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# Jurnal Ners

## Volume 16, Issue 2, Oktober 2021

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# ACKNOWLEDGEMENT TO REVIEWERS

**Ners Journal**

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Amid the COVID-19 pandemic, it is natural for people to want to know about the causing virus, its transmission, prevention, the government's response and other relevant information through the information channels. In the past, before science developed, people considered the plague as a manifestation of the anger of the gods. Along with the times, people began to open up to science. While there are still some superstitious societies, most believe in scientific arguments.

Unfortunately, high expectations and enthusiasm for science are often not accompanied by a critical attitude and increased interest in reading. There is a tendency for people to cherry-pick the information. Cherry-picking can distort knowledge due to bias in the selection of information sources. This can lead people to fall into pseudoscience or "bad science"—to borrow Ben Goldacre's term. Both pseudoscience and bad science are things that sound scientific but are not or have a scientific basis but are interpreted haphazardly.

During the COVID-19 pandemic, much scientific-sounding information and analysis are milling about. Some of the initial examples are the interpretation of the COVID-19's low case fatality rate (CFR), claims of traditional ingredients to prevent COVID-19, herd immunity discourse, to the vaccines adverse effects. COVID-19 was initially considered harmless with a low CFR, some even equating it with the common cold. However, instead of being similar to the common cold, COVID-19 is feared to have an impact like the 1918 flu pandemic, which claimed estimated millions of lives worldwide because of its swift spread (Petersen et al., 2020).

In addition, when the COVID-19 outbreak had not been detected in Indonesia, there was a view that Indonesians were immune to coronaviruses because of a diet rich in spices. Some researchers even took advantage of this moment to promote their findings of ingredients that can ward off the coronavirus by increasing the immune system. However, so far, there has been no publication about the results of testing for these materials, specifically for COVID-19 patients, and how significant the effects are when compared to other materials that already exist. So, the claim is only a claim.

In the era of information technology, when most people have been out of superstition, worrying is not the clash between science and mystical views but between actual science and bad science or pseudoscience. In his book The Death of Expertise, Tom Nichols wrote that one could not become an expert just by reading a lot. Without having the correct analytical method, ordinary people will not process information into knowledge. That is why any information circulating must be sourced from experts in the field. This makes the statement about COVID-19 spreading in the community very dynamic. Therefore, it is essential to keep updated with the latest information from trusted sources, as well as a crosscheck to other sources before concluding.

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EDITORIAL

# Combatting Pseudoscience Amidst the COVID-19 Pandemic

## Gading Ekapuja Aurizki

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Original Research

# Clinical Profile and Nursing Diagnosis of the Newborn in a Special Care Nursery (SCN) Unit

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**ABSTRACT**

**Introduction:** A good comprehension of the clinical profile and nursing diagnosis of newborn in Special Care Nursery (SCN) unit guides decision-making by nurses. In addition, it can become an initial basis for making plans for improving quality of care, management and nursing research. The purpose of this study was to identify clinical profile and nursing diagnosis of newborns in an SCN unit.

**Methods:** It is a quantitative, cross-sectional, descriptive study in SCN (Level II and III) with a sample of 77 medical records of newborns less than 31 days old in a national referral hospital. Descriptive analysis was used to identify demographic characteristic, the medical diagnosis and nursing diagnosis of newborns at birth and hospitalization.

**Results:** Newborns treated in SCN unit are dominated by preterm with low birth weight (74%). Respiratory system disorders (55.8%) and infections (35.1%) dominate newborn problems both at birth or coming. Most nursing diagnoses when the baby is born or coming are the risk of infection (90.9%) and ineffective breathing patterns (76.6%). As for the treatment, most diagnoses show the risk of infection and hypovolemia.

**Conclusion:** A good clinical profile and nursing diagnosis of newborns can guide nurses to decision-making. Continuous update on nursing diagnosis determination, improvement of nurses' knowledge about the signs of deterioration, and future research that prioritizes issues in neonates are required to optimize nurses' role in SCN units.

## INTRODUCTION

Neonates have the highest risk of health issues that can potentially lead to death. Globally, almost 2.5 million babies in the world die within their first month of life (neonatal age). Most neonatal death (75%) happens in the first week of life, and approximately one million neonates die in the first 24 hours of life. Premature birth, perinatal asphyxia, infection, and birth defects are the main causes of neonatal mortality (WHO, 2019). The Indonesia Demographic and Health Survey (IDHS) in 2017 indicated that the neonatal mortality rate was 15 per 1,000 live births. This number showed a decrease compared to 2012, when the neonatal mortality rate was 19 per 1,000 live birth (Ministry of Health - Republic of Indonesia, 2018).

The reduction of neonatal mortality requires cooperation among healthcare professionals, families, and the community to provide excellent and continuous health services for mothers during pregnancy and delivery, and for mothers and neonates during the neonatal period (Ministry of Health - Republic of Indonesia, 2010). Among the delivery of health services to neonatal is services to the perinatology unit. One of the important elements in providing quality services in the perinatology unit is nursing. The 2014 constitution of The Republic

Indonesia mandated that nursing services are an integral part of health services based on nursing knowledge and tips (Constitution of The Republik Indonesia, 2014). Through their knowledge and skills, nurses are expected to be able to make a major contribution in the process of solving various problems in the unit. Article 29 No. 38 of the constitution outlines the authority of nurses to be able to provide comprehensive nursing services including nursing care, executing assignments overflow, as counselors, service managers, and researchers.

In nursing care, nurses are guided through the nursing process, which includes assessment, nursing diagnosis, intervention, implementation and evaluation. One of the important elements in the nursing process is the nursing diagnosis. Nursing diagnoses help nurses see the patient holistically and create nursing plans. A good nursing diagnosis can result in good quality of care and strengthen their professional role (Håkans, 2012). To be able to achieve this, basic data are needed that describe the initial conditions of the newborn along with the nursing diagnosis that is enforced. Nursing studies about it are limited and there is no research that describes the uniqueness of newborns in Indonesia.

Based on this, it is necessary to build baseline data related to neonatal conditions in the form of clinical profiles and diagnosis of neonates undergoing hospitalization in an SCN unit. This basic data for nursing development can be further utilized such as (1) developing nursing intervention protocols based on priority problems, (2) making nursing care standards based on the most common nursing diagnoses, (3) developing research based on priority nursing problems.

## MATERIALS AND METHODS

A cross-sectional study was used to explore clinical profile and nursing diagnosis neonates in an SCN. We classify SCN as level II and III of care according to the American Association of Pediatrics (AAP) 2012 (Barfield et al., 2012). The number of samples required in the quantitative study was determined using a categorical descriptive formula in accordance with the expected main outcome (Dahlan, 2016) (i.e., the nursing diagnosis). With 5% alpha, 20% nursing diagnosis proportion, and 0.09 precision, this resulted in 76 for the minimum number of samples. Therefore, this study examined 77 medical records (MR), which were selected by using a proportional random sampling technique. Samples comprised complete documents for babies less than 31 days old who were born between January and December, 2016 in a national referral hospital. The medical record includes neonatal demographic data, neonatal symptom signs at birth and hospitalization, medical diagnosis and nursing diagnosis at birth and hospitalization. These data were analyzed descriptively using the Statistical Package for Social Sciences (SPSS). The descriptive analysis of the quantitative variables involved of percentage, mean, standard deviation (SD). Data were collected in a special care nursery unit in a national referral hospital between June and August, 2017.

This research obtained ethical approval from the institutional review board of the Faculty of Medicine Universitas Indonesia: No. 671/UN2.F1/ETIK/2017.

## RESULTS

The results of an analysis of the quantitative data are presented in the following table and graphics. Table 1 is the demographic data of neonates, while graphics 1, 2, and 3 present the signs and symptoms at birth and during treatment, the medical diagnosis and the nursing diagnosis at birth and during treatment, respectively.

The respondents of this study were dominated by premature infants with average 33.57 weeks, birth weight average 2016.97 gr. Forty-nine babies were born by caesarean delivery in the local hospital (not a referral hospital) (65%). Fifty-four percent were male and 45% were female.

The newborns' signs and symptoms during hospitalization were dominated by mucosal secretions of the respiratory tract (n=29 (37.7%), desaturation (n=25 (32.5%)), and chest wall retraction (n=24 (31.2%)). Hypotonia, grunting, cold acral and pale body were the clinical conditions that were found only in the first few hours of life and were not reported in the following days.

The most common disorders and medical diagnoses at birth were respiratory system disorders (n=43), immunity/infection disorders (n=27), cardiovascular system disorders (n=14), and surgery case. The number of respondents with these disorders increased with the length of stay. Hyperbilirubinemia, indigestion, and central nervous system disorders were new problems that arose after treatment.

Risk of infection was the most frequent diagnosis identified by nurses on the first day of life and during treatment. During hospitalization, fluid volume deficit, ineffective airway clearance, imbalanced nutrition (i.e., less than body requirements), and ineffective breathing patterns were also diagnosed by nurses.

## DISCUSSION

This study aimed to identify clinical profile neonatal (demographic data, neonatal symptom signs at birth and hospitalization, medical diagnosis at birth and hospitalization) and nursing diagnosis newborn at birth and hospitalization in a Special Care Nursery from admission and during hospitalization. An SCN unit specializes in taking care of neonates aged 0–28 days. Neonates have the highest risk of death—up to 60–80% (Ministry of Health - Republic of Indonesia., 2018; WHO, 2018). Most neonatal patients (74.02%) who were treated in the SCN unit were premature infants. This is in line with the observation of Chawanpaiboon et al. (2019), who included Indonesia

in the five countries with the greatest number of preterm births. Premature infants are helpless human beings with diverse health problems (Trembath, Payne, Colaizy, Bell, & Walsh, 2016) who need complex support, both from specialized equipment and services (Trembath et al., 2016). Under certain conditions, preterm infants in an SCN unit of a hospital must be referred to another hospital.

In this study, respiratory disorder was the main problem faced during treatment. This was because most of the respondents were preterm infants. Parkash, Haider, Khoso, and Shaikh, (2015) state that 33% of treated neonates were admitted with a gestational age of less than 28 weeks, resulting in respiratory disorder being the main reason for babies to receive treatment, except if the baby was born with congenital anomalies or surgical conditions.

Caesarean delivery was also considered a factor contributing to respiratory disorder in neonates (Kotecha, Gallacher, & Kotecha, 2016). Chest retraction, cyanosis, and grunting were the most frequently found symptoms in newborns, and these also led to the syndrome of respiratory disorder (Parkash et al., 2015). Another problem in this research is oxygen desaturation. Oxygen desaturation in preterm infants happened when oxygen saturation fell below 80%/ or 85% for >10 seconds (Chawanpaiboon et al., 2019; Fairchild. Nagraj, Sullivan, Moorman, & Lake, 2019; Paliwoda, New, Davies, & Bogossian, 2018). Martinez et al. (2012) state that desaturation and bradycardia in premature infants is related to cardiorespiratory instability and respiratory control immunity.

Table 1. The Demographic of Neonates (n=77)

| Variable | N | (%) | Mean | Min-Max | SD | CI ± 95% |
|---|---|---|---|---|---|---|
| Sex | | | | | | |
| Male | 42 | 54% | | | | |
| Female | 34 | 45% | | | | |
| *Ambiguous genitalia* | 1 | 1% | | | | |
| History of Resuscitation | | | | | | |
| Yes | 35 | 45% | | | | |
| No | 42 | 55% | | | | |
| Birthplace | | | | | | |
| *On- site* | 65 | 84% | | | | |
| *Off-site / Referral* | 12 | 16% | | | | |
| Type of Labor | | | | | | |
| Normal | 28 | 36% | | | | |
| Sectio Caesarea | 49 | 64% | | | | |
| Birth Weight | | | | | | |
| > 4000 gr | 2 | 3 % | | | | |
| Normal (2500-4000 gr) | 18 | 23% | | | | |
| *Low Birth Weight* (1500-2500 gr) | 32 | 42% | | | | |
| *Very Low Birth Weight* (1000- 1500 gr) | 20 | 26% | | | | |
| *Extremely Low Birth Weight* (<1000 gr) | 5 | 6% | 2016.97 | 680- 4110 | 844.885 | 1825.21-2208.74 |
| Gestational Age | | | | | | |
| *Extremely preterm < 28 week* | 8 | 10.3% | | | | |
| *Very preterm 28-< 32 week* | 13 | 16.9% | | | | |
| *Moderate to late preterm 32-< 37 week* | 36 | 46.7% | | | | |
| *Term 37-41 week* | 20 | 26.1% | 33.57 | 24-41 | 3.928 | 32.68-34.46 |
| *Post term ≥ 42 week* | 0 | 0% | | | | |
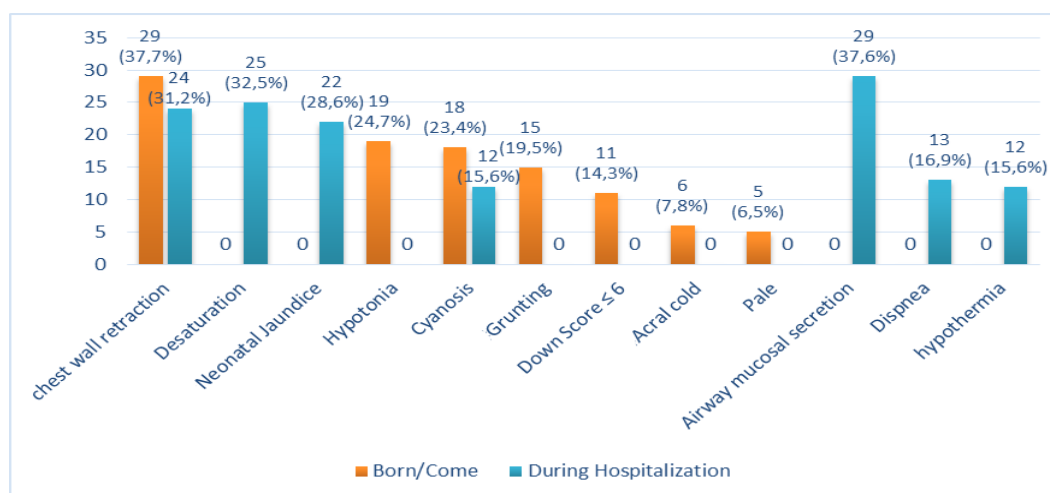


Figure 1. Signs and Symptoms of the Newborn at Birth and During Hospitalization
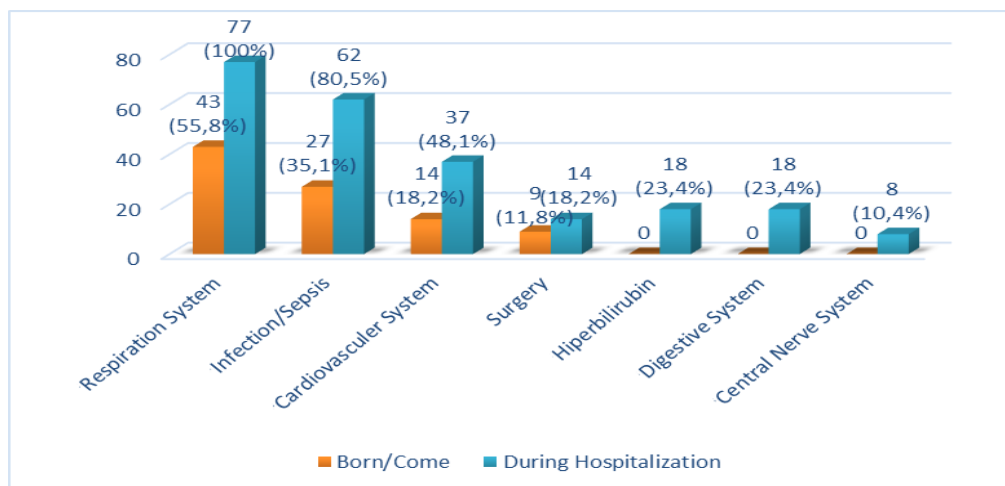
Figure 2. Medical Diagnosis at Birth and During Hospitalization
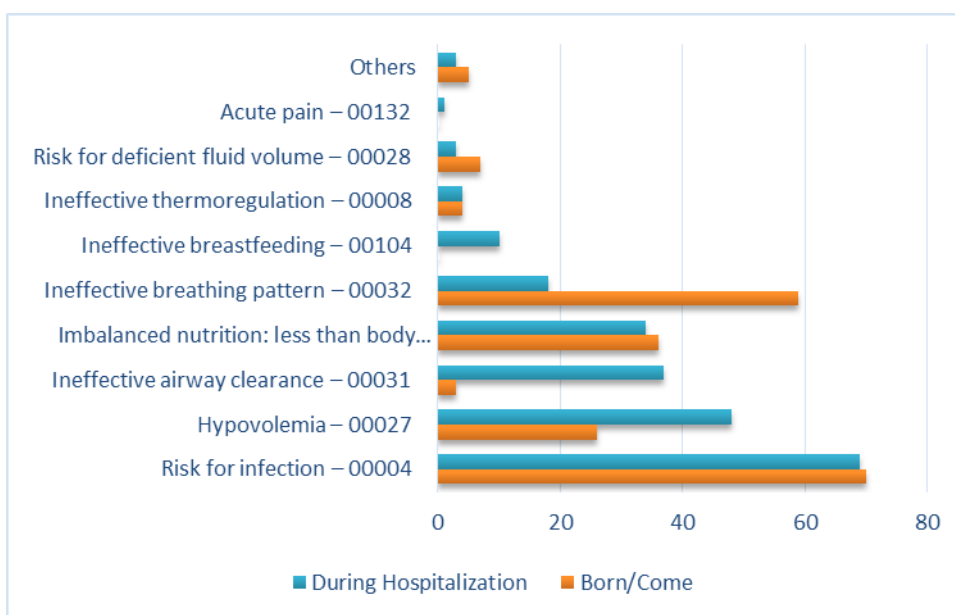


Figure 3. Nursing Diagnosis at Birth and During Hospitalization

In line with symptoms, nursing diagnosis of ineffective breathing patterns is one of the biggest problems with an incidence of more than 75% when the baby is born or comes to the hospital.

Neonatal sepsis was the most common problem in this study of hospitalized neonates (i.e., 62 respondents (80.5%)). Globally, infection was the second leading cause of neonatal mortality (Trembath et al., 2016; WHO, 2019) and is an issue especially in developing countries (Adatara et al., 2018). In our study, risk of infection was the most frequently identified nursing diagnosis—69 respondents (89.61%) identified risk for infection. Many factors contribute to the increased susceptibility of premature babies to infection. They are innate immunity consisting of barrier, inflammatory response and cells that fight infection having not developed significantly compared to term infants (Collins, Weitkampb, & Wynn (2018). In line with this, the infection risk nursing diagnosis became

the most frequently raised diagnosis both at birth / at and during hospitalization.

The most common nursing diagnosis in this research is deficient fluid volume. Problem in fluid in neonates likes dehydration generally results from inadequate fluid intake, often a result of inadequate breast-feeding (Jobe, 2007). In addition, when coordination is poor between sucking and swallowing, especially in the late preterm infant (GA 34-36 weeks), it increases the risk of dehydration. This condition was related to the immaturity of gastrointestinal function and NEC/necrotizing enterocolitis (Nsibande et al., 2013).

## CONCLUSION

The new-borns treated in the SCN unit were mostly late preterm babies with low birth weight (1500–2500 gram). Respiratory distress and infection dominated the nursing diagnoses at birth/admission and during treatment. The most common nursing diagnoses were risk for infection and ineffective

breathing pattern. Continuous update on nursing diagnosis determination, improvement of nurses' knowledge about the signs of deterioration, and future research that prioritizes issues in neonates are required to optimize nurses' role in SCN units.

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Original Research

# The Relationship Between Level of Knowledge and Behaviors of COVID-19 Prevention among Indonesian Population

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## ABSTRACT

**Introduction:** Currently, there are no specific drugs to cure COVID-19, so it is an important strategy to be implemented in the community to increase knowledge and preventive behavior in order to prevent transmission. The purpose of this study was to see the relationship between the level of knowledge and preventive behavior against COVID-19 among Indonesian population.

