consistent with Kozier et al. (2010), Slow Deep Breathing Exercise can reduce heart frequency, muscle tension and systolic and diastolic blood pressure.

This was consistent with previous study which conducted by Arif, S.U., & Agis, T. (2019) on 25 hypertension respondents at Kembaran Timur Purwokerto health center which found there was a different decreased pulses before and after slow deep breathing exercise. Before slow deep exercise, mean's pulse 90,16x/minute and after slow deep breathing, mean's pulses 87,84x/minute.

This study showed that slow deep breathing exercise could decreased respiratory rate and temperature normal. Researchers argue that slow deep breathing exercise can make fill the lungs with oxygen so that reduce shortness of breath and make respiratory rate to be normal. Slow deep breathing exercise can relax muscles so that make temperature to be normal.

This was consistent with Kozier et al. (2010), Slow Deep Breathing Exercise can reduce oxygen consumption, metabolism, respiratory frequency, heart frequency, muscle tension and systolic and diastolic blood pressure.

From table 4, it can be analyzed on days 1 and 2 based on subjective data, the pre and post intervention headache scale shows a significant difference but the objective data of blood pressure pre and post intervention on the first and second day do not show there is a significant difference which means that there are no maximum results in administering Slow Deep Breathing Exercise on days 1 and 2 to reduce the scale of headache and systolic and diastolic blood pressure. But on days 3 and 4 showed the maximum results in the administration of Slow Deep Breathing Exercise in reducing the scale of headache in hypertensive patients on third and fourth days.

The Researchers argue that slow deep breathing exercise works optimal with oxygen filled the lungs. The heart also works optimal to out the blood to the body, make blood pressure to be normal and there is no headache. This was consistent with Kozier et al. (2011), relaxation techniques Breathing deeply is a technique used to reduce levels of chronic stress and pain. Deep relaxation techniques allow the patient to control his body's response to tension and anxiety. Relaxation techniques Breathing deeply can reduce oxygen consumption, metabolism, respiratory frequency, heart frequency, muscle tension and blood pressure.

Implication this study are for nurses always teach slow deep breathing exercise for hypertension patients to make relax and reduce the headches scale, blood pressure, heart frequency, respiratory frequency and temperature. The other implication are for hypertension patients who must performed slow deep breathing exercise as a regular exercise in their home so that they didn't felt headache again, blood pressures, heart frequency, respiratory frequency and temperature to be normal.

This study has several limitations and therefore needs to be refined so that future researchers can further develop the characteristics and number of respondents to be reproduced so that the results obtained are more precise.

## Conclusion

Efforts to Giving Slow Deep Breathing Exercise for 4 days four times a day have an effect on the decrease in the scale of headache and vital signs consisting of systolic and diastolic blood pressure, pulse, pulse frequency, respiratory rate and temperature of the respondent. Suggestions for further researchers to add factors counfounding BMI, smoking and exercise.

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# Risk Factors of Maternal Nutrition Status During Pregnancy to Stunting in Toddlers Aged 12–59 Months

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## Abstract

Maternal nutrition status during pregnancy highly contributed to risk factors of stunting among children. Bone ossification approximately begins in the sixth weeks of embryonic development and continues to the end of pregnancy. However, inadequate nutrient supply in pregnant women harmed fetal growth. The study aimed to identify the association between pregnant women's nutrition status and stunting. The case-control study using the retrospective design involved mothers with children aged 12–59 months. A proportional random sampling technique was applied to select participants. The sample was 80 toddlers, divided into 40 stunted, and 40 non-stunted toddlers. Data were taken from 27 April to 3 May 2019 through observations following the Mother and Child Health handbook and children's height. Weight gain calculation during pregnancy determined the maternal nutrition status, referred to as maternal pre-pregnancy body mass index. The univariate analysis used frequency distribution, while bivariate analysis used the chi-square test. This study obtained approval from The Health Research Ethics Committee of the Institute of Health Science of General Achmad Yani, Cimahi. The mothers' poor nutritional status caused as many as 85% of stunted toddlers' prevalence during pregnancy. Results showed that maternal nutritional status during pregnancy was significantly associated with stunting among children (p-value: 0.000). The OR value was 13,222, which means children born to mothers with inadequate nutrient supply during pregnancy were more likely to be stunted as much as 13,222 times, than children born to mothers who had good nutrient supply. It is recommended that health workers prevent stunting from pregnancy by providing supplementary food to pregnant women, and promoting the health of the maternal nutritional status during pregnancy. Suggestions for pregnant women is to increase nutrient intake and nutritional status during pregnancy to prevent stunting in children.

**Keywords**: Case-control, Indonesia, nutrition status, pregnancy, stunting.

**Introduction**

Stunting is a dominant nutritional problem in Indonesia compared to other nutritional issues such as malnutrition, underweight, and overweight, which tends to increase every year. The prevalence of stunting has continued to increase since 2016 to reach 30.8% in 2018. This achievement is further from the stunting target tolerated at 20%. West Java Province is one of the provinces with the highest prevalence of stunting in the last three years. In 2017, West Java had a stunting prevalence at the age of 0-59 months of 15.1% and experienced an increase in 2018 to 31.1% (Kemenkes RI, 2018). Cimahi City is one of the cities in West Java with a high prevalence of stunting at 0-59 months. The Cimahi City Health Office stated that the incidence of stunting in Cimahi City reached 27.78% in 2017. The highest prevalence of stunting, as many as 573 children under five, was in the Central Cigugur Health Center (Kamaludin, 2018).