**Methods:** This study used an analytical method with a cross-sectional design. Samples were taken from the people of Depok City as many as 406 people. The independent variable was knowledge and the dependent variable was preventive behavior. The instruments used were questionnaires on the characteristics of the respondents and knowledge and behavior with online questionnaire via Google Forms. The sampling technique was non-probability sampling with a consecutive sampling method. Data analysis used descriptive analysis test, Chi-square and correlative hypothesis test.

**Results:** The results showed that respondents have good knowledge (56.9%) and good prevention behavior (75.9%). The largest source of information about COVID-19 respondents was from Television News (84.4%). There was a significant relationship between the level of knowledge and preventive behavior toward COVID-19 (p=0.000). Moreover, there is a significant relationship between age (p=0.000), gender (p=0.000), education level (p=0.000) and work status (p=0.016) with knowledge.

**Conclusion:** The findings suggest that the local government should initiate an innovative program of health education focusing on knowledge and preventive behavior toward COVID-19 at a community level. The strategies to combat COVID-19 will require community involvement to control and prevent the disease outbreak.

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## INTRODUCTION

Corona Virus Disease 2019 (COVID-19) is an infectious disease caused by the Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2), which was first discovered in the city of Wuhan, China at the end of December 2019 (WHO, 2020a). This virus causes disease from human to animals and has now been transmitted from human to human (Kemenkes RI, 2020a; WHO, 2020b) In humans, this virus can infect the respiratory path with the main symptoms of fever, dry cough, shortage of breath (Daryai et al., 2020; Hoque et al., 2020; Taghrir et al., 2020; WHO, 2020b) including other nonspecific symptoms such as headache, dyspnea, fatigue and muscle pain (Mo et al., 2020). There are also those

who report suffering from symptoms, digestion such as vomiting and diarrhea (Huang et al., 2020). This virus spreads very quickly and has spread to almost all countries, including Indonesia, in just a couple of months. At least more than 200 countries around the world have been infected so that this virus becomes a serious threat to public health in the world (Ahmed et al., 2020; Daryai et al., 2020; Hoque et al., 2020).

According to WHO (2020a) there were an additional 185,536 cases as of July 14, 2020, bringing the total cases in the world to 13,150,645 cases while developments in the case in Indonesia has taken a significant increase amounting to 1,591 cases spread over 34 provinces and 461 cities with the total cases of 78,572 patients. Depok is a city in West Java Province, where it is the second province with

the highest number of cases after DKI Jakarta with an increase of 74 cases, with the total number of positive cases being 5,160. Meanwhile, Depok City is the first city where the COVID-19 cases appeared. As of July 14, 2020, there were also seven additional cases in Depok, with the total number of confirmed positive patients 890 people, so it can be concluded that the transmission is still ongoing up to now (Kemenkes RI, 2020b).

The increasing number of cases has impacted on many fields in various aspects, either health, economy, politics, social, education, religion or even security. Sukmana et al. (2020) stated that COVID-19 has an impact on health, tourism, economy, social and other sectors. The biggest major impact is in the health sector where there are additional positive cases that threaten public health and even cause death. On the other hand, the economy is also very much impacted, where people find it difficult to find jobs, difficulty to meet their daily needs, and even lose their income. Meanwhile, Indonesia's economic figure continues to significantly decline by 5%. The Minister of Finance said that if the prevention strategies were not implemented correctly and properly, Indonesia's economic growth could be depressed to a level of 2.5% or even lower (Hanoatubun, 2020). That is why an effective and correct handling strategy is needed to maintain the stability of an economy that is being threatened.

At the moment, there are no specific drugs and vaccines to fight COVID-19; therefore, the most crucial strategy in the community is preventive behavior to reduce the number of cases. Cvetković et al. (2020) and Ouassou et al. (2020) stated that preventive behavior with a clean and healthy lifestyle is effective for controlling and breaking the chain of transmission of COVID-19, when pharmacological interventions have not been found. Preventive actions that can be taken are washing hands regularly, covering mouth and nose with a mask, avoiding touching the face, covering mouth when coughing and sneezing, isolating cases that are suspected of being positive at home, maintaining a minimum distance of one meter (Cvetković et al., 2020; Daryai et al., 2020; Kemenkes RI, 2020a), implementing a clean and healthy lifestyle, controlling comorbid diseases and managing positive emotions (Kemenkes RI, 2020a).

The basis for change and prevention must start in society because it is a key element in the success of reducing the COVID-19 numbers. This is confirmed by the research of Qiu et al. (2020) on the public in China, that the involvement of the society in prevention factors significantly reduces the rate of virus transmission. The community must take responsibility for the health and safety of their family members by providing them continuous education. A preliminary study conducted by researchers in China resulted in the large number of people who gather at several points for such unnecessary activities, leaving the house without putting a mask on, wearing a mask but not in an appropriate way and other activities that do not apply health protocols.

The increasing number of positive cases continues every day probably because of inappropriate community preventive behavior. This could be based on a lack of knowledge or biased behavior by disobeying government calls. Health education is needed on knowledge of disease prevention and control behaviors to reduce the incidence of COVID-19 (Ouassou et al., 2020). Based on the above background, the researcher was interested in conducting research on the relationship between the level of knowledge and prevention behavior against COVID-19 in Depok City.

## MATERIALS AND METHODS

This research used a correlation analytic method with a cross-sectional design which aims to find the relationship between the level of knowledge and behavior of the people of Depok City towards the prevention of COVID 19.

The data were obtained from questionnaires that were distributed to the researchers' social media accounts via Google Forms which were filled in online because of the COVID-19 pandemic situation. In addition, the researcher also asked for the help of students and colleagues to distribute questionnaires through their social media accounts. In the questionnaire, the instructions for filling and a statement of the respondent's willingness to be used as research respondents were explained.

Respondents who gave consent to willingly participate in the survey would click the 'Continue' button and would then be directed to complete the self-administered questionnaire. The Research and Community Service Unit of STIKes Raflesia (UPPM) approved our study protocol, procedure, information sheet and consent statement (Number: 247 B/STIKES-RAF/VII/2020). The ethical principles used during the research involve using the informed consent principles, anonymity, confidentiality and justice. After that, the researcher distributed the questionnaires.

Research data collection was carried out from July 20 to August 3, 2020, with a total population of all Depok City people aged 15-69 years, as many as 884,540 people. The minimum sample size obtained is 399.8 people based on the Slovin formula calculation (Nursalam, 2017). The consecutive sampling method was used for sampling where respondents are willing to fill out the questionnaires if they meet the inclusion criteria. The inclusion criteria for this study were willing to become respondents, age range between 15-69 years, living in Depok City, and able to read. The number of samples obtained was 406 people.

Knowledge was measured with 14 closed-ended questions and categorized into good (>75%), moderate (56-74%) and insufficient knowledge (<55%) (Arikunto, 2016). Meanwhile, preventive behavior was measured with 13 close-ended questions on a 3-point Likert scale which is categorized into good (75%), moderate (56-74%) and insufficient behavior (55%) (Budiman & Riyanto, 2013). Meanwhile, the confounding variables were age, gender, education, occupation and sources of information.

The survey instrument was an adapted from previous research (Calano et al., 2019; Sari et al., 2020; Zhong et al., 2020) and Guidelines for the Prevention and Control of Coronavirus Disease, Revision IV (Kemenkes RI, 2020a). The questionnaire was tested for its reliability and validity. Cronbach's alpha value for the reliability of the knowledge questionnaire was 0.675. The result added credence where, according to Griethuijsen et al. (2014), the range of Cronbach's alpha within 0.6 to 0.7 is considered adequate and reliable. Data analysis was performed using IBM SPSS statistical software version 20. The researcher performed univariate and bivariate analysis (Chi-square).

## RESULTS

### The Characteristics of the Respondents

Based on Table 1, it is shown that the majority age of respondents are 12-25 years old (49.3%). Based on gender, the majority of respondents were 68.5% women. In addition, based on the education level, the majority of respondents earned senior high school education (52.7%). Based on employment status, the majority of patients were employed (86.5%). Most of them obtained source of information about COVID-19 from television news (8.4%) and at least 0.7% received information from family doctors. The respondents were allowed to answer more than one regarding the source of information.

### The Relationship Between Knowledge Level and Preventive Behaviors

Table 2 explains that the majority of respondents have good knowledge (56.9%). The distribution of respondents based on prevention behavior shows the majority of respondents with good preventive behavior was 75.9%.

### The Relationship Between Respondents' Characteristics and Knowledge Level

Table 3 explains that the majority of respondents having a good level of knowledge are aged 12-25 years (31%). In the gender category, the majority who have a good level of knowledge are women (43.8%). The majority of respondents who have a good level of knowledge in the education level category graduated from senior high school or equivalent (28.3%). Majority of respondents based on the employment status category who had a good

Table 1. Respondents' characteristics

| Characteristics | n | % |
|---|---|---|
| **Age** | | |
| 12-25 years | 200 | 49.3 |
| 36-45 years | 162 | 39.9 |
| 46-65 years | 41 | 10.1 |
| >65 years | 3 | 7 |
| **Gender** | | |
| Male | 128 | 31.5 |
| Female | 278 | 68.5 |
| **Education** | | |
| Elementary school | 14 | 3.4 |
| Junior high school | 32 | 7.9 |
| Senior high school | 214 | 52.7 |
| Higher education | 146 | 36 |
| **Employment status** | | |
| Employed | 351 | 86.5 |
| Unemployed | 55 | 13.5 |
| **Source of information** | | |
| Television news | 343 | 84.4 |
| Radio | 216 | 53.2 |
| Newspaper, magazine | 156 | 38.4 |
| Friends, relatives, colleagues | 91 | 22.4 |
| Online social media | 45 | 11.08 |
| Government/WHO official websites | 14 | 3.4 |
| Online news portal | 5 | 1.2 |
| Family doctors | 3 | 0.7 |

Table 2. Respondents' knowledge and preventive behavior

| Variable | | n | % |
|---|---|---|---|
| Knowledge Level | Insufficient | 41 | 10.1 |
| | Moderate | 134 | 33 |
| | Sufficient | 231 | 56.9 |
| Preventive Behaviors | Insufficient | 29 | 7.1 |
| | Moderate | 69 | 17.0 |
| | Sufficient | 308 | 75.9 |

level of knowledge were respondents who worked (47%). The chi-square test showed that age, gender, level of education, and employment status have a significant relationship with knowledge level.

### The Relationship Between Knowledge Level and Preventive Behavior

Table 4 shows that respondents who have good knowledge and have good preventive behavior are 54.9%. The results of statistical tests using the Chi-square test obtained p = 0.000, which means that there is a relationship between the level of knowledge and COVID-19 prevention behavior. It can also be seen that the correlation coefficient value is 0.642, which means that the close relationship between the level of knowledge and COVID-19 prevention behavior is strong. A positive value means that if the level of knowledge increases, the better the preventive behavior will be.

## DISCUSSION

This study found that there was a significant relationship between age and the level of knowledge about COVID-19. The correlation coefficient value shows that the higher the age, the knowledge about COVID-19 is minimum. This study aligns with

Table 3. The Relationship between Respondents' Characteristics and Knowledge Level against COVID-19

| Characteristics | | Knowledge Level | | | | | | Total | | p-value | Correlation coefficient |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Insufficient | | Moderate | | Sufficient | | | | | |
| | | n | % | n | % | n | % | n | % | | |
| Age (years) | 12-25 | 5 | 1.2 | 69 | 17 | 126 | 31 | 200 | 49.3 | | |
| | 26-45 | 27 | 6.7 | 49 | 12.1 | 86 | 21.2 | 162 | 39.9 | 0.000 | -0.166 |
| | 46-68 | 9 | 2.2 | 16 | 3.9 | 19 | 4.7 | 44 | 10.8 | | |
| Gender | Males | 22 | 5.4 | 53 | 13.1 | 53 | 13.1 | 128 | 31.5 | 0.000 | 0.218 |
| | Females | 19 | 14.7 | 81 | 20 | 178 | 43.8 | 278 | 68.5 | | |
| Education Level | Elementary and junior high school† | 25 | 6.2 | 17 | 4.2 | 4 | 1 | 46 | 11.3 | 0.000 | 0.397 |
| | Senior high school | 12 | 3 | 86 | 21.2 | 115 | 28.3 | 213 | 52.5 | | |
| | Higher education | 4 | 1 | 31 | 7.6 | 112 | 27.6 | 147 | 36.2 | | |
| Employment status | Unemployed | 1 | 0.2 | 14 | 3.4 | 40 | 9.9 | 55 | 13.5 | 0.016 | 0.134 |
| | Employed | 40 | 9.9 | 120 | 29.6 | 191 | 47 | 351 | 86.5 | | |

†) Elementary and junior high school levels were combined into one category because three cells (25%) had an expected value less than 5, which was exceeding the maximum 20% standard for Chi-square test.

Table 4. The Relationship between Knowledge Level and Preventive Behavior against COVID-19

| Knowledge | Preventive Behaviors | | | | | | Total | | p-value | Correlation coefficient |
|---|---|---|---|---|---|---|---|---|---|---|
| | Insufficient | | Moderate | | Sufficient | | | | | |
| | n | % | n | % | n | % | n | % | | |
| Insufficient | 24 | 5.9 | 15 | 3.7 | 2 | 0.5 | 41 | 10.1 | | |
| Moderate | 5 | 1.2 | 46 | 11.3 | 83 | 20.4 | 134 | 33.0 | 0.000 | 0.642 |
| Sufficient | 0 | 0 | 8 | 2 | 223 | 54.9 | 231 | 56.9 | | |
| Total | 29 | 7.1 | 69 | 17 | 308 | 75.9 | 406 | 100 | | |

research by Scoy et al. (2020) but contrasts with some previous research (Bates et al., 2021; Kirac et al., 2021; Wulandari et al., 2020). According to Lerik and Damayanti (2020), the relationship between age and level of knowledge about the myths and facts of COVID-19 was nowhere to be found. Different results to this research are conveyed in Nurmala et al.'s (2018) study, that people of different ages were able to have the same exposure to information. Wawan and M (2014) presented a different persepective which explains that the more people grew up, the level of maturity and strength of a person will be more in thinking and working.

This study also found female participants with better knowledge and preventive behavior than male ones. These findings were consistent with some of previously conducted studies (Bates et al., 2021; Hosen et al., 2021; Kirac et al., 2021; Wulandari et al., 2020). Their research shows a relationship between gender and *physical distancing* prevention behavior where the gender variable has a significant relationship with *physical distancing* behavior. The women tend to have good *physical distancing* behavior by 3.4 times better than men.

In addition, in this study there is a relationship between work status and the level of knowledge about COVID-19. This is following the theory presented by Nursalam (2011) that work will affect a person's level of knowledge. While the correlation coefficient shows that the relationship is very weak and has a positive correlation, which means that if the respondents work, the level of knowledge is increased. It is the same with the results of research by Scoy et al. (2020) and (Bates et al., 2021) but

contrary to the research conducted by Wulandari et al. (2020).

Last, this study found that the respondents with higher education had higher knowledge. This result is the same compared with previous research (Anhusadar & Islamiyah, 2020; Bates et al., 2021; Hosen et al., 2021; Kirac et al., 2021). This result is also supported by Nursalam (2011), that a person's knowledge is also influenced by educational factors. However, the result of this research is contrary to some previously conducted studies (Lerik & Damayanti, 2020; Wulandari et al., 2020). It has been assumed that information or knowledge is not only obtained in formal education but can be obtained from experience, environment, and non-formal education (Ayurti et al., 2016; Wawan & M., 2014). Any information greatly affects a person's knowledge; even though someone has low education, when he/she is often exposed to information from various sources, the knowledge will be increased. The educational factor is not very influential because various information about COVID-19 at this time is very easy to be accessed (Wawan & M, 2014).

There is a significant relationship between the level of knowledge and COVID-19 prevention behavior in respondents. These results echo the research conducted by Sari et al. (2020) which stated that there is a relationship between public knowledge and obedience in the use of masks as an effort to prevent COVID-19 in Ngronggah. Research by Syadidurrahmah et al. (2020) also showed that the variable of knowledge related to physical distancing has a significant relationship with physical distancing behavior. This research shows that respondents who have good knowledge of

physical distancing have a 1.7 times chance of having good physical distancing behavior than those who have less knowledge.

The correlation coefficient states that, if the level of knowledge increases, the prevention behavior will be better. This is supported by Juwariyah and Priyanto (2018) and Hosen et al. (2021) but contrasts with research by Bates et al. (2021). Knowledge and behavior factors play a role in forming healthy habits (Shaw, 2016). Most people have inadequate health behaviors due to a lack of knowledge of health (Nurjanah & Mubarokah, 2019). Knowledge is a very important domain to creates one's actions (Nurmala et al., 2018). Behavior which is based on knowledge, awareness, and positive attitude will last longer rather than behavior that is not based on these three things (Notoatmodjo, 2014). As previously discussed, many factors connect knowledge and behavior. Knowledge is a predisposing factor before a person adopts a new behavior; people must understand first about the meaning or benefit of this behavior for one's self or family (Notoatmodjo, 2014). A person will take preventive action for COVID-19 if he/she knows what the benefits and goals of prevention are for (Hamel et al., 2020). Pratama and Hidayat (2020) found that society is still maintaining social distancing because they recognize the importance of the safety of themselves and others.

The results of the research show that there are still respondents who have good knowledge with adequate preventive behavior (2%). This is possible because of other factors from that person. As everyone knows, the COVID-19 pandemic has had many impacts on the various sectors. Economic sectors have a big impact on society. Now people experience difficulties to find jobs, experience difficulties to fulfill their daily needs, and even lose their income (Hanoatubun, 2020; Pratama & Hidayat, 2020) so even though people have good knowledge, they are constrained by the economy because they do not have money to buy masks, hand sanitizers or vitamins to prevent COVID-19, and thus, preventive behavior cannot be done properly. The other influencing factor is the social relationship factor in the form of disruption of social relations. There is still a belief that social distancing will lead to distant social relationships (Pratama & Hidayat, 2020). The lack of preventive behavior can also arise due to the non-obedience factor, a condition when an individual or group wishes to comply but several factors stop them from being submissive to the advice given by health professionals (Prihantana & Wahyuningsih, 2016).

This study has limitations by conducting research in one location, as in Depok, Indonesia. The study may be conducted in other areas to explore the same context with various variable. In addition, the data collection instruments, particularly the behavioural aspect, were self-administered by the respondents; thus, the researchers could not directly observe the actual behaviour demonstrated by the participants.

## CONCLUSION

The results showed that a good level of knowledge will lead to good behavior as well. Variables of age, gender, education level, work status also have a relationship with a person's level of knowledge. Innovative health education is still needed to increase public knowledge in order to increase knowledge and prevention behavior for reducing the risk transmission of COVID-19. This study can provide input on level of knowledge and COVID-19 behavior to the government in making the right policies and strategies regarding COVID-19.

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Original Research

# Nurses' Individual Characteristics Associated with Five Moments Handwashing Compliance

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## ABSTRACT

**Introduction:** The most effective way to control infection is to ensure that hospital staff carry out handwashing according to the protocols. This study aims to determine the characteristics of nursing individuals that affect the compliance of the five moments of handwashing in the hospital inpatient room.

**Methods:** The method used was a quantitative with a cross-sectional approach. The population was all nurses in five inpatient rooms totalling 84 nurses selected using purposive sampling. The dependent variable was the compliance of nurses' handwashing. The independent variables were the individual characteristics of the nurses, including knowledge, gender, age, attitude, motivation, skin condition, years of service, education, employment status, infrastructure, and type of room. The data were collected using a questionnaire and observation of handwashing compliance. The handwashing observation was based on the hospital guidelines, and the relationship between the variables was analyzed using Chi square and logistic regressions test.

**Results:** The study indicates that there is a significant relationship between motivation, education, and room type on compliance with the five moments handwashing ($p < 0.05$). The most dominant factor was type of room, and there is no relationship between gender, age, years of work, skin condition, knowledge, attitude, employment status and infrastructures ($p > 0.05$).

**Conclusion:** It is hoped that nurses can increase self-motivation to wash their hands for five minutes while working, as a form of dedication at work and to protect patients and themselves from nosocomial infections. Besides, hospital management needs to make efforts to increase the motivation of nurses.

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## INTRODUCTION

The incidence of nosocomial infections is increasing in both developed and developing countries. The cause of nosocomial-infections is mostly transient flora. Microorganisms classified as transient flora are obtained by health workers when they are in direct contact with patients or with a contaminated environment. The source of cross-contamination in hospitals is the transfer of microorganisms from the hands of healthcare workers who make direct contact from one patient to another. The impact of the incidence of infection nosocomial can cause long days of stay, increase resistance to microorganisms, increase the burden of treatment costs, and, the most dangerous, death. One of the components to limit the spread of nosocomial infections is sufficient infection control. The most effective way to control contamination is to ensure that hospital staff perform hand hygiene according to the regulation (Lankford et al., 2003; WHO, 2009).

The Word Health Organization (WHO), a long-standing leading authority in campaigning hand hygiene (HH), urges every country to strengthen infection prevention and control, and appeals for networking with stakeholders to take better action for the prevention of HAIs (Saito, Kilpatrick, & Pittet, 2018). HAIs are still a substantial burden among infectious diseases, exceeding the burden of other infections such as influenza and tuberculosis (Cassini, Plachouras, Eckmanns, Abu Sin, Blank, Ducomble, & Suetens, 2016).

Nurses, doctors, and all people involved in patient care must perform infection prevention and control

(Duerink et al., 2006). Hand hygiene is the most effective simple way and the most cost-reducing approach to nosocomial infections (Hugonnet et al., 2002; Kampf et al., 2009; Sickbert-Bennett et al., 2016; von Lengerke et al., 2017). Nurses are professionals who play a significant role in hospital services and have contact with patients for a longer time, up to 24 hours straight. Thus, nurses have a role in the incidence of nosocomial infections (Nursalam, 2011). Health workers generally know about the importance of washing hands to prevent infections. However, the implementation of handwashing that follows the standard procedure is still low among health workers (Akyol, 2007; Nurbaety et al., 2019). Various previous studies stated that compliance with nurses' handwashing was still low, not reaching 100% (Jonker & Othman, 2018; Karuru et al., 2016; Putri et al., 2018; Ratnasari & Dulakhir, 2016; Umboh et al., 2017 ). Based on previous research, it is known that the individual characteristics of nurses related to handwashing compliance include age, gender, length of work, knowledge, attitudes, motivation, and nurse education (Anugrahwati & Hakim, 2019; Fauzi et al., 2015; Zainaro & Laila, 2020).

Based on the description above, this study aims to determine the individual characteristics of nurses that affect the compliance of the five moments handwashing in the inpatient room of Pangkalpinang City with a quantitative approach.

**MATERIALS AND METHODS**

This research is a quantitative study with a cross-sectional approach. The dependent variable of the study is the nurses' compliance with handwashing in the inpatient room. The independent variables are individual characteristics, including knowledge, gender, age, attitude, motivation, skin conditions, length of work, education, employment status, infrastructure, and type of room. The population of the study were all associated nurses who work in the inpatient room, as many as 98 nurses. A total of 84 implementing nurses as research respondents was obtained using purposive sampling (ICU = 14; PICU = 16; Non-surgical = 27; Children = 12; Surgery = 15) with the following inclusion criteria: (1) willing to be respondents, (2) not being assigned to the isolation room during the research. The COVID-19 isolation room was not involved in the research because, when the study was taking place, there were no patients. Thus, they could not estimate washing hands for the five moments.

The procedure in this research began by arranging a permit to a government hospital in Pangkal Pinang City. It was followed by conducting a meeting to equate the perception of the research process. The meeting was performed by hospital infection prevention and control programs (IPC). Four people assisted in the process of data collection. Two students were as research assistants who were in charge of collecting questionnaires and documentation. Two hospital IPC officers were responsible for observing the compliance of nurses' handwashing in the rooms. Researchers also coordinated with all heads of room related to research activities. First, the researchers explained to the respondents about the objectives and procedure of the research and the guarantee of data confidentiality. Nurses willing to sign the informed consent form as research respondents then filled out the questionnaire. The study questionnaire was adopted from previous researchers with modifications. The questionnaire covered the nurse's identity (name, age, gender, latest education, years of service, skin condition), room name, and handwashing infrastructure. The knowledge variable consists of 10 questions about the five moments handwashing and has passed the validity and reliability test. Questionnaire validation and reliability test had been done at RSUP Ir. Soekarno with the number of respondents as many as 20 people. Cronbach's alpha test results obtained knowledge value (0.932), motivation (0.958), attitude (0.969) and were declared reliable. Of the 10 questions and statements, all are declared valid with a calculated R value > R table (0.375). Each correct answer is given a value of 1 and 0 if the answer is wrong. The attitude variable includes 10 statements consisting of eight positive statements and two negative statements using a Likert scale. Meanwhile, the motivation variable has 10 statements using a Likert scale. For positive statements, the highest point is 5 in the SS category (strongly agree), while the highest point negative statement is 5 in the STS category (strongly disagree).

The 84 nurses were then observed for the five moments of handwashing compliance in the room by the hospital IPC officers. The observation process was uninformed to the respondents, and only carried out once in 10 days, starting from 22nd to 31rd of August, 2020. Furthermore, each research respondent is given a code, R01 for the first respondent up to R84. The questionnaire files and observation sheets were not accessible other than to the researchers. After data collection was complete, the study continued with data entry. Incomplete nurse data were confirmed to the head of the room concerned. The relationship between individual characteristics and compliance with handwashing was tested using the Chi-square test with a confidence degree of 95% ($α = 0.05$). Meanwhile, the relationship between variables was analyzed using the multivariate analysis method using logistic regression test with SPSS version 20 software.

**RESULTS**

Based on Table 1, there are 11 characteristic components of individual nurses. The dominance of female gender nurses, age less than 40 years, vocational education, long working period, non-sensitive skin condition, and civil servant status. Knowledge, attitude and motivation have equal value.

Table 1. Characteristics of Research Respondents

| Characteristics of Respondents | n | % | Median |
|---|---|---|---|
| Age | | | |
| > 41 Years | 13 | 15.5 | - |
| ≤ 40 Years | 71 | 84.5 | |
| Motivation | | | |
| Low | 35 | 41.7 | 39.07 |
| High | 49 | 58.3 | |
| Attitude | | | |
| Negative | 39 | 44.6 | 43.67 |
| Positive | 45 | 53.6 | |
| Knowledge | | | |
| Fair | 31 | 36.9 | 9.61 |
| Good | 53 | 63.1 | |
| Work Period | | | |
| New | 10 | 11.9 | - |
| Old | 71 | 88.1 | |
| Infrastructure | | | |
| Insufficient | 4 | 4.8 | - |
| Adequate | 80 | 95.2 | |
| Skin condition | | | |
| Sensitive | 14 | 16.7 | - |
| Not Sensitive | 70 | 83.3 | |
| Education | | | |
| Vocational Degree | 63 | 75 | |
| Academic Degree | 6 | 7.1 | - |
| Professional Degree | 15 | 17.9 | |
| Employment Status | | | |
| Civil Servant | 63 | 75 | - |
| Contract | 21 | 25 | |
| Gender | | | |
| Male | 12 | 14.3 | - |
| Female | 72 | 85.7 | |

Table 2. Distribution of Respondents' Handwashing

| Handwashing Compliance | n | % |
|---|---|---|
| Noncompliant | 53 | 63.1 |
| Compliant | 31 | 36.9 |
| **Total** | 84 | 100 |

Table 3. Percentage Distribution of Respondents' Handwashing by Type of Room

| Type of Room | Handwashing Compliance | | | | Total |
|---|---|---|---|---|---|
| | Noncompliant | | Compliant | | n |
| | n | % | n | % | |
| ICU & PICU | 7 | 23.3 | 23 | 76.7 | 30 |
| Non-surgical | 25 | 92.6 | 2 | 7.4 | 27 |
| Surgery | 12 | 80 | 3 | 20 | 15 |
| Children | 9 | 75 | 3 | 25 | 12 |
| Total | | | | | 84 |

## Handwashing Compliance

Most of the respondents (63.1%) in this study did not comply with the five-minute handwashing, as in Table 2. The room with the highest level of compliance with washing hands was the ICU & PICU room, while in the normal inpatient room the level of compliance with washing hands was low, as shown in Table 3. While the five most neglected moments are after touching patient surroundings, as in Table 5.

Based on the statistical test in Table 2, there are three variables with p-value < 0.05, namely motivation, education, and type of room. It shows that the three aspects affect the washing of hands by nurses in the room. Furthermore, the OR value of the motivation variable is 2.986, meaning that nurses who have high motivation have the opportunity to comply 2.98 times more than nurses with low motivation. Based on the multivariate logistic regression test, the omnibus test section shows a p-value of 0.0001 (<0.05), which means that there is an interaction between motivation, education and type of room on compliance with handwashing. Based on Table 6, it can be found that the most dominant variable is the type of room.

## DISCUSSION

Most of the respondents in this study did not comply with washing their hands for five moments. The research found only a small part of the individual characteristics of nurses that affect handwashing compliance, namely education and motivation. New findings from this research are that type of room was known to be significantly related to handwashing compliance, and to be the most dominant factor. The results of this study support previous research reporting that most nurses do not comply with handwashing (Arifin & Ernawaty, 2019; Karuru et al., 2016; Nurbaety et al., 2019). Handwashing or hand hygiene is a general term that refers to the act of cleansing the hands five times, commonly called five moments. The five moments are: the moment before contact with the patient, before the cleaning procedure or aseptic, after procedures exposing to the body fluids, after contact with patients, and after contact with the area around the patient (WHO, 2009). Permenkes no 27 Tahun 2017, concerning infection prevention and control in health facility services, states that hand hygiene is one of the standard precautions that must be applied routinely in the care of all patients in the hospital.

The hospital as a medical service unit cannot be separated from the activities of treatment and care for patients with various causes, one of which is infection. Infections that occur in health services during treatment and medical procedures after ≥ 48 hours and after ≤ 30 days after leaving a health facility are called nosocomial infections or hospital-acquired infections (HAI). According to Petersen et al. (2010), HAI causes a prolonged length of stay, thus harming patients and increasing treatment costs. HAI is a worldwide problem because it is detrimental to patients and hospitals. Lankford et al. (2003) state that one of the components to limit the spread of HAI is to implement infection control. The most effective way to control infection is to ensure that hospital-staff practice hand hygiene following the standard.

Factors related to the compliance level of nurses' handwashing include individual-factors, i.e.: gender, age, facilities, attitudes, length of work (Anugrahwati & Hakim, 2019; Arifin & Ernawaty, 2019; Fauzi et al., 2015; Pratama et al., 2016). However, this study gave different results as to which of these factors did not

Table 4. Five Moment Handwashing by Type of Rooms

| Five Moment | | Type of Room (%) | | | |
|---|---|---|---|---|---|
| | | ICU & PICU | Non-Surgical | Surgery | Children |
| Before touching a patient | Noncompliant | 0 | 59.3 | 33.4 | 41.7 |
| | Compliant | 100 | 40.7 | 66.6 | 58.3 |
| Before clean/aseptic procedures | Noncompliant | 0 | 22.3 | 13.4 | 25 |
| | Compliant | 100 | 77.7 | 86.6 | 75 |
| After body fluid exposure/risk | Noncompliant | 0 | 7.5 | 6.7 | 0 |
| | Compliant | 100 | 92.5 | 93.3 | 100 |
| After touching a patient | Noncompliant | 0 | 0 | 0 | 0 |
| | Compliant | 100 | 100 | 100 | 100 |
| After touching the patient's surroundings | Noncompliant | 26.7 | 92.6 | 80 | 75 |
| | Compliant | 73.3 | 7.4 | 20 | 25 |

Table 5. Relationship of Nurses' Individual Characteristics toward Handwashing Compliance

| Characteristics of Individual Respondents | Compliance with Handwashing | | | | Total | | OR (95% CI) | p-value |
|---|---|---|---|---|---|---|---|---|
| | Non-compliant | | Compliant | | | | | |
| | n | % | n | % | n | % | | |
| Age | 7 | 53.8 | 6 | 46.2 | 13 | 100 | 0.643 | 0.537 |
| > 41 Years | 46 | 64.8 | 25 | 35.2 | 71 | 100 | (0.192-2.093) | |
| ≤ 40 Years | | | | | | | | |
| Attitude | 27 | 77.1 | 8 | 22.9 | 35 | 100 | 0.584 | 0.339 |
| Negative | 26 | 53.1 | 23 | 46.9 | 49 | 100 | (0.239-1.429) | |
| Positive | | | | | | | | |
| Knowledge | 20 | 64.5 | 11 | 35.3 | 31 | 100 | 1.102 | 1.000 |
| Fair | 33 | 62.3 | 20 | 37.7 | 53 | 100 | (0.438-2.770) | |
| Good | | | | | | | | |
| Work Period | 7 | 70 | 3 | 30 | 10 | 100 | 1.420 | 0.738 |
| New | 46 | 62.2 | 28 | 37.8 | 74 | 100 | (0.339-5.945) | |
| Old | | | | | | | | |
| Infrastructure | 4 | 100 | 0 | 0 | 4 | 100 | 1.633 | 0.292 |
| Insufficient | 49 | 61.3 | 31 | 38.3 | 80 | 100 | (1.372-1.944) | |
| Adequate | | | | | | | | |
| Skin condition | 8 | 57.1 | 6 | 42.9 | 14 | 100 | 0.741 | 0.840 |
| Sensitive | 45 | 64.3 | 25 | 37.5 | 70 | 100 | (0.231-2.377) | |
| Not Sensitive | | | | | | | | |
| Education | 43 | 68.3 | 20 | 31.7 | 63 | 100 | - | 0.042 |
| Vocational Degree | 1 | 16.7 | 5 | 83.3 | 6 | 100 | | |
| Academic Degree | 9 | 60 | 6 | 40 | 15 | 100 | | |
| Professional Degree | | | | | | | | |
| Employment Status | 36 | 57.1 | 27 | 42.9 | 63 | 100 | 0.314 | 0.09 |
| Civil Servant | 17 | 81 | 4 | 19 | 21 | 100 | (0.95-1.040) | |
| Contract | | | | | | | | |
| Gender | 9 | 75 | 3 | 25 | 12 | 100 | 1.909 | 0.521 |
| Male | 44 | 61.1 | 28 | 38.9 | 72 | 100 | (0.476-7.664) | |
| Female | | | | | | | | |
| Motivation | 27 | 77.1 | 8 | 22.9 | 35 | 100 | 2.986 | 0.043 |
| Low | 26 | 53.1 | 23 | 46.9 | 49 | 100 | (1.134-7.861) | |
| High | | | | | | | | |
| Type of Room | 7 | 23.3 | 23 | 76.7 | 30 | 100 | - | 0.0001 |
| ICU & PICU | 25 | 92.6 | 2 | 7.4 | 27 | 100 | | |
| Non-Surgical | 9 | 75 | 3 | 25 | 12 | 100 | | |
| Pediatric | 12 | 80 | 31 | 20 | 15 | 100 | | |
| Surgery Room | | | | | | | | |

have a significant effect on the compliance of nurses' handwashing. The gender of nurses was dominantly females. However, there is no difference in the proportion of compliance with handwashing between female and male respondents. The age of nurses was mostly ≤ 40 years, but there was found no difference in the proportion of compliance with handwashing between nurses aged ≤ 40 years and nurses aged > 41 years. Most of the nurses considered that the handwashing infrastructure was adequate in the patient room, and there was no difference in the proportion of compliance with handwashing among nurses who were considered supported by the infrastructure to be adequate and inadequate. These findings support previous research that found that the availability of facilities and infrastructure did not relate to handwashing compliance (Yotlely, 2019). The researcher assessed the non-correlation because there were adequate handwashing facilities in the

room. There were hand rubs in each patient's bed, room corridor, and nurse station.

The results showed that most of the nurses had a long working tenure, namely > 5 years, but there was no difference in the proportion of compliance with handwashing between nurses with a long tenure and nurses with a new tenure. The positive attitude of nurses is almost proportional to negative attitudes, and there is no difference in the proportion of compliance with handwashing between nurses with positive attitudes and nurses with negative attitudes. The same thing is found in the knowledge factor. Most of the nurses have good knowledge of handwashing. However, there is no difference in the proportion of compliance in washing hands between nurses with adequate knowledge and nurses with less knowledge. This is also in line with previous research which found that knowledge was not related to handwashing cosmpliance (Arifin & Ernawaty, 2019; Ratnasari & Dulakhir, 2016; Syamsulastri, 2017). Nurses may have good knowledge about handwashing, but other factors can lead to difficulty implementing handwashing compliance, one of which is the high workload. From the research results, nurses in ordinary inpatient rooms (surgical, non-surgical, children) were the most obedient to wash their hands at moment 3 (after being exposed to body fluids) and moment 4 (after touching the patient). However, the most neglected moment is moment 5 (after touching the patient's environment). It shows that nurses prioritize washing hands after exposure to patients. Further research is needed regarding the workload of nurses in inpatient rooms.

Also, another finding from this study is that employment status does not correlate with nurse handwashing compliance. Most of the nurses are civil servants, but there is no difference in the proportion of compliance in washing hands between nurses who are civil servants and nurses who are honorary status. Also, most skin conditions are not sensitive to handwashing fluids. However, there is found no difference in the proportion of washing hands between nurses with sensitive skin conditions and nurses who are not sensitive to handwashing fluids. There were complaints from the respondent such as dry hands, but the researcher's opinion is that the small number of nurses who have sensitive skin causes this variable to be unrelated. It is necessary to develop further research to find out more clearly.

An interesting finding in this study is that nurses' motivation affects compliance with nurses' handwashing. The number of nurses with high motivation is almost equal to those with low motivation. Nevertheless, there is a difference in the proportion of compliance with handwashing between highly motivated nurses and those with low motivation. These findings support previous research where 'motivation' is significantly related to nurses' compliance with handwashing (Ananingsih & Rosa, 2016; Fauzi et al., 2015; Sani & Pratiwi, 2017). Nurses need to cultivate high motivation as a form of dedication and altruism to patients' needs for healing

(Nursalam, 2017). Besides, nurse education was found to affect compliance with handwashing. There was a difference in the proportion of handwashing between nurses with vocational, academic, and professional education. One of the factors that can increase the productivity or performance of nurses is the formal education of nurses. Education provides knowledge not only directly related to the implementation of tasks, but also a foundation for self-development and the ability to utilize all available facilities for smooth tasks (Nursalam, 2017).

The new finding from this study is that room type is related to the compliance of nurses' handwashing. There is a difference in the proportion of compliance with handwashing between intensive and non-intensive rooms (general inpatient care). Based on Table 6, it was found type of room to be the most dominant factor. Of the five rooms studied, there were two types of intensive rooms and three general inpatient rooms. Based on diagram 2, the highest handwashing compliance is in the intensive room, where moments 1 to 4 are 100%, but in moment 5 the compliance is 73.3%. Meanwhile, in general, inpatient rooms, the non-compliance of handwashing was five moments higher. This finding supports previous research that the workplace influences compliance with hand hygiene, where ICU nurses are more obedient than other wards (Arini, 2016). Further research is needed to be able to find a more specific cause.

The researcher's opinion is that not only individual characteristics should be highlighted in compliance with nurses' handwashing. Other factors outside the nurses as individuals also contribute to handwashing compliance. They can be organizational characteristics, which include reward systems, training, and development, leadership, and organization culture. Moreover, it is important to pay attention to aspects of job characteristics, including feedback, workload, and assignment methods.