Stunting has a negative impact both in the short and long term, and can even cause death in children under five years (UNICEF, 2017). Children with stunting will experience physical growth disorders, disruption of brain development, intelligence, and metabolic disorders in the body. Meanwhile, the long-term effects of stunting include low cognitive abilities and learning achievement leading to low economic productivity and decreased immunity. Hence, children get sick quickly and have the risk of developing diabetes, obesity, heart disease, stroke, and disability in old age (Picauly & Toy, 2013). This condition will be detrimental to individuals and the State.

There are two main factors causing stunting: the mother's condition and factors due to the child's condition (Rahayuwati et al, 2019; Ermiati, Setyawati, A & emaliyawati, E, 2018). Maternal factors that cause stunting include malnutrition in pregnant women, lack of maternal health during pregnancy, closely spaced pregnancy, and teenage mothers (Budijanto, 2018). While factors due to the child's condition are the intake of exclusive breastfeeding (breast milk), that is not optimal, giving too early MP-ASI, genetic factors, and nutritional deficiencies

in children (Dwitama et al, 2018). Besides, a history of infectious diseases is also a risk factor of stunting in children (AM Abd El-Maksou et al., 2017).

Among all these factors, the maternal nutritional status during pregnancy is a crucial causative factor in the first thousand days of life. The pregnant woman's nutrition is the primary source of food for embryonic growth and development, which is the beginning of life (Karinne et al., 2019). Lack of nutrition during pregnancy, which is the beginning of life in the first thousand days of life, where growth occurs very rapidly, is hazardous to stunting in the first two years of life (Black, 2013). Damage during pregnancy cannot be repaired in the next phase of life and will affect health outcomes in childhood and adulthood (Soetjiningsih, 2015). Therefore the nutrition of pregnant women is an essential factor in determining the incidence of stunting.

The formation and growth of the placenta and the rapid development of fetal cells need nutritional intake from the beginning to the end of pregnancy (Alison et al., 2018). At the age of 0 days, nutrients are necessary to prepare the implantation of the conception results, namely the formation of decidua endometrium which contains lots of glycogen, protein, lipids, and minerals, which are sources of embryo nutrition since implantation before the placenta is formed (Guyton & Hall, 2012). The next stage is the growth and development of the placenta in the first week. The nutritional needs will increase to form a perfect placenta that will guarantee the transportation of oxygen and nutrients from the mother to the fetus and embryo (Alison et al., 2018). Nutritional needs will increase for embryonic and fetal development processes.

Nutrition is essential for the process of growth and bone formation since the beginning of fetal life until the end of pregnancy (Setiawan et al., 2012). At the age of six days, a skeleton is formed, which was initially in the form of cartilage consisting of mesenchyme cells, which are embryonal tissues (Sethi, Priyadarshi, & Agarwal, 2020). From the age of 6 to 7 weeks, mesenchymal cells undergo an ossification process so that the cartilage will gradually turn into hard bones. Bones will undergo intramembranous

and endochondral ossification (Alison et al., 2018). Long bones are bones that are responsible for the endochondral ossification process that allows bones to grow longer. This endochondral ossification process occurs in the plate/cartilage epiphyte area, an area at the border of the epiphysis and diaphysis bone (Sethi et al., 2020; Prendergast & Humphrey, 2014). The endochondral ossification process occurs in the epiphyseal plates that consist of four zones, namely the chondrocyte reserve zone, proliferation zone, maturation zone, and calcification zone, which are cartilages undergoing mineralization (Setiawan et al., 2012; Christiani, Setiawati, & Yulihastuti, 2017). Besides, each zone has a role.

The rest zone is rich in hyaline cartilage, which consists of ovoid-shaped chondrocytes resting and do not undergo morphological changes. A proliferation zone is a place where chondrocytes are actively mitotic. This process serves as a place for the formation of new chondrocyte cells to replace cells that have undergone hypertrophy and degeneration in parts bordering the diaphysis. This process requires the essential ingredients of protein and energy (Helmita, 2015). New chondrocyte cells formed from mitosis are flat and arranged into columns parallel to the bone's long axis, which results in increased bone length (Setiawan et al., 2012).

The maturation zone is where the chondrocytes are being calcified. This process will produce hydroxyapatite and requires calcium, phosphate, and zinc, helping the absorption of calcium. All necessary minerals must be available in fetal body fluids (Setiawan et al., 2012). In the fourth zone called the calcification zone, the calcification process occurs for the hydroxyapatite deposition to form a thin barrier around degenerated chondrocytes. In this calcification zone, there is one or several layers of chondrocytes which are hypertrophic and dead, so this zone is called the atrophy zone. The calcification process in the calcification zone is very much in need of minerals, calcium, magnesium, and phosphorus, which must be available in the fetal fluid. (Christiani et al., 2017).

The ossification process is closely related to the calcium and phosphorus content of the parent body. Calcium for fetal growth is obtained from the parent through absorption of $Ca2+$ from the digestive tract, reabsorption in the proximal tubule of the proximal renal kidney, and reabsorption through osteoclasts (Alison et al., 2018). Inadequate maternal nutritional intake will reduce the supply of nutrients to the fetus so that the fetal nutritional needs are not met (Karinne et al., 2019), resulting in a long growth process on the epiphyseal plate in four inhibited zones (Setiawan et al., 2012). The rate of mitosis in the inhibited proliferation zone will disrupt the process of chondrocyte replacement. If the chondrocyte proliferation rate is not balanced with the chondrocyte resorption rate, then the thickness of the maturation zone will be disrupted. The calcification zone will also decrease as it is related to the previous areas experiencing growth retardation (Setiawan et al., 2012). So that inadequate nutrient intake in pregnant women will reduce the baby's length and high potential.