This study has several limitations, although attempts have been made to overcome them. Researchers could not control nor directly see when respondents filled in answers or justify the truth of the answer given. In addition, observing the compliance of nurses' handwashing was only done once in a period.

## CONCLUSION

Most nurses do not comply handwashing. From 11 nurses' individual characteristic factors, there were three factors related to the compliance of the nurse's hand washing, namely education, motivation and type of patient room. The research found type of room to be the dominant factor. However, knowledge, facilities, attitudes, age, gender, skin sensitivity conditions, and employment status do not relate to handwashing compliance.

It is hoped that nurses can increase self-motivation to perform the five moments of hand hygiene while working, as a form of dedication at

work and to protect patients and themselves from nosocomial infections. The researcher also recommends that further researchers be able to identify more about other factors, including reward systems, training and development, leadership, organizational culture, feedback, workload, and assignment methods. Thus, they can find the right intervention to increase compliance with the nurse's handwashing.

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Original Research

# Parental Interactions Associated with Adolescent Health Risk Behavior: Premarital Sexual and Aggressive Behavior

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## ABSTRACT

**Introduction:** Interactions within the family will determine the behavior of adolescents. Lack of interaction in adolescents is a risk factor for adolescent behaving deviant, among others, unmerried sexual and aggressive behaviors. The purpose of this study was to analyze the relationship between parental interaction and the premarital sexual and aggressive behavior among adolescents.

**Methods:** A cross-sectional approach was taken. The sample consisted of 744 adolescents from junior high school and senior high school in Java Island aged 13 - 19 years old who had completed a Google form. The independent variable was parent interaction while the dependent variable was premarital sexual and aggressive behaviors. The PACHIQ-R questionnaire was used for measuring parent interaction. While the dependent variable was using checklist questionnaire. The data was analyzed using Spearman Rank correlation with a level of significance α=0.05.

**Results:** The results show that there is a correlation between the parent interactions and premarital sexual (p=0.007; r=0.100) and aggressive behavior among adolescents (p=<0.001;r=0.156). Parental interaction has an association on the adolescent's behavior, especially in terms of premarital sexual and aggressive behavior.

**Conclusion:** Nurses need to provide education not only to parents, but also for adolescents to prevent premarital sexual and aggressive behaviors among adolescents in any media that available.

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## INTRODUCTION

Chemotherapy Risky behaviors in adolescents greatly affect their health (Achhab et al., 2016). The behaviors include fighting, drug use and extortion. One of the behaviors that is less often in the spotlight is sexual behavior when dating (Catur, 2015). It is also supported that the factors that influence adolescent sexual behavior include the adolescent's parental relationships, negative peer pressure, an understanding of religion (religiosity) and exposure to pornographic media (Arista, 2015; Murdiningsih, Rosnani, & Arifin, 2016; Yusuf, Bahiyah, Nihayati, & Wiyono, 2017). Parental interactions have been shown to be associated with risky behavior in adolescents (Kurnia et al., 2019)(Krisnana, Diyan, Yuni, Arief, & Dwi, 2019). The impact of aggressive

behavior can be seen from the impact on both the perpetrators and victims. The impact of the perpetrators is that they will be shunned and not liked by others. The impact of the victim includes physical and psychological pain and losses due to aggressive behavior (Restu & Yusri, 2013).

Based on a reproductive health survey conducted by the National Family Planning Board (BKKBN) 2017, 67% of adolescents were dating, 18,6% boys had kissed each other and 5% of adolescent (male) teens who were dating had had sexual intercourse before marriage(BKKBN, 2017). Based on the data from WHO (2018) stated that nearly one in three adolescent girls aged 15 – 19 years (84 million) has been a victim of emotional, physical and/or sexual violence perpetrated by their husband or partner (WHO, 2018). Based on the data from the National

Commission on Child Protection 2016, there were 41 brawls between students, while childhood violence (bullies) totaled 93 cases (Komisi Perlindungan Anak, 2016).

Child relationship with family becomes an important factor in the prevention and management of juvenile delinquency (Doly Purba, 2014). The parent-child interactions are a mutually beneficial process because the parental behavior will affect the child and vice versa. The child will affect the parents so then both experience change(Adah & Arisna, 2015). Various theories of nursing have been introduced by nursing experts, one of which is the theory of Kathry E. Barnard. This theory discusses the interaction between children and their parents. The reason for taking this theory into account is because it is in accordance with the problems that are to be explored, namely the interaction between the parents and the evidence of pre-marital sexual and aggressive behavior in adolescents. The focus of Barnard's theory is to view the parents and children as an interactive system (Alligood, 2014). The parent-child system is influenced by the individual characteristics of each member involved and the individual characteristics are modified to meet the needs of the interactive system in turn. The identification of the parent interactions as it relates to the premarital sexual behavior of adolescents is very important. This is because Indonesia is a country that still adheres to norms of Eastern behavior and customs. There is still only a small amount of research that explains the relationship between parental interactions, aggressive behavior and premarital sexual behavior in adolescents. The researchers are interested in conducting an analytical study of the relationship between parental interactions, aggressive behavior and premarital sexual behavior in adolescents. Study on parental interaction with premarital sexual behavior and aggressive behavior in adolescents on the island of Java has not been carried out. Therefore, the purpose of this study is to analyze the relationship between parental interactions with pre-marital sexual behavior and aggressive behavior among adolescents on the Java Island.

## MATERIALS AND METHODS

The design in this study was cross-sectional. This research was conducted in one time data collection on the subject. The population of this study consisted of 13 - 19 year old adolescents attending junior and senior high school in Indonesia, particularly in Java Island. The inclusion criteria in this study were 1) adolescents living in Java, aged 13-19 years old, 2) adolescents who can access Google Forms. The determination of the sample size in this study was done using the Gpower 3.1.9.2 application and statistical test Correlations: Two dependent Pearson r's (common index). The results of the calculation using power analysis obtained 744 samples as the ideal size. Sampling based on quota sampling according to the results of the sample size formula.

The independent variable was parent interaction and the dependent variable was pre-marital sexual behavior and aggressive behavior.

The researcher made an online questionnaire using Google forms https://goo.gl/forms/49lv8TrN2D3qzFcs1. The form contained the informed consent sheet, the respondent's demographic data, the PACHIQ-R questionnaire, the premarital sexual behavior questionnaire and the aggressive behavior questionnaire. The questionnaires were distributed through social media such as Line, Whatsapp, Facebook and Instagram to be filled in by the respondents on 3 months period (September-November 2017). The respondents fill out the informed consent form first. After agreeing, the respondents filled in the biodata and PACHIQ-R questionnaire, in addition to the premarital sexual behavior questionnaire and the aggressive behavior questionnaire that was used in the Google form. The PACHIQ-R questionnaire (The Parent-Child Interaction Questionnaire-Revised) was made by Lange (2002) and it was filled in by the adolescents(Lange, Evers, Jensen, & Dolan, 2002). The PACHIQ-R questionnaire was translated from English into Indonesian and it was tested for validity and reliability (Krisnana et al., 2019). All of the items in the questionnaire had good validity scores. The reliability testing had a Cronbach's Alpha score = .854. The questionnaire was divided into 2 measurements, namely the measurement of the interactions of the parent and the measurement of the interactions of the adolescent. The adolescent version had 25 questions. The 2 subscales were conflict resolution (certain behaviors) and acceptance (certain feelings). There were both positive and negative questions in the PACHIQ-R questionnaire: (6, 8, 9, 11, 14, 16, 17, 18, 19, 20, 21, 23, 24, and 25) and (1, 2, 3, 4, 5, 7, 10, 12, 13, 15, and 22) respectively. PACHIQ-R used five response categories: "never", "hardly ever", "sometimes", "almost always", and "always". The higher the score, the higher the level of interaction between the adolescents and their parents. The questionnaire was completed by those with the means who had understood the instructions for filling it in. Meanwhile, the dependent variable data is in the form of descriptive data, namely the percentage of adolescents who did and did not engage in premarital sexual behavior and aggressive behavior. The researcher gave the participants a cellphone number that they could be contacted on if there were questions related to the questionnaire. The completion of the questionnaire took approximately 20 minutes. For the completed questionnaire, the researcher checked Google forms directly to find out the number of questionnaires that had been filled in. Once they met the target, the researcher turned off the link that allowed access to the Google form. The data was analyzed using Spearman Rank correlation with a level of significance of α=0.05.

This study has passed the review and certification of the Ethical Agreement with no. 566 - KEPK issued

by the Faculty of Nursing University of Airlangga. This study follow the princip of ethic are anonymity, justice, informed concent, confidentially, beneficience.

## RESULTS

The results show that the majority of respondents were their mid adolescents, in the range of 15 - 17 years old (as many as 374 people; 50.2%). The majority of respondents (606) had a high school level of education (81.3%). The majority of the respondents' parent's education was high school for the father and mother, totaling 328 people (44.1%) and 314 people (42.2%) respectively. The majority of the respondents resided with their parents (672 people; 90.3%). Most of the respondents used motorbikes as their medium of transportation to get to school (as many as 462 people; 62.1%). The majority of respondents were given pocket money by their parents, totaling as much as < 50,000 IDR (as many as 626 people; 84.1%) (Table 1).

The parent interactions with the adolescents had a minimum score of 55. This score indicates that there were no adolescents who had never interacted with their parents. The maximum score was 121. This score shows that none of the adolescents had a perfect score. The mean value was 95 which means that the adolescent interactions were in the range of 'sometimes' and 'almost always' (Table 2).

Most of the adolescents had never engaged in premarital sexual behavior (96.1%) and they had not engaged in aggressive behavior either (73.1%). The parent interactions with the adolescents consist of a very weak positive relationship. These results indicate that the higher the level of interactions, the higher the tendency of the adolescents to not engage in premarital sexual behavior (p = .007; r = .100) and aggressive behavior (p = <. 001; r = .156) (Table 3).

## DISCUSSION

Table The results showed that there was a relationship between parental interactions with premarital sexual behavior and aggressive behavior in adolescents. Interaction refers to contact and communication which is interpreted as the mutual influence on various aspects of a shared life(Lange, Evers, Jansen, & Dolan, 2002). There were 2 subscales used to measure the interaction between parents and adolescents, namely conflict resolution and acceptance. For the conflict resolution subscale, most adolescents call their parents directly by their names. For the acceptance subscale, the acceptance of a small proportion of teenagers is related to always being told by their parents to do everything. Good family interactions will provide happiness in the family which can provide protection various problems and minimize the occurrence of negative things in the children(Adah & Arisna, 2015). Adolescents, while developing, need love, attention and a sense of security from their parents(Saputri, 2014). This is consistent with the research conducted by(Rogi,

Table 1. Demographic Characteristics of the Adolescents (n=744)

| Characteristics | n | % |
|---|---|---|
| **Sex** | | |
| Boys | 391 | 52,6 |
| Girls | 353 | 47.4 |
| **Ages** | | |
| Early adolescent | 105 | 14.1 |
| Mid-adolescent | 374 | 50.3 |
| Late adolescent | 265 | 35.6 |
| **Education** | | |
| Junior high school | 138 | 18.5 |
| Senior high school | 606 | 81.5 |
| **Father's Education** | | |
| Bachelor | 141 | 19.0 |
| Diploma | 37 | 5.0 |
| Senior High School | 328 | 44.1 |
| Junior High School | 109 | 14.7 |
| Elementary School | 129 | 17.3 |
| **Mother's Education** | | |
| Bachelor | 110 | 14.8 |
| Diploma | 42 | 5.6 |
| Senior High School | 314 | 42.2 |
| Junior High School | 125 | 16.8 |
| Elementary School | 152 | 20.4 |
| Uneducated | 1 | 0.1 |
| **Stay at Home With** | | |
| Parents | 672 | 90.3 |
| Grandparents | 25 | 3.4 |
| Other family | 7 | 0.9 |
| Boarding house | 40 | 5.4 |
| **Transportation** | | |
| Motorcycle | 462 | 62.1 |
| Public transportation | 95 | 12.8 |
| Delivered | 180 | 24.2 |
| Bicycle | 7 | 0.9 |
| **Pocket Money per Day** | | |
| < 50,000 IDR (3 USD) | 626 | 84.1 |
| > 50,000 IDR (3 USD) | 118 | 15.9 |

Table 2. Correlation between Premarital Sexual and Aggressive Behaviors with Parent Interaction in Adolescents (n=744)

| Variables | Min-max | Mean | SD | p | r |
|---|---|---|---|---|---|
| Parent interaction | 55-121 | 95.4 | 10.9 | | |
| Premarital sexual behavior | 1-2 | 1.96 | 0.19 | .007 | .100 |
| Aggressive behavior | 1-2 | 1.73 | 0.44 | <.001 | .156 |

2015) where the results showed that juvenile delinquency occurred due to the lack of intense family communication where the power related t the control and guidance of the parents towards adolescent behavior was very limited.

Adolescence is a period of rapid physical, cognitive, emotional and social maturity in both males and females(Wong, Hockenberry, Wilson, Winkelstein, & Schwartz, 2009). Adolescents who

actively communicate with their parents have risky sexual behavior that is in the mild category. The respondents who passively communicate with their parents have risky sexual behavior in the severe category (Sekarrini, 2012). The research conducted by(Gustina, 2017) showed the same result, that there is a relationship between parental communication and sexual risk behavior. Poor communication between parents and adolescents results in the adolescents engaging in risky sexual behavior. Interactions between the teenagers and their parents can delay and even reduce the level of sexual intercourse behavior in adolescents(Hidayah & Maryatun, 2013).

The impact of free sexual behavior is that it puts the adolescents at risk of developing STDs, Human Immunodeficiency Virus (HIV) and Acquired Immune Deficiency Syndrome (AIDS). The risk of unplanned pregnancy can lead to the action of abortion which can result in death(Arista, 2015). Some of the factors that can cause the teenagers to behave freely include puberty, poor communication with their parents and friends, other social factors and media exposure(Sekarrini, 2012). Adolescent health risk behavior includes casual sex, brawling and alcoholism(Hartono & Gianawati, 2013). Children from harmonious families have more of a stronghold when it comes to the prevention of aggressive behavior(Gómez-Ortiz, Romera, & Ortega-Ruiz, 2016). The interactions in a harmonious family can have a positive influence on adolescents. . Physical punishment and strict disciplinary practices on part of the parents will result in negative impacts, one of which is the emergence of aggressive behavior in the children(Hidayah & Maryatun, 2013). The level of parental interaction related to adolescent health risk behavior includes free sex and aggressive behavior. Efforts to minimize the increase in adolescent health risk behavior can be applied by increasing the understanding of the parents about the importance of maintaining open communication and interactions with adolescents. Based on the results of this study showed that parental interaction has a relationship with premarital sex behavior and violent behavior in adolescents. the school and the government need to provide education and empowerment for parents so that they can monitor adolescents in order to prevent health risk behaviors.

The limitation of this study was that the researchers could not directly observe the process of the questionnaires being filled out by the adolescents via a Google form.

## CONCLUSION

Parental interaction has an impact on the adolescent's behavior, especially in terms of premarital sexual and aggressive behavior. Nurses need to provide education not only to parents, but also to teenagers to prevent premarital sexual and aggressive behaviors among adolescents in any media that available. For futher study need to explore the parents perspective of premarital sexual and aggressive behavior of adolescents.

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Original Research

# The Influence of Web-Based Spiritual Problem Solving on the Prevention of Suicidal Risk among University Students

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## ABSTRACT

**Introduction:** Suicide is a health phenomenon that is currently increasing, especially in young adults aged 15-29 years. The spiritual aspect in the form of belief in God is one way to prevent suicide. This study was conducted to determine the effect of web-based spiritual problem solving on the prevention of suicide risk in college students.

**Methods:** The research design used a pre-experimental one-group pre-post-test. The sample was 59 respondents using the purposive sampling technique. The independent variable was web-based spiritual problem solving, and the dependent variable was suicide risk prevention. The intervention was delivered via the web using PowerPoint media, inspirational videos, and counselling for approximately one month with four sessions. Data were collected using a questionnaire and analysed using the Wilcoxon sign rank test.

**Results:** Web-Based Spiritual Problem Solving significantly decreases suicide risk with a p-value of 0.000 (p < 0.05).

**Conclusion:** Web-Based Spiritual Problem Solving has been shown to be effective in reducing students' suicide risk. This web intervention can be used for 24 hours and specifically for counselling and two-way communication on the web; privacy is maintained because of a hidden identity, which is seen in code when interacting with counsellors so as to minimize stigma.

## INTRODUCTION

Suicide is a phenomenon of increasing health problems among young adults aged 15-29 years. Suicide cases often appear in media coverage (Kementerian Kesehatan Republik Indonesia, 2019). Suicide is the leading cause of morbidity and mortality worldwide (Ballesteros & Hilliard, 2016). That there is an increasing need for mental health in US Colleges, as many as 35% of college students report "feeling so depressed and having difficulty learning and another 50% experiencing intense anxiety that makes it difficult to succeed academically, according to the Center for Collegiate Mental Health (CCMH) counselling., It was found that from 263 universities, 33% had serious mental health problems and were accompanied by suicidal ideation (Tsong et al., 2018). A person's inability to control stress will lead to suicidal behaviour (Keliat & Pasaribu, 2016). The suicide death rate in

Indonesia was higher in 2016 by 100,000 population, men 4.8/100,000 higher than women by 2.0/100,000 population (Kementrian Kesehatan Republik Indonesia, 2019).

Students are a group of young adults entering their early adulthood who will experience a period of challenges, rewards, and crises (Potter & Perry, 2005). The life challenges and responsibilities that a person feels when approaching adulthood will be heavier, especially when entering the phase of being a student, the number of tasks and the perceived pressure will affect mental health. In 2019 a university student in Surakarta committed suicide (Ryantono, 2019). A preliminary study on students at Surakarta health college in 2019 revealed that the idea of suicide occurred highly in 32% students, and was lower in 68% of students. The results of researcher interviews indicates there were problems with consulting students as some did not want to meet directly but only wanted to go through

WhatsApp communication due to embarrassment, students blamed and were disappointed in God for the problems experienced. This needs to get serious attention so that preventative efforts can be made so that no suicide occurs. College students as the nation's next-generation must be aware of the potential risk of suicide that exists in themselves and it is increasingly important for universities to provide prevention and intervention programmes in the campus environment (Tsong et al., 2018). A study by Wolitzky-Taylor et al. (2019) described a meta-analysis that revealed that suicide data programmes were effective in University suicides.

Spiritual factors are part of the internal protective factors that are easier to modify so that problem-solving efforts can be done by reinforcing aspects. Spiritual (belief) is one way to prevent suicide. The online world can be used as a means to help lecturers provide guidance to counsellors to counsel. Counselling is not only done face-to-face (FTF) in one closed space, but can be done through a remote format assisted by technology which is further known as e-counselling (Hidayat, 2018). The use of the internet and social media is very high in college students as a repository to find solutions to solving mental health problems while maintaining privacy, reducing stigma, and efficiency of distance and time, so it is necessary to make facilities in the form of web-based spiritual problem-solving. This web-based spiritual problem solving is an effort to overcome obstacles with focused thought to find solutions by pouring out the spiritual aspect, namely belief by interpreting life problems and life goals through online networks. Web-based spiritual problem solving with the Watson approach that links healing roots, caring, and spirituality in nursing will be very important. Belief systems can affect clients emotionally, physically, psychologically, and behaviourally (O'Brien et al., 2013). Mcauliffe, Mcleavey, and Fitzgerald (2014) explained that problem-solving skills training provided significant psychological and social improvements, showed a positive treatment effect in the self-harm group.

Based on the phenomenon of problems above, this study is needed to analyse the effect of Web-Based Spiritual Problem Solving on the prevention of suicide risk in college students.