This study is different from previous studies. The difference is on the measurement indicators of the nutritional status of pregnant women. This study used the calculation of weight gain during pregnancy compared to the Body Mass Index (BMI) before pregnancy. Measurements using BMI are more reliable in reflecting the nutritional status of pregnant women. In previous studies, nutritional status indicators used the Mid Upper Arm Circumference (MUAC) (Sukmawati et al., 2018). This study aimed to identify the relationship of maternal nutritional status during pregnancy with stunting in toddlers aged 12 to 59 months at the Public Health Center (Puskesmas) of Cigugur Tengah.

**Method**

The method used an analytic study of a case-control with a retrospective design. The population was mothers who had toddlers aged 12 to 59 months who lived in the Cigugur Tengah Health Center's working area. The criteria were, the mother had maternal-and-child health (MCH) card, the mother did not have anemia during pregnancy, and the age of the mother during pregnancy was above 20 years. The criteria determination was to homogenize the population. The MCH card was a population requirement to get

historical data about the mother's weight and height before pregnancy and weight gain during pregnancy. Data regarding maternal weight before pregnancy, weight at the end of pregnancy and height at pregnancy are secondary data obtained from the MCH card. These data were needed to determine the history of a mother's nutritional status during pregnancy and to obtain a history of anemia during pregnancy. Based on these requirements, a population of 180 mothers was selected, who were generally newcomers, since Cigugur Tengah includes urban areas. The sample size was obtained using an unpaired categorical formula. According to Dahlan (2010), the basis is the categorical data scale and the unpaired data. The sample obtained was divided into two groups, consisting of 40 non-stunted toddlers and 40 stunted toddlers. The sample was obtained through a proportional random sampling technique because the population spread over several neighborhood groups (Rukun Warga-RW). Sampling was carried out in three RWs with a high incidence of stunting. From each RW, the number of samples was obtained based on proportional calculation, from RW 13, 12 stunted, and 12 not-stunted toddlers, from RW 14, 14 stunted, and 14 not-stunted,

and RW 19, 14 stunted, and 14 not- stunted toddlers. The sample determination was conducted randomly in each RW.

The nutritional status was collected from the MCH handbook to get data on maternal weight before pregnancy and weight gain during pregnancy, Furthermore, the nutritional status of pregnant women was obtained by comparing weight gain during pregnancy with Body Mass Index (BMI) before pregnancy. Data on the stunting of toddlers are collected by measuring toddlers' height using a microtome, and then the toddler's height is compared with the Z-score (TB/U) table (Kementerian Kesehatan RI, 2018). Data on height and age of children are primary data. Data collection was conducted from 27 April to 3 May 2019. Furthermore, the univariate data were processed with frequency distribution, while the bivariate data used the Chi-square test. The study results were presend in tables. This study received ethical approval from the STIKES Research Ethics Committee general Achmad Yani number 49/KEPK /V/2019.

**Results**

**Table 1 Frequency Distribution of Maternal Nutritional Status During Pregnancy in the Stunting and Non-Stunting Groups In Cimahi City West Java Province in 2019**

| Stunted | Stunting | | No Stunting | |
|---|---|---|---|---|
| | n | % | n | % |
| Mother with less weight gain | 34 | 85.0 | 12 | 30.0 |
| Mother with normal weight gain and mother with excessive weight gain | 6 | 15.0 | 28 | 70.0 |
| Total | 40 | 100 | 40 | 100 |

**Table 2 Relationship of Maternal Nutritional Status during Pregnancy with Stunting in Toddlers Age 12-59 Months at Cimahi City West Java Province in 2019**

| Variable | Stunting | | No Stunting | | P Value | OR (CI 95%) |
|---|---|---|---|---|---|---|
| | n | % | n | % | | |
| Mother with less weight gain | 34 | 85.0 | 12 | 30.0 | 0.000 | 13.222 (95% CI: 4.400 – 39.732) |
| Mother with normal weight gain and Mother with excessive weight gain | 6 | 15.0 | 28 | 70.0 | | |
| Total | 40 | 100 | 40 | 100 | | |

The percentage of maternal nutritional status during pregnancy in the stunted and non-stunted groups in Cimahi City, West Java Province in 2019 can be seen in the following Table 1.

Table 1 shows that in the group of stunted toddlers, most of the mother's conditions during pregnancy were in poor nutritional status.

The relationship of maternal nutritional status during pregnancy with stunting in toddlers can be seen in Table 2 below.

Table 2 illustrates the results of the chi-square statistical test with the Continuity Correction test. The p-value was smaller than α (α = 0.05), so it could indicate a relationship between the mother's nutritional status during pregnancy and the stunting in toddlers. The statistical test results obtained an Odds Ratio of 13.222 (95% CI: 4.400 – 39.732). This means that mothers who gained less weight had a risk for stunting in toddlers by 13 times compared to toddlers whose mothers experienced normal weight gain and mothers with excessive weight gain.

**Discussion**

The results found that the majority of stunting toddlers were toddlers born to mothers who were malnourished during their pregnancy. Poor nutritional status in pregnant women is still a significant problem in Indonesia (Kementrian Kesehatan RI, 2018). The level of education, maternal knowledge, and social-economic status are the dominant causes (Irianto, 2014; Notifa et al., 2016). This factor is characteristic of urban migrants. Mothers are less able to modify the daily diet with the available income. Mothers' skills in choosing foods require knowledge and awareness of the importance of nutrition during pregnancy. Lack of knowledge and information causes pregnant women to consume food based on what is found and desired, only to overcome hunger without considering the nutritional value.

The study results stated that poor nutritional status during pregnancy risks stunting in children thirteen times compared to mothers with good nutritional status during pregnancy. The results of this study are in accordance with previous studies (Sukmawati et al., 2018; Pusparini et al., 2016). The maternal nutritional status will determine the fulfillment of micro and macronutrient dietary needs during pregnancy for the formation of the placenta, amniotic fluid, organogenesis, and fetal growth and development from the beginning to the end of pregnancy (Black, 2013). Poor nutritional status in pregnant women will result in a reduced supply of nutrients to the fetus, thereby disrupting the fetus's process of organogenesis, growth, and development (Rahmaniar et al., 2011).

The maternal nutritional status determines the process of the formation of an entire placenta. The placenta structure begins with the creation of decidua endometrium starting at the age of 0 days, requiring the essential ingredients of glycogen, proteins, lipids, and minerals (Guyton & Hall, 2012). These essential ingredients are obtained from the mother; when the mother does not have these nutrient reserves, the formation of decidua endometrium and placenta will be incomplete. An imperfect placenta decreases the supply of oxygen, nutrients, and minerals to the fetus during pregnancy. Fetal life is very dependent on the entire placenta. The supply of blood, oxygen, nutrients, and primary minerals is highly dependent on the placenta because the intestinal and renal fetuses are not functioning (Fikawati et al., 2015; Sethi et al., 2020). Therefore, it takes an entire placenta to ensure the fulfillment of all fetal needs. The entire placenta is formed from the maternal nutritional reserves.

The maternal nutrition status will determine the nutrient reserves needed for fetal organogenesis, including bone organ formation. Human fetal cartilage framework and primary ossification center in the vertebra and long bones are completed in the first trimester (Sethi et al., 2020). The cartilage formation process requires essential protein compounds (amino acid composition), namely collagen, as the dominant structural material in the bone matrix (Guyton & Hall, 2012). The essential ingredients of collagen bones are obtained from the mother. If the mother cannot fulfill this need, then the formation of fetal cartilage skeleton and primary ossification center in the vertebra and long bones will be inhibited, including

the potential for reduced bone length. The primary ossification center of the long bones and vertebrae, which is the center of the fetal body's length, has been completed in the first trimester, it can no longer be formed at a later time.

The maternal nutritional status will still guarantee the continuity of the subsequent bone formation process. That is the endochondral ossification process, which allows the bones to grow long, and the intramembranous ossification process helps to harden the bones. The endochondral ossification process of the long bones occurs in the epiphyseal plate, which is the center of fetal length increase. The epiphyseal plate is divided into four zones: the reserve zone, proliferation zone, maturation zone, and mineralization zone. The proliferation zone is a zone where active chondrocyte cells produced new cells by mitosis. This process requires the main ingredients of protein and minerals obtained from the mother. In this condition, also mitochondria of chondrocyte cells need an adequate source of energy for the process of mitosis (Helmita et al., 2015). The mother is the primary source of protein and energy in fetal life through the placenta (Sethi et al., 2020). Lack of energy sources and maternal protein reserves will cause a decrease in the supply of protein and energy to the fetus, thereby inhibiting the mitosis of chondrocyte cells (Helmita et al., 2015). So inhibition of bone cells' formation will cause the thickness of the proliferation zone to decrease. The proliferation zone will affect the next zones, namely the maturation and mineralization zones. It will cause cells shorter in the maturation and mineralization zones, for in those zones, cell proliferations do not occur again (Setiawan et al., 2012; Christiani et al., 2017).

Calcium is an essential nutrient needed in the ossification process in the maturation zone. New cells in the proliferation zone will shift towards the maturation zone. Chondrocyte cells will experience hypertrophy and vacuole; in this zone, there will be no new cell formation (Setiawan et al., 2012). In the maturation zone, chondrocytes play a vital role in the calcification process. Chondrocytes accumulate Ca ++ ions in their mitochondria, which then form matrix vesicles. The matrix vesicles will mutually aggregate to form globules that subsequently form hydroxyapatite crystals in the longitudinal septa of the maturation zone. This hydroxyapatite crystal is a material for the process of mineralization and bone calcification in the mineralization zone.

The mother is the primary source of calcium in fetal life through the placenta, which actively moves against electrochemical concentration and gradients. Ca levels of the fetus are maintained from 0.3 to 0.5 mM / L, higher than Ca levels in maternal serum, to keep the level difference between mother and fetus. Low Ca levels in maternal serum can cause low serum Ca levels in the fetus (Sethi et al., 2020). Low Ca fetal serum causes inhibition of matrix vesicle formation; consequently, it will also inhibit the formation of hydroxyapatite crystals in the longitudinal septa of the maturation zone, which will result in the reduced thickness of the maturation zone.

A lack of zinc intake can also hamper the process of forming hydroxyapatite crystals in the maturation zone. Zinc is instrumental in the absorption of calcium by cells; if zinc levels are low, the uptake of calcium by cells will also be reduced (Setiawan et al., 2012). Zinc also plays a role in the function of growth hormone; if the zinc level is insufficient; then, the growth hormone's role is less than optimal (Black, 2013). Besides affecting bone growth, calcium ions can also affect genetic programs that determine body height. If calcium intake reduces, it will cause low blood calcium levels and may disrupt the genetic height process (Prendergast & Humphrey, 2014).