## MATERIALS AND METHODS

This study used a pre-experimental design of one group pre-post-test. Before the research was carried out informed consent was gained from respondents. The study was conducted between March and June 2020. The population was 359 college students at the Health College in Surakarta. The total sample was 59 respondents obtained by purposive sampling with inclusion criteria: 1) regular students; 2) young adults aged 17-29 years; and 3) college students with positive screening results at high risk of suicide, screening using the Suicide Behavior Questionnaire-Revision (SBQ-R). The independent variable is web-based spiritual problem solving, and the dependent variable is the prevention of suicide risk. The risk of suicide was measured using the SBQ-R, which has four total score items. The total score was obtained by accumulating the individual item scores with total score ranges from 3 to 18 points. A total score of $\geq 7$ indicates a high risk of suicidal behaviour, while the <7 indicates a low risk of suicidal behaviour (Osman et al., 2001). The instrument has been tested for validity and reliability using Cronbach alpha with a value of 0.785. The validity test was conducted in November 2019 by first testing the questionnaire on a number of 30 respondents who were not study subjects and who had the same characteristics as the study subjects.

The intervention was delivered via the web using PowerPoints, inspirational videos, and counselling for approximately one month with four sessions. The web can be used for 24 hours and specifically for counselling, the contract is made in advance according to the agreement with the counsellor so that two-way communication can occur. This research was in collaboration with an IT Consultant from the Institute of Phicos Group Surakarta so that there was a letter of agreement to maintain the privacy and security of respondents' data. During the counselling process, the data that appears on the consultation screen is only a student numeric code so that the counsellor will not know the identity of who was communicating with the counsellor. This was done to maintain the privacy of respondents. The investigators explained the research process to the respondents and provided guidance books on the use of spiritual problem-solving web to students, respondents fill out informed consent through the web by choosing willing or unwilling choice.

The first step was session 1, pre-test by filling out assessment questionnaire links on the web. The second step was session 2, intervention with the web problem solving media using PowerPoint system and inspirational video which tells an inspiring story in the face of problems. The third step was session 3, two-way counselling with a counsellor. The fourth step was session 4, an evaluation.

A two-way solution was conducted with the counsellor and filling in the post-test by filling in from the web system. The evaluation was carried out 1 week after counselling. The time allotted for two-way counselling was 60-90 minutes. Counselling was done online based on the web. Respondents were not identified because they appeared on the web as a code to reduce stigma and students willing to seek mental health help through the web can get the problems solved.

Ethical clearance for this research was carried out at the ethics committee at the Faculty of Nursing, Airlangga University on December 9, 2019, with certificate number 1854-KEPK. Before the data collection, the respondents were given informed consent which indicated the purpose of the study, the potential benefits and harm of the research, and ensures their complete anonymity throughout the

research profess, and that they have the freedom to withdraw from the study at any time. After the informed consent distribution, the respondents were asked to sign it signifying the respondent's voluntary decision to be part of the study. The researcher addressed issues such as confidentiality, anonymity, and privacy. Further, the completed questionnaires are stored on the web and can only be accessed by IT admins.

## RESULTS

Based on Table 1, some college students at Surakarta Health College had a positive risk of suicide (n = 59, 16%). The response rate was 85%. For the positive risk group totaling 59 college students, the majority of respondents were women (93.2%), at the second semester (first-year students; 37.3%), aged 20 years old, (27.1%), having physical or sexual abuse experience (3.4%), and preferring to keep their problem alone (45.8%).

Based on Table 2 and on the indicators of risk of suicide, there is a change for the better, the majority think that the desire to try suicide is a pre-test, the mind only passes it to be better during the post-test, that is, there is never any thoughts of suicide, for the frequency of suicidal thoughts in the pre-test year, the majority is rare (1 time) to change for the better during the post-test, namely never.

Based on Table 3, the study found a high risk of suicide pre-test 98.3% to 40.7%. This shows that after being given a web-based problem-solving spiritual intervention the risk of suicide has decreased. The results of the study were carried out by the Wilcoxon test because the data were not normally distributed, the Wilcoxon test results were different or there was a significant effect between the risk of pre and post suicide carried out by web-based spiritual problem-solving interventions with a p-value of 0.000 (p < 0.05).

The Wilcoxon test results on the variable risk of suicide produced a Z-Value of -4,676 with p = 0.000. It shows the value of significance was lower than level of significance (a = 5% or 0.05). So, it can be concluded that there is a significant difference in the results of the risk of suicide at the pre-test and post-test. This means that there is an influence of web-based spiritual problem solving on the ability to prevent student suicide risk

## DISCUSSION

Based on the results of the screening the risk of suicide was measured using the SBQ-R, the positive prevalence of student suicide risk at the Surakarta Health College was 16% of the total respondents, with the highest demographic character in first-year students. They have a higher risk of suicide than those with second-year students or above because they are new students and are still in the transition period from late adolescence to early adulthood, learning methods that are different from high school education, greater responsibility, and the period of

Table 1. Respondents' Characteristics (N = 59)

| Characteristics | n | % |
|---|---|---|
| Semester | | |
| 2 | 22 | 37.3 |
| 4 | 9 | 15.3 |
| 6 | 21 | 35.6 |
| 8 | 7 | 11.9 |
| Age (years old) | | |
| 17 | 1 | 1.7 |
| 18 | 12 | 20.3 |
| 19 | 13 | 22.0 |
| 20 | 16 | 27.1 |
| 21 | 13 | 22.0 |
| 22 | 3 | 5.1 |
| 23 | 1 | 1.7 |
| Gender | | |
| Male | 4 | 6.8 |
| Women | 55 | 93.2 |
| Response to problems | | |
| Talk to friends | 21 | 35.6 |
| Keep it alone | 27 | 45.8 |
| Talk to family | 1 | 1.7 |
| Talk to friends & kept alone | 2 | 3,4 |
| Talk to friends & family | 2 | 3,4 |
| Keep alone, talk to friends & family | 4 | 6.8 |
| History of Physical/Sexual Violence | | |
| Yes | 2 | 3,4 |
| Not | 57 | 96.6 |

adaptation to lectures cause them to have higher stress levels. Meanwhile, the students above are stronger because they have adapted and are psychologically mature. Even though the positive number is only 16%, it is very important to note because it can have serious consequences for them.

Research results from Lu, Bian, and Song (2015) explains that mental health problems such as anxiety, depression and suicidal thoughts often occur in new students (Pieter & Lubis, 2017). The psychological hazards in early adulthood, both personally and socially, stems from a failure in development that leaves them immature compared to other adults. Some of the factors that hinder this development include physical health barriers, parents who are overprotective of their children, and the influence of associations or peers.

The age range of college students who were positive for the risk of suicide was 17-23 years and most occurred at the age of 20 years. This contradicts the theory of Yusuf, Fitriyasari, R, and Nihayati (2015), that the risk factors for suicide in adolescents and those aged up to 45 years have a higher risk than those aged 25-45 years and 12 years. Today's young adult groups face greater challenges than the previous era, this is due to the very rapid development of science and technology, one of which is social media, which can influence their attitudes and behaviour, including suicidal behaviour. Putri (2018), Dr. Nova Riyanti Yusuf, SpKj from the association of Indonesian Psychiatrists (PDSKJI) Jakarta said that social media is one of the

Table 2. The Pre and Post-Test Suicide Risk Scores

| Indicator | Pre-test | | Post-test | |
|---|---|---|---|---|
| | **n** | **%** | **n** | **%** |
| Thinking of trying to kill yourself | | | | |
| Never | 0 | 0.0 | 17 | 28.8 |
| Only thoughts pass by | 39 | 66.1 | 32 | 54.2 |
| Have a plan | 18 | 30.5 | 8 | 13.6 |
| Has attempted suicide | 2 | 3,4 | 2 | 3,4 |
| Frequency of suicidal thoughts in a year | | | | |
| Never | 2 | 3,4 | 19 | 32.2 |
| Rarely (1x) | 28 | 47.5 | 22 | 37.3 |
| Sometimes (2x) | 19 | 32.2 | 13 | 22.0 |
| Often (3-4x) | 4 | 6.8 | 3 | 5.1 |
| Very often (≥ 5x) | 6 | 10.2 | 2 | 3,4 |
| Have told someone else that you wanted to kill yourself | | | | |
| None | 34 | 57.6 | 38 | 64.4 |
| Yes, at one time | 21 | 35.6 | 20 | 33.9 |
| Yes, more than 1x | 4 | 6.8 | 1 | 1.7 |
| How big will it be to try to kill yourself one day | | | | |
| Never | 5 | 8.5 | 31 | 52.5 |
| No way at all | 7 | 11.9 | 6 | 10.2 |
| More than impossible | 6 | 10.2 | 3 | 5.1 |
| Impossible | 28 | 47.5 | 9 | 15.3 |
| Maybe | 1 | 18.6 | 0 | 15.3 |
| More than possible | 1 | 1.7 | 1 | 0.0 |
| Very likely | 1 | 1.7 | 1 | 1.7 |

Table 3. Wilcoxon Test Statistics for Student Suicide Risk (N = 59)

| Suicide Risk | Pre-test | | Post-test | |
|---|---|---|---|---|
| | **n** | **%** | **n** | **%** |
| Low | 1 | 1.7 | 35 | 59.3 |
| High | 58 | 98.3 | 24 | 40.7 |
| | z-value | | p-value | |
| | -4,676 | | 0.000 | |

factors that trigger a person to commit suicide. Ages 16-24 years have a higher risk of suicide. The suicide rate is directly proportional to the increase in age, and increases at a young age, namely 15-24 years (Riyadi, 2004). It is strengthened by research from Kementerian Kesehatan Republik Indonesia, (2019), which states that suicide is currently the second leading cause of death in adolescents and young adults aged 15-29 years.

The research findings reveal that the majority of students prefer to keep their problems to themselves, and some of them have a history of physical/sexual violence. Student who prefers to keep their problems alone, tends to be introverted, and has physical/sexual abuse traumas, has a higher chance of mental health disorders, to the point that it can result in a person at risk of suicide because a history of physical/sexual violence will result in trauma and affect psychological resilience in dealing with problems. If someone has a problem and feels unable to face it and does not ask for advice, solutions, or motivation from other people, it will add to a heavier burden. If this condition is not addressed, it will cause suicidal thoughts. Humans are created as social beings and need the attention and support of others when facing problems. Alternative solutions and motivation are needed so

that he does not feel alone but has attention and help from others in solving/facing life's problems.

Baertschi, Costanza, and Conuto (2018) described personality as a potential determinant of suicidal ideation and attempts. Yusuf, Fitriyasari, and Nihayati (2015) explained that several factors cause suicide, one of which is behaviour and personality disorders. There are four aspects of a closed personality associated with an increased risk of suicide, namely hostility, impulsivity, depression, and hopelessness.

The results of the study found that most of the students attempted suicide, namely passing thoughts with a rare frequency. Suicide is an act that is prohibited by all religions so that the desire to try suicide that comes to students' minds will decrease when they remember God and will appear again when they feel unable to face the problem at hand. The factor of close people or loved ones also plays a role in reducing suicidal thoughts/desires. But what needs to be watched out for is that a history of suicidal thoughts can recur or come back if you do not have the knowledge and skills of problem-solving as well as good coping mechanisms. Spirituality is a tendency to create meaning in life through intrapersonal and transpersonal relationships in overcoming life's problems (Yusuf et

al., 2017). Shinde and Wagani (2019) explained that thoughts or attempts to commit suicide that have occurred will be the most significant risk factor for the occurrence of repetition of actions in the future, so it is very important to screen students for suicide risk to identify quickly so that efforts can be made to prevent suicide risk as early as possible for students.

The results of pre-test research is that the risk of suicide is high. This is because they do not have problem-solving skills. Research Mcauliffe, Mcleavey, and Fitzgerald (2014) explained that problem-solving skills training provided significant psychological and social improvements and showed a positive treatment effect in the self-harm group. Problem solving training has a positive impact and is proven worthy of self-harm therapy, quality of life and depression (Perry et al., 2019). Social problem-solving therapy was found to provide an additional percent of the variance in Non Suicidal Self Injury (NSSI) predictions (Lucas et al., 2019). Supported by the results of the Lutz et al. (2020), the research study found that problem solving therapy as a psychotherapy intervention reduces the risk of suicide in adults and anxiety disorders. Breitborde, Wastler, Pine, & Moe's (2021) study showed that improved social problem-solving skills may facilitate suicide reduction.

After conducting spiritual problem-solving interventions via the web, it is found that there is a decreased risk of suicide. Screening found an increase in the number of respondents who said they "never thought about trying to kill themselves". The number of suicidal thoughts in the year saying "never" increased. The majority of students said that they "do not speak of suicidal thoughts to others," and will never attempt suicide again. Spiritual problem-solving interventions via the web provide high motivation to make changes to themselves for the better and have a more adaptive coping mechanism and find ways to solve the problems faced appropriately according to the demands and desires of current students. Motivation is an active impulse so that there is a change in energy in humans that moves to achieve goals or needs. Motivation has a function as a driving force and driving behaviour (Candra et al., 2017). Motivation and learning are two inseparable things. Learning something based on strong motivation will give good results, as it is known learning is the process of acquiring various skills, skills, and attitudes, and learning brings about behaviour change (Muhammad, 2017). In addition to motivation problem-solving skills are also needed. Research from Sarkisian, Van Hulle, & Goldsmith (2021) found that problem solving research in children was significantly meaningful with the risk of suicidal thoughts. Such problem-solving therapies can improve the prediction and treatment of suicidal ideation in adolescents.

In the results of the evaluation in the counselling session via the web, the respondents said that they prefer web-based interventions because their identity is unknown, they are more flexible in conveying problems, are not ashamed, and can facilitate students who have introverted personalities or have difficulty communicating directly. Intervention conventionally has a weak side, namely the presence of stigma that reduces the interest of respondents to seek solutions to problems/solutions to professionals, so that an alternative solution to problems through web applications is needed. Web applications have the advantage of being more efficient in time, place, and cost. The results of this study are consistent with other studies, namely research Luca, Lytle, and Yan (2019), students prefer to seek mental health assistance online, this type of intervention could be beneficial for students who need services who are afraid to visit mental health centres on campus because of the stigma. An effective way to reduce student distress, and the presence of suicidal thoughts, with a combination of online and conventional services, can be provided. Research from Ballesteros and Hilliard (2016) explained that online counselling has a significant relationship with self-stigma. Problem-solving skills have resulted in systems that are now suitable for chronic mental disorder management, problem solving using technologies such as an application whose operation has more privacy and confidentiality of all information stored in the application, and users can anonymize their identity. Troubleshooting using smartphone apps with self-harm prevention management (Hatcher et al., 2020).

## CONCLUSION

Web-Based Spiritual Problem Solving has been shown to be effective in reducing college students' suicide risk. The interventions were delivered via the web using PowerPoints, inspirational videos, and counselling. It can be used 24 hours and specifically for counselling, two-way communication on the web, and privacy is maintained because of a hidden identity. It is hoped that the researchers will further develop web-based interventions in the prevention of suicide risk in the campus environment.

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## Original Research

# The Effect of Thinking Like a Nurse Simulation as an Online Clinical Learning Method on Nursing Students' Satisfaction and Confidence during the Covid-19 Pandemic

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**ABSTRACT**

**Introduction:** Corona Virus Disease (Covid-19) was declared as a pandemic by the World Health Organization (WHO) resulting in changes in existing patterns of life. This impact also affects the world of education, including nursing vocational education. Nursing vocational education must be able to design online methods for the clinical competency with existing facilities and infrastructure. The online clinical method can describe the achievements achievable in clinical facilities so as to build students' satisfaction and confidence.

**Methods:** This research used quasi-experimental pre-posttest without control group method by providing clinical learning thinking like a nurse simulation. The research sample consists of 110 diploma students with purposive sampling method. Simulation focuses on clinical judgment, communication skills, and skill simulations by adopting clinical practice in hospitals. Assessment is measured using Simulation Design Scale (SDS) and Student Satisfaction and Self-Confidence in Learning Scale (SCLS). Pair t test with level of significance 0.05 is used to process data.

**Results:** It is found that there is an increase in students' satisfaction and confidence using the clinical simulation method of "thinking like a nurse" having an average 40.69%. Meanwhile, online clinical learning methods has an average increase of 114%. There is an effect of thinking like a nurse simulation method on students' satisfaction and self-confidence (p < 0.05).

**Conclusion:** This research is recommended to add to the reference for online nursing clinical learning methods during Covid-19. Determining the ratio between students and lecturers in online clinic learning can be considered for further research.

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## INTRODUCTION

The determination of the status of Covid-19 spread as a pandemic on 11 March 11 by the World Health Organization (WHO) resulted in all learning activities turned online. The Decree of the Minister of Education and Culture through a circular number 4 of 2020 gave an order to carry out the learning and teaching process from home starting from 24 March, 2020 to reduce the acceleration of the spread of the Covid-19 virus.

All educational institutions were forced to adapt very quickly. The learning and teaching process from home had to be carried out immediately to achieve the students' competencies. Simple online methods, such as through chat, voice record, video record, online meeting applications, email, to learning via web were specially designed by educational institutions. All institutions thought hard to be able to provide effective online learning for their students, including educational institutions with diploma nursing program (Al-Balas et al., 2020).

Educational institutions can no longer send students to gain learning experiences through clinical practices since the emergence of Covid-19. However, the closure of these educational practices cannot stop the teaching and learning process. It is not easy to transform learning at clinical institutions into an

online effort, so preparation is required to design appropriate methods so that clinical learning outcomes in knowledge and skills can still be achieved (De Metz & Bezuidenhout, 2018)

The three main competencies obtained from learning methods at clinical institutions are the ability of students to carry out clinical judgments, communication skills, and nursing procedure skills. Learning methods that are carried out online must be done through very well-made simulations so that they are representative to achieve nursing knowledge and clinical judgment (Letcher, Roth, & Varenhorst, 2017). Clinical judgment is the key to caring and decision-making for intervention on patients based on existing assessments and data, (Yuan, Williams, & Man, 2014), and reduced evidence-based experience in conducting clinical judgment can cause students to lack critical skills in nursing process and real problem solving for patients (Konrad, Fitzgerald, & Deckers, 2020a).

Online clinical learning has been carried out and evaluated in clinical courses in the even semester 2019/2020. The method used is to provide cases, group discussion, online case presentations, and videos on nursing action procedures. This method is not sufficiently representative of students who do not acquire experience doing clinical judgment, communication skills, and nursing procedure skills. Unrepresentative methods of learning have an impact on students' satisfaction and self-confidence. Some issues that make online learning dissatisfied are less time to practice procedural skills, numerous tasks, insufficient group discussions, technical learning, and network problems (Shih, Chen, Chen, & Wey, 2013a). Dissatisfaction may produce anxiety in students and cause them to doubt their abilities, causing further impact, namely from decreased academic achievement to student retention (Abdous, 2019). Confidence is very important for all individuals since it affects the performance of the work done and the results of the work. Therefore, it is very important to build nurses' confidence with effective online learning methods so that they have satisfaction with the clinical learning process that is carried out online.

Based on this description, the researchers develop a "thinking like a nurse" method adapted and modified based on the clinical judgment for the nurse learning model (Tanner, 2006). The process shall have three main stages to train skills in conducting clinical judgment, namely noticing, interpreting and response, and reflection. (Tanner, 2006). Noticing is the first stage; the lecturers provide simple cases and students are trained to complete the assessment and the necessary supporting data, as if the student met a new patient at the hospital. In this phase, the students are triggered to think critically about the data that must be studied, diagnostic data on supporting patients, and a flow of thinking on the reason why the data are needed to be completed. The interpreting stage is the stage where students are able to interpret the data obtained through the noticing stage; making diagnosis and designing the interventions to be

carried out and knowing the rationality of implementing these interventions. The responding stage is carried out where students evaluate the actions taken. In this method, researchers include the process of communication and nursing procedure skills while students will be trained to think critically in overcoming patient problems according to their developmental conditions; besides that, students will also be trained to carry out activities in the nursing room such as handover, Situation, Background, Assessment, Recommendation (SBAR), pre-conference, and post-conference. A self-reflection process carried out in the learning process will help students understand learning outcomes; the reflection process carried out will also increase professional development, personal growth, empowerment, and facilitated learning This research is expected to produce appropriate online clinical learning methods and to increase students' satisfaction and confidence. The result of this study can be used as a reference for online nursing clinical learning methods during Covid-19.