Calcium (Ca), phosphorus (Pi), and Magnesium (Mg) are the major minerals in fetal bone mineralization in the mineralized zone. Hydroxyapatite crystals formed in the maturation zone will experience mineralization in the mineralized zone. The fetal Ca levels are maintained at 0.3 to 0.5 mM/L higher than maternal serum levels of Ca. This is to keep differences in levels between mother and fetus. Calcium low levels in maternal serum can cause low levels of serum Ca in the fetus. Phosphorus is maintained at 0.5 mM/l higher than maternal serum phosphorus levels. Phosphorus is

active in the endochondral ossification, which plays a role in the chondrocyte apoptosis process and osteoid formulation. Magnesium is maintained at 0.05 mM / L higher than maternal serum levels. Mg plays a crucial role in biomacromolecules (DNA, RNA, and Protein), forming an energy-producing bone matrix. Fetal magnesium levels depend on maternal mg intake; if the mother lacks mineral intakes, then fetal serum mineral levels will decrease. Low levels of minerals in fetal serum will inhibit the mineralization process in the mineralized zone, osteoblast dysfunction, and disrupted bone metabolism (Sari et al., 2016). This condition decreases the thickness of the mineralized zone. This in Turn causes the baby's length to be reduced and the potensial for reduced height as well.

Status of mothers with poor nutritional conditions has the potential to reduce fetal height after birth. Mothers who are unable to meet the fetal protein needs will inhibit chondrocyte cell proliferation in the proliferation zone, reducing the thickness of the proliferation zone. Furthermore, mothers who are unable to meet the fetal calcium and zinc needs will cause a decrease in the formation of hydroxy acid crystals in the maturation zone, which ultimately inhibits the process of mineralization and bone calcification in the next area, the cartilage zone. Moreover, mothers who cannot fulfill the fetal serum mineral needs, including Ca, Ph, and Mg in the mineralized zone, will cause the thickness of the mineralized zone to decrease. Overall, unmet nutrients cause the thickness of the epiphyseal plate to decrease. The lack of epiphyseal plate thickness will reduce the fetal length and reduce the potential fetal length after birth. So the mother's status during pregnancy has the potential for stunting in children.

This study also found a unique case that stunting could occur in toddlers with mothers who had good nutritional status, even though it happened with a small presentation. The explanation for this unique case can be that the incidence of stunting may be affected by factors other than the nutritional status of pregnant women. Budijanto (2018) states that several factors underlie stunting in toddlers, including the pregnancy spacing that is too close, the teenage mother, the

amount of parity, maternal height, and exclusive breastfeeding. In this study, factors of pregnancy spacing, maternal age, and maternal height were not selected. There was a possibility that these factors were the reasons for stunting in mothers with good nutritional status. Based on this, it can be a topic for further research to examine other factors that influence stunting besides the nutritional status of pregnant women.

## Conclusion

The pregnant woman nutritional status is related to the incidence of stunting in toddlers aged 12–59 months. The maternal nutritional status during pregnancy determines the length of the baby and the potential length of the fetus. Recommendations for health workers are to carry out stunting prevention since pregnancy by providing supplementary food to pregnant women and health promotion of the maternal nutritional status during pregnancy. Suggestions for pregnant women are to increase food and nutritional status during pregnancy to prevent stunting in toddlers.

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# The Effectiveness of Dhikr to Intensity of Pain during Active Phase in Mothers Getting Inducing Labour

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## Abstract

Women in labor process with induction are more painful than normal labor that need to applicate an intervention to reduce pain in stage I labor. The purpose of this study is to determine the effect of dhikr towards intensity of pain of labor during the active phase of the mother with labour induction. The study was conducted since May until June 2018 with one group quasi-experimental design. Pain score is measured before and after dhikr using Visual Analog Scale (VAS) every 30 minutes during the active phase of first stage. The mothers who met criteria recruited as the samples. Fifteen muslim mothers who had first labor induction, starting cervical dilatation in 4 cm, gynecoid pelvis and completed cervical dilatation to 10 cm. Statistic analysis performed by ANOVA Repeated Measure test at α = 0.05. The result of the statistical test shows that dhikr has moderate effect of 32.5% to decrease the average score of induction pain at the active phase of first stage (value-p=0.08) after controlled with confounding variables; age and parity. Dhikr had an effect on the decrease of VAS score after 30 minutes intervention (p-value = 0.016), but did not affect the measurement at the end of the first stage of labour (p-value = 0.651). Therefore, dhikr could be used to control pain of induced labor during active phase of first stage. Suggested has teached pregnant women since the third trimester and combined with the other intervention to reduce labour pain.

**Keywords:** Dhikr, induction labor, nursing, pain.

## Introduction

Labor induction is a process of achieving vaginal delivery by stimulating uterine contractions before the onset of spontaneous labor (Goodwin, 2010). Increased frequency of uterine contractions that occur in mothers with labor induction can increase labor pain in the first stage, because strong contractions are a strong source of pain (Andarmoyo, 2013). Rahmawati (2014) stated that the pain of the first stage of labor in mothers with induction of labor was stronger than that of normal delivery mothers. In addition, drip or injection of induction of labor happens rapidly that the brain can't respond properly to pain in the early stage. Labor induction had been associated with potential risks, such as uterine tachysystole with or without fetal heart rate changes that resulting more contraction of uterine which consequency is mothers feeling more painful (Viteri and Sibai, 2018).

Pain the the First stage of labor varies in accordance with the phase. The first stage of labor consists of 2 phases, namely the latent phase (cervical opening 1–3 cm), the active phase (4–10 cm). Women begin to feel uncomfortable when entering the active phase, because the intensity of contractions begins to increase, longer. The active phase is the most appropriate phase for mothers to do relaxation techniques. (Cuningham, 2016; Rici, 2013). Women can reduce pain in stage I labor by reducing pain intensity and reduce pain sensation with relaxation therapy (Manning, 2013).

Labor pain that is not handled properly can have a bad impact. Labor pain can have a psychological impact on the mother, i.e. anxiety. Anxiety that is felt by someone can increase the secretion of adrenaline as a result of the body's response to psychological stress and hypoxia associated with labor pain. Increased adrenal secretion can cause vasoconstriction as a result of decreased uterine blood flow, resulting in the occurrence of fetal hypoxia and bradycardia which will eventually occur fetal death and can inhibit contractions, thus slowing labor (Saragih, 2017).

Duration of labor is one of the causes of maternal death, so indirectly pain in labor if not getting adequate intervention can cause maternal death. Therefore, labor pain is something that should be a concern for birth attendants, including nurses. According to the Dick-Read theory, women can reduce their pain by reducing pain intensity and reducing pain sensation with relaxation therapy (Manning, 2013). Previous studies exhibited the factors that most influenced labor pain were previous experiences of labor pain associated with parity, age (Meštrović et al., 2015; Shrestha et al., 2013; Tampubolon, 2015).

Relaxation therapy is a form of non-pharmacological to reduce pain. For Moeslim patients, one of selected choice of relaxation therapy during stage I labor process is dhikr. Dhikr is a relaxation technique that can activate God Spot, the center of religiosity in the brain. It can be stimulating hypothalamus to activate the work of the parasympathetic nervous system and increase endorphin secretion. Gate control theory explains improvement Endorphin secretion can inhibit delta-A and C neurons from inhibiting release of substance P thereby closing the defense mechanism (door gate). When the gate is closed, the message is conveyed to cerebral cortex in the form of modulation stimulation, not pain. Remembrance is a form of worship by remembering and reciting Asma Allah repeatedly (Yusuf, 2017).

Some researchs by Nurbaeti (2015), Fajriah (2013), and Sumaryani (2015) showed that dhikr had an effect on the average decrease in the intensity of first-stage labor pain in primipara. Some study the effect of dhikr on the pain in spontaneous labor had been conducted, but a little study the effectiveness of dhikr on pain intensity among inducing labour. However, nowaday, increasing rate of use of labor induction and labor pain stronger than spontaneous labor pain (Goodwin, 2010; Rahmawati, 2014). Important to know effectiveness dhikr on pain during active phase encourage to conduct research. The purpose of this study was to analyze the effectiveness dhikr on the intensity of labor in active phase of labor in inducing mother.

**Method**

Research design is one group quasi experimental design. Labour mothers who met the criteria were recruited in month of May to June 2018. Inclusion criteria were moeslim women, in the active phase with 4-7cm opening, first getting induction, normal pelvis (pelvic gynecoid) and had completed cervical dilatation till 10 cm. Exclusion criteria were maternal women who experienced induction failure or received pharmacological analgesic therapy and had fetal distress. From 29 mothers, 14 mothers drop-out cause of failed induction, getting Sectio cesarian birth and had fetal distress. A number of 15 mothers completed the intervention and measurement.

Selected participants who met criteria and agreed to participated in this study were explained about procedure of intervention. Before intervention, researcher collected demographic characteristics and measure pain scale. The procedure of intervention of dhikr had been done every 15 minutes since the first cervical dilatation of four. Initial mothers guided dhikr by researcher, and repeated every 15 minutes. Mothers also were provided guidance of dhikr.

The instruments consisted of demographic characteristic consist of ethnic, level of education, working status, obstetric status and labor observation sheet which is a modification of the partograph sheet. Visual Analog Scale developed by by Perry and Potter (2010) to measure the scale of labor pain in the active phase had been inserted in partograph sheet.

Pretest scores were obtained from the measurement of pain scale before the intervention with VAS at the beginning of the first phase of the active phase (opening 4-7cm) and then the researcher guided the respondent to read the dhikr when the respondent began to feel pain due to contractions until the pain of contraction disappeared during the first phase of the active phase. Posttest scores were measured every 30 minutes during the first phase of the active phase using VAS until the end of the first phase of the active phase (opening 10 cm).

Data analysis used was univariate analysis for demographic data variables, maternal age and gestational age data, obstetric data, and pain variables; Hypothesis testing uses repeated measures ANOVA, as well as to control confounding variables with the ANCOVA test.

Every research respondent gets protection by respecting the respondent's rights and holding ethical principles in research. Research respondents signed informed consent before the study was conducted as evidence that they had agreed to participate in the study. Confidentiality is guaranteed by: anonymity in the questionnaire, given a code to mark, store and process data only by the principal investigator. The ethical clearance was approved by the Tangerang District General Hospital ethics committee number 445/06- KEP - RSUTNG.

**Results**

**Table 1 Demographic Data (N=15)**

| Variable | n | % |
|---|---|---|
| Etnic | | |
| Betawi | 1 | 6.7 |
| Javanesse | 2 | 13.3 |
| Sundanese | 12 | 80.0 |
| Level of Education | | |
| Elementary | 4 | 26.7 |
| Secondary | 6 | 40.0 |
| High School | 4 | 26.7 |
| University | 1 | 6.7 |
| Working status | | |

| | | |
|---|---|---|
| No work | 15 | 100.0 |
| Total | 15 | 100.0 |

**Tabel 2 Distribution Freqiensy of Obstetric Status (N=15)**

| Variable | n | % |
|---|---|---|
| Parity | | |
| Primiparity | 7 | 46.7 |
| Multiparity | 8 | 53.3 |
| Previous Type of Labour | | |
| No | 7 | 46.7 |
| Spontaneuos | 8 | 53.3 |
| Medical Diagnosis | | |
| PROM | 8 | 53.3 |
| Preeclampsia | 5 | 33.3 |
| Postmature | 2 | 13.3 |
| Type of Induction | | |
| Misoprostol | 6 | 40.0 |
| Misoprostol dan oksitosin | 3 | 20.0 |
| Oksitosin | 6 | 40.0 |
| Total | 15 | 100.0 |