## MATERIALS AND METHODS

The method used in this study is a "quasi-experimental pre-posttest without control group" using statistical tests with paired t-test. The sampling technique uses a non-probability sampling with a purposive sampling method with a sample size of 110 students with the inclusion criteria of students who attended mental and maternity clinical lectures with a supervisor who is a member of the research team and the sampling process was carried out for five days for each class with lectures fully accompanied for two sessions and two session student group discussions. Independent variable in this research is online clinical method. The Simulation Design Scale (SDS) instrument by Jeffries and Rizzolo (2006) with Cronbach's alpha 0.96 was used to assess the method using questionnaires assessed using a Likert scale of 1-5. The dependent variable of this research is satisfaction and self-confidence. The instrument used, namely the questionnaire, is the Student Satisfaction Self-Confidence in Learning Scale (SCLS) by Jeffries and Rizzolo (2006) with a Cronbach's alpha value of 0.94. The satisfaction assessment component consists of satisfaction on the learning method, the variety of materials provided, the facilities in the processes of learning, motivation, and suitability of the simulation process with the competencies to be achieved (Jeffries & Rizzolo, 2006). In measuring satisfaction and self-confidence, the researchers use the concept put forward by Jeffries and Rizzolo (2006). Self-confidence is assessed through the aspects of mastery of the material provided, the need for the material presented, the availability of learning resources, and a place to look for learning sources, both sources for questions and sources of reference.

The first stage of research implementation is to conduct a literature study and identification of research problems. The second stage is a pre-test to measure the level of satisfaction and self-confidence and an assessment of the design of the simulation method used

Table 1. Stages of Implementing Online "Thinking Like Nurse" Clinical Learning Method

| Stages | Lecturers' Activities | Students' Activities |
| --- | --- | --- |
| Explanation of learning methods | Explains the clinical learning process using the "Thinking like a nurse" simulation | |
| *Clinical Judgment: Noticing* (Days 1-3) | Determination work schedule groups - morning and evening<br>Shares medical records (simulations) and formulas to use<br>Divides trigger cases (cases will be provided on the first day and changes in the patient's condition will be given on the following day until the patient is discharged).<br>Patients are treated for 3 days<br>Day 1- Simulation: asks questions<br>  1. Which follow-up studies should be done?<br>  2. Why are they done?<br>  3. What diagnostic tests should be done?<br>  4. What is the purpose of the examination?<br>Day 2- the simulation provides the progress of the case.<br>Simulation with questions:<br>  1. What causes the change in the patient's condition?<br>  2. Describe any further assessments to carry out<br>Day 3 - simulated patient preparation for discharge.<br>  1. What are the discharge preparations made by the nurse for the patient?<br>  2. What is the rationale for such preparation?<br>  3. What forms should the nurse prepare? | Have discussion on the cases acquired<br>Pre-conference<br>*Hand over*<br>Fills in the assessment; Fills in the Initial patient's assesment form to the ward (day 1)<br>Carries out further assessment (day 2)<br>Prepares the patient to return home (day 3)<br>Performs self-reflection |
| *Clinical Judgment: Interpreting* (Days 2 and 3) | Simulation: through questions<br>  1. What are the characteristic limitations of the diagnosis offered?<br>  2. Which is the priority problem?<br>Simulation: through questions<br>  1. Why are there such planning and outcome criteria? | Enforcing Nursing Diagnosis<br>Performs self-reflection<br><br><br>Making plans and criteria for nursing care outcomes<br>Performs self-reflection |
| *Clinical Judgment: Responding* (Days 2 and 3) | Simulation (discussion on zoomeeting)<br>  1. Lecturers provide the results of nursing actions taken by students<br>  2. The lecturer provides an overview of the patient's condition after the intervention<br>  3. The Lecture provide advices for student about Nursing care delivered, SBAR hand over, and documentation.<br><br><br><br><br><br><br>Simulation: through questions<br>  1. What Should you do if the next condition of patient ......? (lecture explain progress patient condition)<br>  2. Which your next priority implementation for patient? | 1. Carrying out the actions to be performed in accordance with the action documentation planning on the documentation sheet.<br>2. Situation, Background, Assesment, Recommendation (SBAR) exercise<br>3. Communications<br>4. Performs self-reflection<br>5. Creating documentation of nursing actions<br>6. Filling out the Integrated patient progress notes form (documentation)<br>7. Handover exercise<br>Making plans and criteria for next nursing care outcomes |
| *Reflecting* (Day 3) | Simulation (discussion on zoomeeting)<br>Lecture Motivates self-reflection by asking question about students understand learning outcomes; the reflection process carried out.<br>Simulation: through questions<br>  1. What the lesson learnt today?<br>  2. How the feeling?<br>  3. What the learning outcone you can get today?<br>  4. What should you improve for your self? | 1. Self-reflection (while treating patients from admission to discharge)<br>2. post-conference<br>Making Self Reflection |
| *Communication and nursing procedure skills* (Days 4 to 5) | Provides nursing procedures that will be trained in accordance with the agreement on the discussion of responding implementation<br>divide nurse-patient | 1. Creates patient-nurse scenarios for cases that have been created for 3 days.<br>2. Performs self-reflection |

by students who have participated in online clinical learning without the "thinking like a nurse" method followed by the provision of the "thinking like a nurse" simulation method and the third stage carries out a post-test to measure the level of satisfaction and self-confidence of students and an assessment of "thinking like a nurse" learning method with the activities as provided in Table 1 - stages of implementing online the "thinking like a nurse" clinical learning method.

This study has passed the ethical test by the Health Research Ethics Commission of the Faculty of Nursing, the Airlangga University, number 2118-KEPK. Data were collected through questionnaires and did not cause any harm to the respondents. Ethical requirements and respondent rights have been fulfilled throughout the research process.

## RESULTS

The results of satisfaction and self-confidence assessment (Table 2) show that the mean value before the intervention is 37.28 with a median value of 27.50. Meanwhile, the mean satisfaction and self-confidence of respondents after the intervention is 52.45 with a median value of 52. The table above also illustrates that there is a difference of 15.17 in the mean before and after intervention with a mean

increase of 40.69%. Hence, it can be concluded that there is a difference in the mean and an increase in the mean of the respondents' satisfaction and confidence before the intervention and after the intervention.

Based on table 3, it is found that the mean of the respondents' online clinical learning method before the intervention is 37.58 with a median value of 27.50. Meanwhile, the mean of clinical learning method by respondents after intervention is 80.46 with a median value of 80. Hence, it can be concluded that there is a difference in the average online clinical learning method before the intervention and after the intervention. The table above also illustrates that there is a difference of 52.9 in the mean before and after with a mean increase of 114%. Hence, it can be concluded that there is a difference in the mean and an increase in the mean of the respondents' satisfaction and confidence before the intervention and after the intervention.

In examining the effect of providing online clinical learning methods with the "thinking like a nurse" method, it was found the students' average satisfaction and self-confidence before and after the effect of providing online clinical learning methods with the "thinking like a nurse" method on students' satisfaction and self-confidence is 15.16, and the difference between these differences is between

Table 2. Average Satisfaction and Confidence Before and After the Intervention (N=110)

| Variables | Mean | Median | SD | Min-Max | Mean Difference | 95% CI | Average increase percentage (%) |
|---|---|---|---|---|---|---|---|
| Satisfaction and Confidence before Intervention | 37.28 | 27.50 | 12.3 | 26-52 | | 0.41-0.59 | 40.69 |
| | | | | | 15.17 | | |
| Satisfaction and Confidence after Intervention | 52.45 | 52.00 | 5.2 | 38-65 | | 0.62-0.80 | |

Table 3. Average Online Clinical Learning Methods Before and After Intervention (N=110)

| Variables | Mean | Median | SD | Min-Max | Mean Difference | 95% CI | Average increase percentage |
|---|---|---|---|---|---|---|---|
| Online Clinical Learning Methods before Intervention | 37.58 | 27.50 | 12.8 | 26-52 | | 0.38-0.57 | 114 |
| | | | | | 52.9 | | |
| Online Clinical Learning Methods after Intervention | 80.47 | 80 | 6.7 | 61-100 | | 0.61-0.79 | |

Table 4. The effect of providing Online Clinical Learning Methods with "thinking like a nurse" Method on Students' Satisfaction and Self-confidence (N=110)

| Variables | Mean | SD | SE | 95% CI | | P Value |
|---|---|---|---|---|---|---|
| | | | | Lower | Upper | |
| Respondents' satisfaction and confidence before and after the intervention | 15.16 | 13.07 | 1.246 | 12.70 | 17.63 | <0.000 |

Table 5 .The Effect of Giving the "thinking like a nurse" Simulation Method on Online Clinical Learning Methods (N=110)

| Variables | Mean | SD | SE | 95% CI | | P Value |
|---|---|---|---|---|---|---|
| | | | | Lower | Upper | |
| Respondents' online learning methods before and after the intervention | 42.9 | 14.03 | 1.345 | 40.24 | 45.54 | <0.000 |

17.63 and 12.70 (95% confidence interval of the lower and upper differences), Sig (2-tailed) of <0.000. Hence, it can be concluded that there is a mean difference in students' satisfaction and confidence between before and after the "thinking like a nurse" simulation; therefore, there is an effect of the "thinking like a nurse" simulation method on students' satisfaction and self-confidence.

Based on Table 5, the results show that the average online clinical learning method for students before and after the "thinking like a nurse" simulation is 42.9, and the difference between these differences is between 45.54 and 40.24 (95% confidence interval of the lower and upper differences), Sig (2-tailed) of <0.000. Hence, it can be concluded that there is an average difference between the online clinical learning method for students before and after the "thinking like a nurse" simulation; therefore, there is an effect of the "thinking like a nurse" simulation method on the online clinical learning method.

## DISCUSSION

The "thinking like a nurse" method is a design adapted from Tanner (2006) and Konrad, Fitzgerald, and Deckers (2020). The stages of this online method are divided into three, namely Clinical Judgment, Communication, and Procedure Skills Simulation. This method is designed since, based on Adam (2015), the clinical online learning method must cover three cognitive aspects (knowledge, comprehension, critical thinking), psychomotor (skill development), and affective (emotional & behavioral response) (Adams, 2015). This method is designed as an effort to respond to the Covid-19 pandemic which makes nursing students unable to practice in hospitals. For the first semester during the Covid-19 pandemic and before the application of this clinical method, online clinical activities were carried out with case provision in which students were asked to produce preliminary reports on three-day nursing care and presentation of the case and continuing with cases' question and answer sessions. Through the method, students only reached satisfaction and confidence with a mean of 37.28 with a mean value of the online clinical learning method used before the intervention of 37.58. The interaction of the old method is less interaction between lecturer and student, and the method cannot describe the situation in the hospital.

Student satisfaction and confidence are low due to the learning process, which is not optimal for presenting clinical learning experiences conducted online. The procedure performed is still oriented toward training students to be able to provide nursing care; but is not yet at the application of simulation stage and, with this method, students only gain knowledge without any clinical learning experiences such as communicating with patients or simulating nursing actions. This is in line with the results of research conducted by Al-Balas et al. (2020) saying that the clinical medical practice

method during a pandemic must include three aspects, namely knowledge, nursing care practice, and representative experience in caring for patients performed online by simulating nursing actions (Al-Balas et al., 2020). The results of research by McGann et al. (2020) state that the online clinical method will be effective if it is not only in the form of knowledge on nursing care, but when it is followed by providing feedback on simulated procedures, providing videos, and practicing communication with patients, and by so doing can increase self-confidence of the students (McGann et al., 2020).

Another study states that students' dissatisfaction in learning is due to anxiety on seven things felt by students, namely unclear online learning technique mechanisms, the absence of face-to-face session, high risk of distraction to social media during online learning, minimum feedback, unsupportive online learning environment, and the absence of interaction with friends such as in the classroom (Abdous, 2019). The research results of Chen et al. (2013) show several issues that cause dissatisfaction in online learning, i.e., less time to practice procedural skills, abundance of tasks, insufficient group discussions, technical learning, and network problems (Shih et al., 2013b). In the previous method, students only work on the given cases, make a path of flow, and ask and answer questions on nursing care provided; students could not see changes in the patients' condition such as students caring for patients in the ward.

After the intervention using the "thinking like a nurse" method adapted and modified from Tanner (2006) and Konrad, Fitzgerald, and Deckers (2020) in five days as an online clinical learning method, the average students' satisfaction and confidence increase to 52.45 with an increase of 40.69% from the condition before the intervention (Konrad et al., 2020a; Tanner, 2006). Likewise, the mean value for the online clinical learning method used after the intervention is 80.47; this value increases 114% from the previous method. This is because the "thinking like a nurse" method provides students with experiences on caring for patients, but it is done online. The noticing stage is the first stage in the clinical judgment process. Lecturers provide simple cases and students are trained to complete the assessment and the necessary supporting data, as if the student met a new patient at the hospital. In this phase, the students are triggered to think critically about the data that must be studied, diagnostic data on supporting patients, and a flow of thinking on the reason why the data are needed to be completed. The management of trigger cases by students is the key to optimal online learning processes (Konrad et al., 2020b; Kyrkjebø, 2006). Learning feedback is immediately provided by the lecturer after students complete the data to know whether the assessment data really needs to be studied before the students make diagnosis. The lecturer also provides the results of the assessment completed on the patient. The focus of the first day on this assessment provides clarity to students on the competencies in nursing assessment

skills. This is consistent with a research from Kim et. al. (2020) that giving the right feedback will increase students' confidence during online learning.

The interpreting stage is the stage where students are able to interpret the data obtained through the noticing stage, making diagnosis and designing the interventions to be carried out and knowing the rationality of implementing these interventions. Lecturers discuss the rationality of diagnosis and planning. In the third stage, the responding stage is carried out where students evaluate the actions taken. The three stages of clinical judgment, namely noticing, interpreting, and responding, are carried out by the interaction of lecturers and students for three days and performed in stages. In each learning process, the lecturer provides feedbacks and triggers for students to think critically. Through this method, students know whether each stage of the nursing care that they make is appropriate or not, and know the rationale for each action. Feedback obtained after each process is the interaction between students and lecturers; this can increase satisfaction and the method becomes more effective because one of the reasons for dissatisfaction with online learning is the lack of interaction with lecturers and students (D'Aquila, Wang, & Mattia, 2019; De Metz & Bezuidenhout, 2018; Singh et al., 2021)

The nursing care given every day is made based on the development or changes in the patient's condition provided by the lecturer as a trigger for nursing care for the next day. Therefore, students are continuously trained to think critically in designing nursing care such as in clinical practice. This is in accordance with the good learning components according to Jeffries and Rizollo (2006), including competence (objectives, material preparation, trigger cases), support (learning resources; motivation provided by the lecturer), problem solving (opportunities to ask questions, ease of finding sources to solve problems), feedback (providing constructive feedback, and self-reflection processes), and accuracy (accuracy with real life conditions) (Jeffries & Rizolo, 2006). This method is also a student-centered clinical learning method that can increase student satisfaction and confidence when the process is able to motivate, the presence of lecturers for interaction and collaboration with students, clear learning activities, and students understand the right goals, competencies, and deadlines (Tartavulea, Albu, Albu, Petre, & Dieaconescu Silvia, 2020).

In the second stage of the "thinking like a nurse" method after clinical judgment, namely communication skills, students will be trained to do handover and patient process reports to doctors using SBAR either during handover or on the phone. Students practice handover with other students for managed cases. The supervisor observes the handover process carried out by the students; the components mentioned are the completeness of the data being transferred and the next action to be taken. Input is also provided by peers between groups. This stage is carried out because, according to O'Neil,

Fisher, Rietschel, and Fisher (2018), three principles that must be fulfilled in online learning are easy to access, easy to navigate, and easy to interact with others. It is also stated that communication is the core of online learning because it is with this communication that interactions will be built between students and students, student and lecturers, and students with trigger cases on learning (O'Neil, Fisher, Rietschel, & Fisher, 2018). Increasing interaction and communication in learning will increase discipline, independent learning ability, self-motivation, level of participation, time management and being active in learning (Reinckens, Philipsen, & Murray, 2014).

The third stage consists of students performing peer-to-peer simulation and practicing selected actions for one of the diagnoses. This action is performed online by students. Actions taken to be simulated are assessment, education, or independent nursing actions. The simulation of providing education to fellow students with the patient nurse scenario is the most effective online clinical action simulation method (Rodríguez, Navarro, Pino, & Maroto, 2020). Simulations of nursing actions with scenarios that are played online are parts of the student-centered learning method and are able to increase students' satisfaction and self-confidence (Englund, Olofsson, & Price, 2017). In this stage, the lecturer also provides videos of nursing procedures that are not possible to be performed by online role play. All actions taken are documented in a simulated medical record prepared and designed in accordance with the standards of teaching hospitals commonly used as practice venues.

These three stages produce average increase in students' satisfaction and confidence. In this clinical learning method, students are motivated to carry out nursing care according to the patient's development, perform communication for nurse-nurse and nurse-patient, and are trained to foster a sense of caring and empathy in caring for patients. Soundy et al. (2021) state that there are three aspects that students must be trained in in order to increase self-confidence in caring for patients, namely the experience of patient nurse interaction, patient empowerment, and training in caring and empathy (Soundy et al., 2021). The same thing is revealed in the study that self-confidence in learning is influenced by eight factors, namely mastery or understanding of certain materials or expertise, materials according to needs, increased psychomotor abilities, availability of reference sources, and the ability to solve existing problems (Franklin, Burns, & Lee, 2014). Clear and continuous feedback can increase satisfaction and self-confidence so that individuals will be able to perform cognitive functions to seek efforts to move closer to goals through various ways and be able to set specific goals for themselves with self-regulation abilities (Luthans, 2007).

Every day, at the end of an online work meeting, students reflect themselves on clinical learning activities. It is designed to increase students'

satisfaction and confidence. The self-reflection process carried out in the learning process will help students understand learning outcomes; it will also increase professional development, personal growth, empowerment, and facilitated learning (Langley & Brown, 2010). Good understanding of learning outcomes by students through self-reflection prevents them from experiencing helplessness, burnout, and burdens (Suliman, Abu-Moghli, Khalaf, Zumot, & Nabolsi, 2021). This learning method also enhances the role of the lecturers as facilitator; the lecturers are in charge of not only providing trigger cases, but also listening to the results of solving cases by students on the last day. In this method, the lecturers understand and participate in online clinical learning interactions. This becomes one of the reasons for students' satisfaction and confidence since they know where to ask and are trained to think critically. Schroeder, Shogren, and Terras (2020) state that online students need instructors to provide personal presence, by being engaging, approachable, understandable, patient, and passionate about the subject. This method does not only focus on students processing cases with a nursing care approach, but also on the interaction between lecturers and students (Schroeder, Shogren, & Terras, 2020). The limitation of this research is that it hasn't considered yet the ratio of students and lecturers based on the ratio on clinical setting; nevertheless, the number of students is divided into several small groups in team teaching.

## CONCLUSION

Based on this research, it can be concluded that the provision of the online clinical learning method of "thinking like a nurse" has an influence on students' satisfaction and self-confidence. This method is designed with the urgency of the impact of Covid-19 causing students to be unable to do clinical practices in hospitals. This design provides a student clinical learning experience, such as learning in a hospital, where students manage patients through nursing care for five days until the patient is discharged. This design is also developed for students to maintain communication skills and nursing procedures, as well as interactions between patient-nurses and nurses-peers. From this method, they learnt three aspects that students must be trained in in order to increase self-confidence in caring for patients, namely the experience of patient nurse interaction, patient empowerment, and training in caring and empathy (Soundy et al., 2021). This method is designed to achieve the clinical online learning method criteria which must cover three cognitive aspects (knowledge, comprehension, critical thinking), psychomotor (skill development), and affective (emotional & behavioral response) (Adams, 2015).