**Table 3 Effectiveness of Dhikr to Intensity of Labour Pain at the Active Phase using Repeated Measures ANOVA**

| Score | N | Mean (SD) | | | Greenhouse-Geisser | Partial Eta-Squared |
|---|---|---|---|---|---|---|
| | | Pre | Post 1 | Post 2 | Difference over time | |
| Visual Analogue Scale Score | 15 | 8.7 (2.09) | 7.47 (2.47) | 7.73 (2.40) | f=6.73 P-VALUE=0.005 DF=1.92 | 0.325 |

**Table 4 Result of Pairwise Comparison (Bonferroni) Test**

| | Mean difference | P-value |
|---|---|---|
| VAS before and after intervention 30 minutes | 0.80 | 0.016 |
| VAS before and end of stage I | 0.53 | 0.080 |
| VAS after 30 minutes Intervention and end of stage I | -0.267 | 0.651 |

**Table 5 Covariate Analisis for Confounding**

| | Df | Mean Square | F | P-value |
|---|---|---|---|---|
| Corrected Model | 2 | 0.167 | 0.166 | 0.849 |
| Intercept | 1 | 0.004 | 0.004 | 0.952 |
| Age | 1 | 0.291 | 0.289 | 0.601 |
| Parity | 1 | 0.255 | 0.254 | 0.624 |

| | | |
|---|---|---|
| Error | 12 | 1.006 |
| Total | 15 | |
| Corrected Total | 14 | |

An overview of the demographic data of the respondents is presented in table 1. In general, all respondents were housewives, almost come from etnics Sundanese and with 6 participants getting their secondary education level.

The average age of respondents was at a healthy reproductive age (mean = 25.13 years, minimum 16 years and a maximum of 33 years). Most of the gestational age respondents have entered term age with an average gestational age of 38 weeks (minimum 28 weeks and a maximum of 43 weeks). Obstetric data shows that seven participants first time mothers (primipara); and all participants had gotten labour induction for the first time. Medical indications for labor induction showed that premature rupture of membran (PROM) is a case that dominates as many as eight participants (53.30%), while the type of induction given to respondents is mostly misoprostol or oxytocin each of six participants.

Intensity of pain that was felt by participants before or after the intervention of remembrance was in the range of moderate to severe pain (score 4-10). The difference between the three data sets is the average. Participants before being given the intervention of remembrance felt severe pain (8.27). The result showed that 95% of labor pain scores before remembrance are in the range of 7.11 to 9.42. The mean pain score after the dhikr intervention during the first 30 minutes decreased to severe pain (7.47) with a standard deviation of 2.47. It is believed that 95% of labor pain scores after 30 minutes of dhikr are in the range of 6.09 to 8.84. However, the mean pain score increased at the end of the first phase of active measurement (7.73).

Table 3 showed that there are at least a pair of meaningful measurements (F= 6.73; p-value = 0.005). The partial eta squared value of 0.325 indicates that dhikr has a large influence of 32.5% on changes in the labor pain score. Next Bonferroni post hoc conducted to determine the comparison of effects on the first, second, and third measurements.

Based on Bonferroni's post hoc results in table 4, the average difference in VAS scores before and after the 30 minutes intervention was 0.8 with a significance value of 0.016. This shows that remembrance has an influence on pain reduction before and after 30 minutes of intervention. Mean pain scores before and at the end of the first stage decreased by 0.53. In contrast to the average pain score after 30 minutes of intervention with the end of the first stage increased by 0.267. Nonetheless, the p-value of the two measurement comparisons > 0.05. Therefore, dhikr effect reduces pain in the early active phase but does not affect the intensity of pain at the end of the first stage

In addition, a covariate analysis test was then performed to determine counfonding factors including age and parity on labor pain intensity. Table 5 shows that maternal age and parity did not affect the decrease in VAS scores. It means that decreasing score of pain did not influenced by age and parity.

**Discussion**

Labor pain is an uncomfortable feeling as a manifestation of uterine contractions (Andarmoyo, 2013; Cuningham, 2016). All mothers who give birth must experience labor pain. This is in accordance with the word of God in the QS. Maryam (19): 23
"Then the pain of giving birth to a child forced him (leaning) on the base of the date palm tree, he said:" Oh dear, it would be nice for me to die before this, and I became a meaningless item, again forgotten ".

Labor pain can be caused by physiological and psychological factors (Cuningham, 2016; Leifer, 2015; Meštrović et al., 2015). Psycological factors that can affect labor pain are anxiety and fear in facing labor (Andarmoyo, 2013, Perry et al., 2013). Based on physiological factors, labor pain in the first stage is called visceral pain. Visceral pain is

pain that comes from organs. This pain results from uterine muscle hypoxia, accumulation of lactic acid, stretching of the cervix and lower uterine segments and pressure on the pelvic bones. Furthermore, afferent nerve fibers from pain are transmitted to sympathetic nerve fibers to neurotaxis between Toracal 10 to Lumbar 1 (Rici, 2013). Intensity of labour pain can be influenced by induction. Labor pain with induction differs in intensity from spontaneous labor pain. Mothers who have induction labor experience more pain than spontaneous labor (Rahmawati, 2014). Induction of labor can improve maternal and neonatal outcomes. Although induction at term could prevent rare cases of fetal death, all induced women will be exposed to potential discomfort causes of uterine hyperstimulation and more pain compared to mothers without induction (Seijmonsbergen-Schermers, 2020). In the first stage labor, generally nurses or midwives provide pain management such as breathing techniques, block pudendus, massage or effleurage to decrease pain in labor. Mardiah (2010) found that 76% nurses and midwives confered breathing techniques, movement /change of position and massage to eliminir pain in the first stage labor.