This research is expected to be able to provide a reference contribution to nursing vocational education to develop online clinical learning methods. This method is also expected to be adopted by nursing vocational education institutions in achieving clinical learning competence. The "thinking like a nurse" method can anticipate changes in hospital practice regulations that have re-accepted students in a limited number, so that it can be used as blended learning. This method also needs to be re-developed by taking into account the number of students and the number of lecturers to get a more optimal process. This research is recommended to determine the ratio between students and lecturers in online clinic learning and can be considered for further research.

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Jurnal Ners

Original Research

# Empowering Health Cadres on Nutrition Education for Pregnant Women in Industrial Areas during the Pandemic

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## ABSTRACT

**Introduction:** Pregnant women living in industrial areas are exposed to higher levels of toxic substances, pollutants, and other chemicals; this is exacerbated by the pandemic conditions. Improving the nutritional status of pregnant women can be pursued through nutritional education for pregnant women. This study aimed to determine the differences in nutrition fulfilment patterns of pregnant women, before and after nutrition education.

**Methods:** This study used quasi-experimental research with a one group pre post-test design. The samples were 51 pregnant women in industrial areas. Treatment in this study was nutrition education by empowering health cadres. The instrument of this research is an observation sheet that has been tested for validity and reliability. Data analysis used a statistical paired t-test.

**Results:** Knowledge of pregnant women increased by 5.21% after treatment, and behaviour increased by 5.2%. The t-test showed that the the nutrition education model for pregnant women in industrial areas could significantly increase the knowledge (p-value = 0.000) and improve the behaviour (p-value = 0.000) of pregnant women.

**Conclusion:** Nutrition education for pregnant women provided by health cadres is proven to increase knowledge of pregnant women about nutrition and behaviour of fulfilling nutrition during pregnancy in a pandemic situation. During the pandemic, pregnant women can increase knowledge related to nutrition fulfilment through the assistance of health cadres without worrying about being exposed to viruses from care providers.

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## INTRODUCTION

A healthy and balanced diet is important in the lifecycle and during pregnancy. The mother's diet must provide sufficient energy and nutrition to meet the usual needs of the mother, as well as the needs of the growing foetus and allow the mother to maintain her own stores of nutrients necessary for the health of the foetus and infant and for the practice of breastfeeding during the puerperium (Fallah et al., 2013). Pregnant women are among the vulnerable population groups with a need to take additional protection against the COVID-19 outbreak (H. Liu et al., 2020).

The nutritional status of pregnant women is a concern of many countries in the world, this is related to the immunity of pregnant women in pandemic conditions (Amini et al., 2021; Whitaker et al., 2021). In Indonesia, the problem of fulfilling nutrition for pregnant women during the pandemic is also a major concern for the government in protecting pregnancy (Abadi & Putri, 2020; Soewondo et al., 2021).

In addition, the fulfilment of the nutritional needs of pregnant women during this pandemic is also influenced by the knowledge of pregnant women about nutrition (Darnton-Hill & Mkparu, 2015; Prado et al., 2012)

Pregnant women who have good knowledge about nutrition will try their best to meet their nutritional needs during pregnancy (Anwar et al., n.d.), (Shah et al., 2017). One of the efforts that can increase the knowledge of pregnant women about the fulfilment of their nutrition is through nutrition education (Hakim et al., 2014; Nimbalkar et al., 2017; Otoo & Adam, 2016).

During this pandemic, nutrition education for pregnant women cannot be carried out intensively by care providers because of restrictions to reduce the transmission rate of the coronavirus disease (Amini et al., 2021; N. Liu et al., 2009; Whitaker et al., 2021).

This study aims to increase the knowledge of pregnant women in industrial areas with an outreach approach by health cadres. It is hoped that even though this nutrition education is not provided directly by the care provider, pregnant women can still optimize the fulfilment of nutrition during pregnancy through nutrition education provided by health cadres in the village.

Pregnant women living in industrial areas are exposed to higher levels of toxic substances, pollutants, and other chemicals, this has been exacerbated by the pandemic conditions (Balabaeva et al., 1993). Exposure to industrial chemicals is associated with pregnancy outcomes, such as low birth weight (Lin et al., 2001; Phatrabuddha et al., 2013).

This is exacerbated because during this pandemic there are regulations limiting physical contact, especially with care providers. This contact restriction causes pregnant women to be limited in receiving knowledge related to pregnancy, including the problem of fulfilling nutrition during pregnancy.

Research conducted on working pregnant women showed that 76.5% had anaemia and 23.5% were not anaemic. In contrast to pregnant women who do not work, this is because pregnant women who work, especially in factories, have less free time that can be used to participate in health education (Purbadewi & Ulvie, 2013). The knowledge that pregnant women do not work has an effect on the lower incidence of anaemia in pregnant women compared to working mothers.

In the midst of a still threatening pandemic, the fulfilment of balanced nutrition is needed to maintain the immunity of pregnant women as well as the growth of the foetus. The problems encountered today are not a few pregnant women who are worried about contact with health workers; this is because they are worried about being exposed to the coronavirus. This phenomenon makes nutrition education during pregnant women also less well received by pregnant women. This study applies a nutrition education model for pregnant women by optimizing the role of health cadres in order to minimize the contact between pregnant women and health workers. It is expected that there will be changes in the fulfilment of nutrition patterns before and after the provision of education.

## MATERIALS AND METHODS

This study was conducted in a quasi-experimental one-group pre-post design. The population was 90 pregnant women in industrial areas. Purposive sampling was used to recruit the participants. The explanation of the terms and conditions of the study was given and informed consent for study participation was obtained. All respondents were assured of the voluntary and confidential nature of the study. A total of 51 pregnant women participated as respondents in this study. The criteria for respondents in this study were 1st trimester pregnant women who lived in industrial areas and also work as factory workers or factory office administrators and were willing to be observed during the study.

There were two kinds of instruments used in this study. To assess the nutritional status of pregnant women using analysis of anthropometric measurements of BMI, measurements of upper arm circumference and haemoglobin levels. Meanwhile, to assess the mother's knowledge about the fulfilment of maternal nutrition during pregnancy, a questionnaire instrument was used that has been tested for validity and reliability with Cronbach's alpha of 0.760, with a sensitivity ranging from 0.450 to 0.829. The questionnaire consists of 25 statements on a Likert scale that explores the mother's knowledge about the basic concepts of

Table 1. Characteristics of pregnant women in industrialized areas

| Variable | n | % |
|---|---|---|
| Age (year) | | |
| &lt; 21 | 8 | 16 |
| 21-35 | 41 | 80 |
| &gt;35 | 2 | 4 |
| Education | | |
| Elementary school | 6 | 12 |
| Junior high school | 5 | 10 |
| Senior high school | 31 | 60 |
| Higher education | 9 | 18 |
| Parity | | |
| Primi para | 20 | 40 |
| Multi para | 29 | 56 |
| Grande multi | 2 | 4 |
| Salary | | |
| Below USD 314 | 24 | 47 |
| Above USD 314 | 27 | 53 |

Table 2. The level of knowledge of pregnant women before and after treatment

| Knowledge | Before | | After | |
|---|---|---|---|---|
| | n | % | n | % |
| Poor | 18 | 35 | 0 | 0 |
| Satisfactory | 26 | 51 | 14 | 27 |
| Good | 7 | 14 | 37 | 73 |
| | | | p-value = 0.000 | |

Table 3. The behaviour of nutritional consumption in pregnant women before and after treatment

| Behaviour | Before | | After | |
|---|---|---|---|---|
| | n | % | n | % |
| Poor | 16 | 31 | 0 | 0 |
| Satisfactory | 20 | 39 | 11 | 22 |
| Good | 15 | 30 | 40 | 78 |
| | | | p-value = 0.000 | |

nutrition: what are the views of pregnant women about nutrition and pregnancy, food sources of nutrients, and how pregnant women improve nutrition during pregnancy.

The treatment in this study was the provision of nutrition education by health cadres. Health cadres, also known as village health promoters, are volunteers selected by the community and tasked with developing the community, usually dealing with health in the community. The health cadres that have been selected are given training beforehand on the fulfilment of nutrition for pregnant women by nutritionists and care providers at the community health centre. Cadres are provided with a guidebook for the fulfilment of nutrition for pregnant women, this includes food sources containing iron and how to process them. The guide is equipped with leaflets and nutrition booklets as media used by cadres for nutritional assistance. Assistance is carried out by cadres visiting pregnant women's homes once a week until the gestational age of pregnant women at the end of 2nd trimester. After being given this treatment, pregnant women are assessed post-test. The data scale of this study is the ratio interval, so the statistical test used is a parametric test. based on the normality test, the data is declared to be normally distributed, then data processing is carried out with a paired T-Test. The ethical permit approval number 141/EC/KEPK-HW/07/2020 was requested from the Health Office of the Research Ethics Commission Hafsyawati Zainul Hasan Genggong. The ethical requirements and rights of respondents have been fulfilled during the research process to collect data and not cause damage or interference.

## RESULTS

Characteristics of pregnant women in industrialized areas can be seen in Table 1. Most of the respondents are of reproductive age, namely 21-35 years of age (80%), with the educational background of most of the high school seniors (60%), parity status is more than half of 56%, age of pregnancy in the first trimester is 30%, the second trimester 35%, and the third trimester 35%. Meanwhile, 47% of economic status earn less than the standard minimum fee of industry employees and 53% earn more than the regional minimal wage (±USD 314).

The results of the analysis in Table 2 show that after being given treatment there was an increase in good knowledge by 73% and no respondent had a lack of knowledge. The analysis showed that 42 people experienced an increase in their level of knowledge and 9 people had no change in their level of knowledge. From the results of the SPSS output, the p = 0.000, which means that the H0 is rejected, meaning that there is an effect of nutrition education on the knowledge of pregnant women on nutritional consumption during pregnancy.

The results of the analysis in Table 3 show that after being given the nutrition education model, there was an increase in the consumption of appropriate nutrition by 78% and there were no respondents who behaved inappropriately. The analysis showed that 36 people experienced an increase in their nutritional consumption behaviour during pregnancy and 15 people had no change in their nutritional consumption behaviour during pregnancy. The p-value is 0.000, which means that H0 is rejected, meaning that there is an effect of the nutritional education model on the nutrition consumption behaviour during pregnancy.

## DISCUSSION

This study shows that the nutrition education model during pregnancy provided by health cadres during the pandemic has been proven to increase knowledge of nutrition consumption behaviour. Similar results were reported by a randomized study conducted at the University of Ghana showing that nutrition education that emphasizes consumption of iron-rich foods is positively associated with increased haemoglobin levels (Otoo & Adam, 2016). A quasi-experimental study conducted by El-guindi et al, (2010) showed a significant positive relationship between dietary practices and increased haemoglobin levels of pregnant women (El-guindi et al., 2010). Similarly, in a pre-test post-test study on pregnancy conducted by Garg & Kashyap (2006), individual counselling significantly increased mean haemoglobin levels in pregnant women (0.97 vs 1.58, P <0.001) (Garg & Kashyap, 2006). Likewise, in a randomized control trial among pregnant Nepalese women, the educational programme saw only significantly higher haemoglobin changes (0.23 gm / dl) compared to the control group (P <0.01) (Adhikari et al., 2012). While a randomized control trial conducted in Greece did not show a significant effect of nutrition education and counselling on haemoglobin levels in the intervention group compared to the control group (Kafatos et al., 1989).

A review of previous randomized control trials and quasi-experimental studies reported substantial and significant effects when nutritional education and counselling was provided with nutritional supplements, mostly via micronutrients, compared to nutrition education alone (Girard & Olude, 2012).

The Nepal Demographic and Health Survey report shows that only 42% of women used the recommended dose of iron during pregnancy and 41% of women between the ages of 15 and 49 are anaemic (Ministry of Health, 2016). Thus, adherence to iron supplementation is still low in pregnant women in Nepal. According to the Multi-Sectoral Nutrition Plan II, Nepal has a target to reduce the prevalence of anaemia among women of reproductive age by up to 50% in line with the Sustainable Development Goals (Ministry of Health, 2016). Counselling on nutrition education and a diet plan based on iron-rich foods for pregnant women can be effective strategies to reduce anaemia among pregnant women.

The nutrition education intervention and diet plan based on iron-rich foods were significantly associated with improved maternal nutritional knowledge scores of anaemia and intake of iron-rich foods in the intervention group compared to the control group (66% vs 24.1%). A randomized study conducted at a Ghanaian university reported that a significant increase in knowledge was demonstrated by the intervention group at the end of the intervention period (Otoo & Adam, 2016). Studies conducted in Ethiopia revealed that the knowledge of pregnant women about nutrition during pregnancy increased significantly after the provision of nutrition education and special dietary practices (Mwangi et al., 2017; Robertson & Ladlow, 2017).

The intervention study design was conducted in Kalyobia Governorate (Moshtoher, KafrShoukr, and Kaha) (n = 200). The results showed 78% of pregnant women had achieved a good nutritional knowledge score after the intervention (El Hameed et al., 2012).

However, most of the counselling performed during antenatal visits tends to be general in nature in the Nepalese context. Our findings suggest that pregnant women who have good nutritional knowledge can increase haemoglobin levels. Thus, nutrition education and counselling during antenatal visits can increase the nutritional knowledge of mothers about iron-rich foods. Similar results were reported by another study conducted, an intervention study that after a nutrition education session, there was a significant increase in the nutritional knowledge score that could help prevent anaemia (Nimbalkar et al., 2017).

Another study conducted by Kafatos AG et al. indicated that nutritional counselling during pregnancy can increase food intake and increase maternal weight (Kafatos et al., 1989). The results of this study indicated that pregnant women who received nutrition education and an iron-based diet experienced a significant increase in the consumption levels of red meat, fish liver, fruits rich in vitamin C, dairy products, eggs and dark green vegetables compared to controls. group. The study conducted by Liu et al. (2009) also showed that fruit consumption increased by more in the intervention group than in the control group (N. Liu et al., 2009). Pregnant women in the intervention group reflected a change in behaviour by practicing a minimum dietary consumption of 3 or more (Daniel et al., 2016; McLean et al., 2009). Nutrition education and counselling have been found in other studies to improve maternal diet including dietary practices and consumption of macro and micro nutrients (Adhikari et al., 2012; Essén et al., 2005).

Micronutrient deficiencies can lead to poor maternal health outcomes and pregnancy-related complications. Previous research showed that increasing the consumption of micronutrients in pregnancy can improve the nutritional status of pregnant women. Research conducted by Emilia (2009) also revealed the need to implement nutrition education as an effort to change behaviour to improve nutrition (Emilia, 2009). Health education with the Information Motivation Behaviour Skill (IMB) approach plays a role in increasing knowledge and patterns of vegetable and fruit consumption in pregnant women (Farhati et al., 2019).

Our study has several limitations. Our study sample size is insufficient because the findings cannot be generalized to a wider population. Adherence to nutritional education and diet plans based on iron-rich foods was not assessed in this study. Only haemoglobin levels were measured so we could not assess the differentiation of anaemia, such as iron deficiency, nutrition, genetics, and infectious anaemia in this study. There is a possibility of bias because there was no control group in this study.

## CONCLUSION

Nutrition education for pregnant women during the pandemic by village health cadres is proven to increase knowledge of pregnant women in meeting nutritional needs. This increased nutritional knowledge resulted in changes in the pattern of nutritional fulfillment of pregnant women for the better. It is recommended for pregnant women to increase their knowledge related to nutritional fulfillment intensively in assisting health cadres without worrying about being exposed to the virus from service providers. For community health centres it is recommended to increase the capacity of health cadres by more intensively providing training as a provision in assisting pregnant women in the community.

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Original Research

# Perspectives of Pregnant Women Regarding Iron Deficiency Anemia

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## ABSTRACT

**Introduction:** Iron deficiency anemia (IDA) is a global health problem. The prevalence of anemia in pregnancy worldwide is nearly half of pregnant women. It impacts on women and offspring outcomes during pregnancy, intrapartum and postpartum period associated with increasing rate of preterm labor, pregnancy induced hypertension, low birth weight, perinatal death including postpartum hemorrhage, postpartum infection, unsuccessful rate of exclusive breast feeding, and postpartum depression. Inadequate iron intake, maternal physiological changes during pregnancy, and bleeding were indicated as common causes of IDA in pregnancy. The objective was to explore the experiences of pregnant women regarding IDA.

**Methods:** A total of eighteen women between 16-36 weeks' gestation participated in the qualitative research. Women were selected by purposive sampling according to inclusion criteria to in-depth interviewed at antenatal care clinic, Watbot hospital, Phitsanulok, Thailand.

**Results:** Thematic analysis of the qualitative interviews identified four main themes: iron-deficiency anemia in pregnant as a normal pregnancy; concern on food rather than hematocrit (HCT) level; maternal instinct in healthy baby; and low socioeconomic as a main obstacle.

**Conclusion:** The findings illustrated to enhance better understanding the nature, attitude, knowledge, perception, and behavior of pregnant women on IDA, facilitators to support women for healthy behavior, and barriers to IDA in pregnancy based on Thai context.

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## INTRODUCTION

Iron deficiency anemia (IDA) in pregnant women is a serious global health issue (WHO, 2011). Anemia in pregnant women is defined as the Hemoglobin (Hb) level lower than 11 g/dL or Hematocrit (Hct) level lower than 33%, divided into three classifications of severity as follows: mild (Hb10-10.9 g/dL), moderate (Hb 7-9.9 g/dL) and severe (Hb <7 g/dL) (Center of Disease Control (CDC), 1989; WHO, 2011). The Center of Disease Control defined the severity of anemia in each trimester AS Hb level lower than 11 g/dL or Hct level lower than 33% in the first and third trimester of pregnancy and Hb level lower than 10.5 g/dL or Hct level lower than 32% in the second trimester of

pregnancy due to the physiological changes during pregnancy (Center of Disease Control, 1989).

The Global Health Observatory (GHO) reports indicated that the prevalence of anemia worldwide is increasing WITH around 40% of pregnant women in 2016 (Murray-Kolb et al., 2012; WHO, 2011,, 2016). One of five cases of anemia in pregnant women is caused by iron deficiency anemia (IDA) (Department of Health, 2017, 2018; WHO, 2011). IDA in pregnant women has direct and indirect impacts on maternal health and offspring outcomes, including both medical and obstetrical complications during pregnancy, labor, and postpartum period. It is associated with increasing rate of preterm labor, pregnancy induced hypertension, low birth weight, perinatal death, postpartum hemorrhage,

postpartum infection, unsuccessful rate of exclusive breast feeding, and postpartum depression (American College of Obstetricians and Gynecologists (ACOG), 2008; Camaschella, 2015; Maha et al., 2011; Tandon et al., 2018).

The evidence strongly supports that maternal physiological changes during pregnancy with inadequate iron intake are indicated as common causes of IDA in pregnancy (Camaschella, 2015; Goonewardene et al., 2012; Lowdermilk et al., 2016; Pinchaleaw, 2017; Reinold et al., 2012; Tana, 2017; Techakampholsarakit et al., 2018). In Thailand, the policy promotes to decrease rate of IDA in pregnant women by the Department of Health (DoH), Ministry of Public Health (MoPH) that provides iron supplement for all pregnant women. including nurses use in the nursing processes with group and individual health education about IDA such as severity, consequences, prevention, treatment, dietary and iron supplement, and self-care during pregnancy (Bureau of Nutrition, Department of Health, 2011; Center of Disease Control, 1989; Department of Health, 2018; Food Division, Bureau of Food, Food and Drug Administration, 2016) and based on the recommendation from the World Health Organization (WHO, 2016) processes may support and decrease rate of IDA in pregnant women.