The mean maternal pain of labor with induction before dhikr is severe pain (8.27). Pain that is felt by maternity is caused by uterine contractions. The existence of anxiety, fear can also increase the pain sensation felt by the mother. This is in accordance with Fear-Tense-Pain Cycle of Dick-Read Theory (1933) in Perry et al., (2013). Mothers can control pain in labour process by reducing pain sensations with relaxation techniques (Cuningham, 2016; Leifer, 2014; Perry et al., 2013). One of the relaxation techniques of meditation for Muslims is remembrance. According to Hudori (2011) religious activities such as remembrance can increase the activity of God Spot, which is the part of the brain that controls religious activities. The existence of activation in God Spot causes impulses to be transmitted to the prefrontal cortex. The prefrontal cortex then passes it to the amygdala. The activated amygdala can stimulate the hypothalamus to activate the parasympathetic nervous system. The parasympathetic nervous system acts as a

counter to the sympathetic nervous system whose activity increases due to labor pain (Sherwood, 2012). Parasympathetic nervous system activities can influence the gate control theory on the mechanism of pain in the presence of endorphins secretion by the pituitary gland. Increased endorphin secretion can inhibit Delta-A and C neurons to release substance P. Decreased substance P can close the defense mechanism (the gate), so that the message delivered to the cerebral cortex is not pain but modulation of pain. In general, the activity of the parasympathetic system in addition to pain modulation can also increase a sense of calm, comfort, relax muscles, and make the body more relaxed (Yusuf, 2017).

The benefits of remembrance that can activate the work of the parasympathetic nervous system have also been explained in Qoran:

الَّذِينَ آمَنُوا وَتَطْمَئِنُّ قُلُوبُهُمْ بِذِكْرِ اللَّهِ ۗ أَلَا بِذِكْرِ اللَّهِ تَطْمَئِنُّ الْقُلُوبُ

"(Ie) those who believe and their hearts are at peace in the remembrance of Allah. Remember, only by remembrance of Allah do hearts find satisfaction. "(Surat Ar Ra'du (13): 28).

A Prophet Mohammed said:
"A group of people who dhikr to Allah SWT, must be surrounded by angels, filled with grace, descended calm, mentioned by Allah among the creatures who are on His side" (HR. Muslim).

The above theories and propositions are consistent with the results of this study. The mean pain score after zikr has decreased, both after 30 minutes of zikr and at the end of the first phase of the active phase. The mean pain score before remembrance was 8.27 with a standard deviation of 2.09. After 30 minutes of remembrance, the mean pain decreased to 7.47. The mean pain score at the end of the first stage when compared to before the dhikr also decreased by 0.53, so the mean pain score was 7.73.

The results of this study indicate that there is a pair of meaningful measurements and remembrance had a major influence on changes in labor pain scores in the active phase of the first phase by 32.5%. Labor pain can be influenced by several factors. According

to previous researchs, factors affected labor pain were the age of the mother and parity (Mestrovic et al., 2015; Shrestha et al., 2013; Tampubulon, 2015). The participants in this study were in the age range 16-33 years with a mean of 25.13. Based on statistical results using Test ANCOVA, age does not affect the decrease in labor pain score (p-value = 0.601). This means that mothers in all age ranges are the same feel pain at labor by induction. This is different from spontaneous delivery, labor pain felt by the mother is greatly affected by age (Maghfiroh, 2012; Shrestha et al., 2013; Tampubulon, 2015). Based on the readiness of the mother to give birth, the age is categorized into low-risk (20-35 years) and high-risk age (<20 years or> 35 years). Shrestha et al. (2013) explained that mothers under the age of 20 experience severe pain more than the older mother. This may happen because of a young mother psychologically have not enough emotion and psychology adults who can affect their acceptance of labor pain (Cunningham, 2016). Another factor that most influences to labor pain is parity. This result similar with Maghfiroh (2012) that parity status and previous experience of labor pain can be affected the pain of first stage labor in spontaneous labor. Parity status is related to the experience of dealing with pain previous delivery. Multipara is considered to have had deep experience faced previous labor pains, resulting in on delivery then she is better able to control the pain of her labor than primipara. Furthermore, based on the post hoc analysis Bonferroni showed that the dhikr affected the reduction in pain in the measurement after 30 minutes of intervention (p-value = 0.016) at the opening of 4-7cm. The results of this study are in line with the results of research by Fajriah (2013) and Nurbaeti (2015) that prove the influence of dhikr on the reduction of labor pain in the active phase. However, there are differences with the results of previous studies conducted by Nurbaeti (2015). In previous studies, dhikr had a large influence of 66.5% on the reduction in labor pain, while in this study the influence of dhikr was 32.5%. The large difference in influence can be due to differences in research subjects. Subjects from previous studies were mothers with normal deliveries, while the subjects in

this study were induction mothers who had greater pain intensity.

The measurement of pain is then performed at the end of the active phase I ie at 10 cm opening with a mean pain score of 7.73, and it is believed that 95% of the pain score at the end of the active phase of the active phase of induction labor is 6.4 to 9.06. Bonferroni's post hoc analysis showed the remembrance did not have an effect on changes in pain scores at the end of the first phase of active measurement (p = 0.08). Non significant in the end of stage I causes mothers in transition to complete cervical ripening feel lost control, unable to relax, are easily offended because the contractions are felt to be very strong, more display and more painful, and the mother has focused on the second stage of labor. Thus, Nurse midwives should manage to control pain from the beginning to end of first stage labour (Karlsdottir et al., 2014).

## Conclusion

Dhikr significantly effected to lower intensity of pain at early stage I among inducing mothers but have no effect in end of stage I labour after controlled by age and parity. Dhikr can use to control pain in early first stage I labour both for primiparaous or multiparaous. This study had limitation of recruited in small group with one group for future research we suggest to conduct quasy experiment with two group control and intervention.

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