In addition, most of the studies focused on the risk factors, intervention, and program to prevent and improve the iron deficiency anemia in pregnant women (Kaljarueg, 2017; Sookdee & Wanaratwichit, 2016; Sukkai & Khiewyoo, 2012). The national statistics reports that IDA in Thai pregnant women was around 20.43%, 21.05%, 20.39%, 18.55%, 17%, and 17%, respectively, from 2013 to 2018 (Department of Health, 2017; 2018). Although, the prevalence of IDA in pregnant women slightly decreased, it is quite steady around 17%. It is still more than KPI for anemia in pregnancy. The key performance indicator (KPI) must be less than 10% for anemia in pregnancy. The prevalence of anemia in Thai pregnant women is still higher than the KPI of anemia in pregnant women. These data illustrated the current studies that focused on the intervention to prevent and improve the iron deficiency anemia in pregnant women. It might not fit with the women's views, which affect the practical use for pregnant women with IDA. Therefore, the overall aim of the study was to explore the experiences and perspectives of pregnant women regarding IDA to understand their attitude, knowledge, and behavior during pregnancy based on the Thai context including

their insight of barriers and facilitators to anemia in pregnant women. This identification of phenomena and experiences of pregnant women with IDA will be used to design the program or intervention that might fit and be of practical use for them.

## MATERIALS AND METHODS

A phenomenology qualitative research was used to explore the experiences and understand the phenomena of pregnant women with IDA through in-depth interviews. Their experiences provided better understanding of the attitude, knowledge, self-care and behavior of pregnant women and provided insights into their experiences of the barriers and facilitators based on the Thai context.

A target sample size was ten to fifteen pregnant women for interviews. The researcher believes the number of sample size around ten to fifteen women is sufficient to identify and understand the phenomena and their lived experiences of pregnant women with IDA (Creswell, 2014; Holloway, 2010). The sampling grid is shown in Table 1. Women were selected by purposive sampling for in-depth interview at antenatal care clinic, Watbot hospital, Phitsanulok, Thailand. Women were initially invited by the nurse at ANC. When a pregnant woman expressed willingness to participate in the interviews, they contacted the researcher by telephone (free call) or in person at the ANC during office hours. Then, women interested in participation were given full information by the researcher. The researcher took written consent. The participants were screened through inclusion and exclusion criteria. The inclusion criteria are woman able to read, speak and understand the Thai language. Pregnant women diagnosed as IDA, who had Hct level less than 33 percentages, and no complications would be eligible for recruitment. Women with any complications and extremely high stress scores (ST-5 score > 8 points) during pregnancy were excluded. Women with extremely high stress scores were referred to nurse at ANC. ST-5 is a stress self-assessment tool within the Thai version of the mother and child health handbook. Stress score was collected from the women as part of their usual antenatal clinical assessments and these data were then extracted by the researcher. Participants were offered a gift voucher of 200 baht for taking part in the interviews.

The data were collected through individual in-depth interviews from February to September 2020. The semi-structured questions were developed by the researcher based on the concepts of anemia in

Table 1. Purposive Sampling Frame for Pregnant Women in the Interviews

| Variable | Details of variable | |
|---|---|---|
| Number of pregnancy | Primigravida (first time) | Multigravida (second or more) |
| Maternal age | Age < 20 years old | Age ≥ 20 years old |
| History of IDA during pregnancy | Yes | No |
| Gestational age (GA) at the first visit | > 12 weeks | < 12 weeks |
| Antenatal care visit at clinic following the recommendation | Yes | No |
| Severity of anaemia | Hb < 7 g/dL | Hb > 7 g/dL |

pregnancy, research objective, and context. The items of questions were verified by the three experts in maternal and newborn nursing in terms of content, construct, and language. The question guide consisted of the participant's experiences with the IDA during pregnancy, caring during pregnancy, facilitators and barriers related the IDA and healthcare service. For example, the key questions were guided to in-depth interview: *"Could you tell me about your experiences during pregnancy?"*; *"Could you tell me about your current Hct level?"*; and *"I would like to start with your usual care, please tell me about what do you do during pregnancy with IDA."* Steps in conducting the interviews were as follows: (1) the name, position and contact details of the researcher were introduced to the participants; (2) study information was briefed to the participants on the purposes, benefits and processes of the study, and ethical issues; (3) any questions from the participants were answered by the researcher before starting the interviews; and (4) the main findings from the interviews were summarized for checking accuracy and correction with the participants (Creswell, 2014; Holloway, 2010). The interviews ended with eliciting the participant's demographic characteristics. All interviews took about 30 to 45 minutes per participant and were recorded with a digital voice recorder and field notes.

Thematic analysis was used to analyze data. The data were managed by the researcher as well as manually. The processes in conducting a thematic analysis were as follows (Braun& Clarke, 2006; Creswell, 2014; Holloway, 2010). Firstly, the data were fully transcribed. The full transcripts were checked and cross-checked for accuracy. Next, all transcripts were read and reread several times to understand each interview in depth. The data were compared for similarities and differences among participants based on a list of all topics from interviews. Verbatim quotes were underlined and highlighted as key words. The data contents were coded. The codes were checked back with the transcripts for accuracy. The codes were grouped according to initial categories and progressed to sub-themes and themes. The themes were examined in terms of relationships in two dimensions between data set and codes; and codes and themes. The themes were defined and named for presenting the overall data in each theme. Lastly, the coding and the themes were examined for accuracy by the researcher, co-researcher and consultant. The process of thematic analysis was reported in relation to the research questions and literature. For instance, the data were transcribed as:

> *"I feel nothing. I had morning sickness and fatigue in the early pregnancy. It is normal signs and symptoms of pregnancy."* ($G_1P_0$, Age 34 years, GA 30 wk., Hb 9 g/dL)

> *"I have had an anemia before as same as this time. I feel nothing. It is a normal, just low level of Hct. I never had signs of anemia."* ($G_3P_2 L_2$, Age 30 years, GA 32 wk., Hb 8.5 g/dL)

The verbatim quotes were underlined and highlighted as keywords as *"never had signs of anemia" and "a normal signs and symptoms of pregnancy."* The data contents were coded and then were examined into the theme.

The study rigor was obtained in terms of trustworthiness through credibility, confirmability, objectivity and transferability (Anney, 2014). The process of qualitative interviews was checked by consolidated criteria for reporting qualitative studies (COREQ) in three domains: research team and reflexivity; study design; and analysis and findings. The researcher summarized the findings from the interviews, which were re-examined by the researcher, co-researcher and consultant in each phase of the data analysis, including codes and themes as a peer-debriefing for credibility (Anney, 2014). The protocols of data collection and data analysis were checked with the researcher, co-researcher and consultant to ensure that they were described well enough in terms of data collection process, raw data, process of data analysis and interpretation of the findings as an audit trial for dependability.

The methods of data collection and data analysis process were reported in rich description of characteristics with the details of research setting, characteristics of participants, and the Thai context. The decision-making of the researcher in each stage was demonstrated so that the research processes and context of the study can be applicable for justification to other contexts or situations in future research as a transferability (Anney, 2014; Baillie, 2015; Creswell, 2014). The research process was recorded with a diary by the researcher including the feelings and contexts behind the decision-making for confirmability. The effect of the researcher on the research process was recognized because the researcher as an instrument might influence the process of the data collection and data analysis. The data analysis process was demonstrated in rich description to ensure that the findings were interpreted from the interviews (Anney, 2014; Baillie, 2015; Creswell, 2014; Shenton, 2004).

Ethical approval for this study was obtained from the Naresuan University Institution Review Board, Naresuan University, Thailand (IRB No. 0596/62) dated on October 08, 2019. The decision to participate was made by individual women independently and without pressure. Pregnant women could withdraw any time without giving any reason and their withdrawal from the research did not affect the standard of care. All data in this study were identified by individual codes, except for copies of the consent form which contained the names and contact details of all participants. No data could be accessed by anyone other than the researcher, co-researcher and consultant. The data were presented and reported without personal identification. During data collection

and analysis, the researcher used a personal laptop with strong password protection. All files and documents were kept securely in locked storage at Naresuan University, Thailand. Personal information will be kept for one year after the end of the study; all other anonymized data will be kept for a period of ten years after completion of the study in locked storage at Naresuan University, Thailand.

## RESULTS

A total of twenty-five pregnant women had expressed an interest in participating in the in-depth interviews. Five women withdrew from the study due to their duties: taking care of their children, transportation and their households. Two women withdrew from the interviews due to their mother and husband having not allowed them to participate in the interviews. They also decided after the introduction to have explained again the aim of the study, the interview process, and checked consent for recording the interviews. One woman's mother said, *"It takes quite a time and there's nothing for us to do that"*; and the husband said, *"It's not significant to us. We just go back home to prepare our street food: Thai sweets."*

The participants were residents of the Lower Northern region of Thailand such as Sukhothai, Pichit, Phitsanulok, and Tak in both the rural (village or countryside) and urban (town) areas. The

Table 2. Demographic characteristics of pregnant women in the in-depth interviews

| Characteristics | n | % |
|---|---|---|
| Age | | |
| < 20 years | 5 | 27.8 |
| 20-34 years | 9 | 50.0 |
| $\geq$ 35 years | 4 | 22.2 |
| Number of gravida | | |
| Primigravidarum | 8 | 44.4 |
| Multigravidarum | 10 | 55.6 |
| Occupation | | |
| Employee | 4 | 22.2 |
| Self-employed | 3 | 16.6 |
| Agricultural | 5 | 27.8 |
| Housewife | 6 | 33.4 |
| Education | | |
| Secondary school or equal | 9 | 50.0 |
| High school or college degree | 6 | 33.4 |
| Bachelor degree or equal | 3 | 16.6 |
| Pre-pregnancy Body Mass Index (BMI) | | |
| Underweight (BMI < 18.5 kg/m2) | 3 | 16.6 |
| Healthy (BMI 18.5-22.9 kg/m2) | 10 | 55.6 |
| Overweight (BMI 23-29.9 kg/m2) | 5 | 27.8 |
| Income | | |
| < 200 US dollar | 3 | 16.6 |
| 200-400 US dollar | 6 | 33.4 |
| 400-800 US dollar | 6 | 33.4 |
| >800 US dollar | 3 | 16.6 |
| Gestational age at the first ANC | | |
| $\leq$12 weeks | 11 | 61.1 |
| >12 weeks | 7 | 38.9 |
| Hb Level | | |
| < 7 g/dL | 2 | 11.1 |
| 7-9.9 g/dL | 4 | 22.2 |
| 10-10.9 g/dL | 12 | 66.7 |

demographic characteristics of pregnant women are summarized in Table 2. The age of participants ranged from 16 to 40 years. The average income of participants was 10,000 baht a month. Around half of participants had a healthy pre-pregnancy BMI (10, 55.6%), five women had an overweight (27.8%) and three women had an underweight (16.6%). Most of the pregnant women had a mild severity of IDA (Hb 10-10.9 g/dL) (n = 13; 66.7%). They had no signs and symptoms of IDA.

Topics of in-depth interviews covered a range of issues on pregnancy and IDA. There were an initial twelve codes and initial nine sub-themes. These are shown in Figure 1. Four main themes emerged from the interviews: iron-deficiency anemia in pregnant women as a normal pregnancy; concern on food rather than Hct level; maternal instinct in healthy baby; and low socioeconomics as a main obstacle.

### Theme 1: Iron-deficiency anemia in pregnant women as a normal pregnancy

This theme illustrates the perception of pregnant women with IDA. Their point of views was still feeling it as a normal pregnancy even though they have had an anemia during pregnancy. They said:

*"I feel as the same as I am a normal pregnant woman. I know, I have a hematocrit level quite lower than usual pregnant women."* ($G_1P_0$, Age 18 years, GA 32 wk., Hb 6 g/dL)

*"When I was pregnant with the last child, this time, I feel the same as well."* ($G_3P_2A_0L_2$, Age 32 years, GA 28 wk., Hb 7 g/dL)

Pregnant women perceive the IDA in the real word as quite different impacts from information from healthcare professionals.

*"I got information from the nurse and doctor at this hospital. They also said that my baby will have growth restriction. It means like a small baby but when the doctor checked my baby via ultrasound, she told me the size of baby is appropriate with my gestation. So, I feel IDA for me as a normal."* ($G_2P_1A_0L_1$, Age 27 years, GA 30 wk., Hb 10 g/dL).

### Sub-theme 1.1: Nothing: not any signs and symptoms

Pregnant women expressed their experiences about IDA during pregnancy. They indicated that they have not had any signs and symptoms and related complications of IDA such as severe fatigue, abortion, infection, baby low birth weight, preterm labor, and others.

*"I'm OK. I don't have any signs and symptoms about anemia that the nurses at the antenatal clinic told me about, such as infection, abortion, and intrauterine growth retardation. I am aware and take care myself and my baby the same as in the previous pregnancy. I just have an anemia in this pregnancy. Last pregnancy, I am not sure, I have Hct*

*level around 35-37 vol%."* (G$_4$P$_2$A$_1$L$_2$, Age 42 years, GA 34 wk., Hb 8 g/dL)

*"I feel nothing. I had morning sickness and fatigue in the early pregnancy. It is    normal signs and symptoms of pregnancy."* (G$_1$P$_0$, Age 34 years, GA 30 wk., Hb 9 g/dL)

*"I have had anemia before, same as this time. I feel nothing. It is normal, just low level of Hct. I never had signs of anemia."* (G$_3$P$_2$L$_2$, Age 30 years, GA 32 wk., Hb 8.5 g/dL)

### Sub-theme 1.2: Common way of life during pregnancy

Participants indicated their lifestyle during pregnancy with IDA as similar as the common way of life during pregnancy. They expressed that they can run their job, take care of their children, household, and come to the hospital by themselves.

*"I feel as similar as other pregnant women because I can do my job at the convenience store and household including take care of my husband. I feel the nurse and doctor care for me the same as normal pregnancy."* (G$_1$P$_0$, Age 34 years, GA 30 wk., Hb 9 g/dL)

*"I have two children at 9 and 5 years old. I take care of this pregnancy the same as normal. Now, I am a single mom. I think, I have a common way of life as a normal pregnancy although I have anemia during pregnancy. It's just anemia, it's the same as normal pregnancy. I do it as my usual life during pregnancy. I also got iron supplement the same as normal pregnancy."* (G$_4$P$_2$A$_1$L$_2$, Age 42 years, GA 34 wk., Hb 8 g/dL)

They illustrated that they also work, live, and do other things during pregnancy with IDA the same as pregnant women without IDA, including getting iron supplement.

### Theme 2: Concern on food rather than Hct level

This theme illustrates the pregnant women's concern on their food and diet as related to their gestational weight gain. They expressed that when they got information from the nurse about their complication: IDA during pregnancy, they were concerned about their usual food, that they should take more food such as milk, vegetables, eggs, and meat. Surprisingly, they did not concern to take iron-rich food such as pork liver, broccoli, green bean, and pork blood.

*"When I know, I am a pregnant. I take a lot of food such as milk, eggs, meat, and veggies. I think, it might help me to get high gestational weight gain. When I know that I have a low level of Hct. I still take a lot of food and I don't focus on iron-rich foods. I think, if I take more food (general foods), my weight will gain. It's quite significant for me. Frankly, I did not concern about my Hct level. Sometimes, I forgot to take an iron supplement."* (G$_1$P$_0$, Age 24 years, GA 36 wk., Hb 10.4 g/dL)

Pregnant women also expressed their experiences that iron-rich foods and iron supplements might not benefit to treat IDA. They perceived iron supplements for all pregnancy, not specifically for IDA during pregnancy.

*"I'm not sure about nutrients in the iron supplements that I got from hospital. I take it following the prescription but I didn't see the outcomes. I still have low Hct level both the previous*
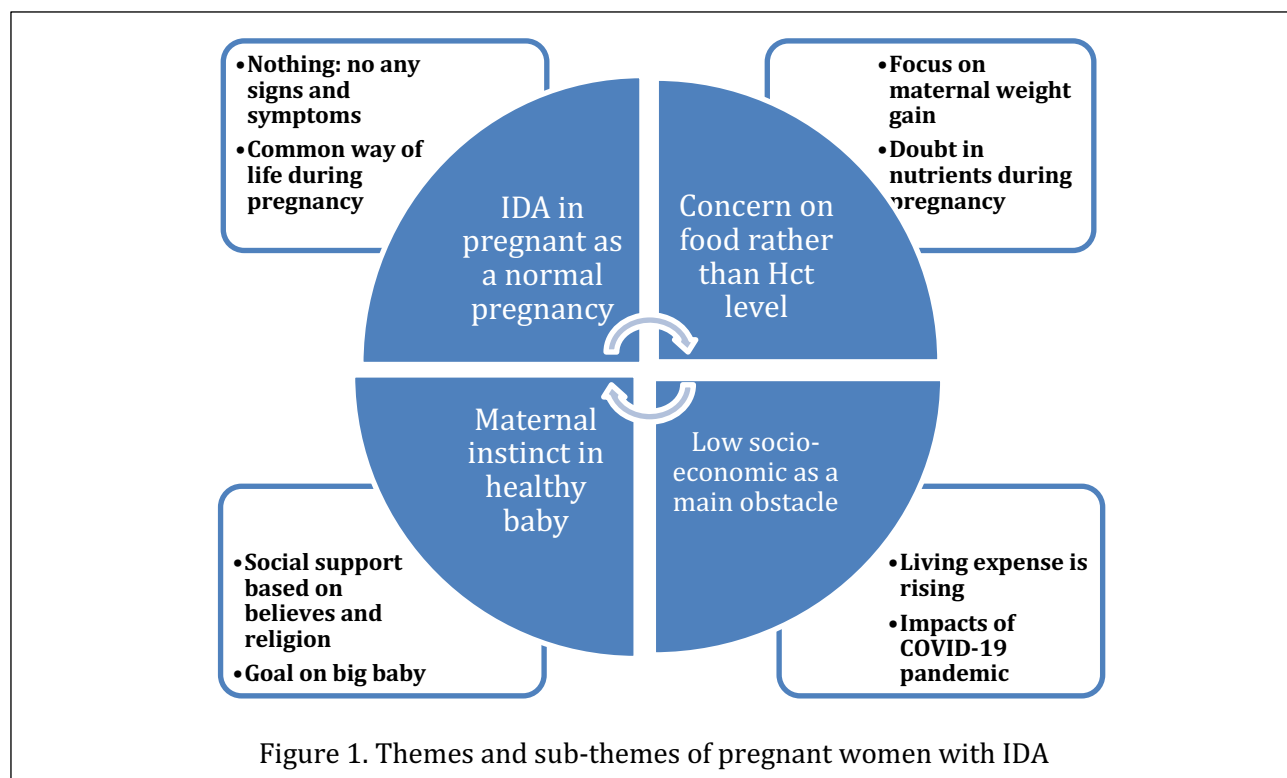


Figure 1. Themes and sub-themes of pregnant women with IDA

*and this time. Does it really help?"* (G$_2$P$_1$A$_0$L$_1$, Age 29 years, GA 31 wk., Hb 8 g/dL)

### Sub-theme 2.1: Focus on maternal weight gain

Pregnant women focus on their gestational weight gain.

*"It's my experience, the first pregnancy I had was normal Hct level but my weight gain was only 9 kilograms in total. My first baby, it's quite smallest just 2,600 grams. Then, I have anemia in the second pregnancy. My total gestational weight gain is 15-16 kilograms, baby birth weight is 3,200 grams. It's quite a difference. If you have anemia and don't have anemia during pregnancy, it may not impact on the different size of the baby."* (G$_3$P$_2$A$_0$L$_2$, Age 35 years, GA 32 wk., Hb 7.8 g/dL)

They stated that they desired to take a lot of food. They believed that food benefits for them to gain their gestational weight.

*"I have anemia during this pregnancy. So, I try to take a lot of food, such as milk, eggs, and fruits. I believe that it's good for me and my baby."* (G$_2$P$_0$A$_1$L$_0$, Age 22 years, GA 29 wk., Hb 7.8 g/dL)

They pointed out that they did not concern about iron-rich foods and iron supplements. They assumed that it's might not be an advantage for them during pregnancy.

*"I still believe you are what you eat in foods rather than iron-rich foods or iron supplements such as pork liver, pork blood, green beans, and vitamin supplements. If I take only pork liver, pork blood, green beans, etc., and Obimin AZ and Ferrous Fumarate every day, my weight might not gain. It's quite bad for me and baby. I think, all pregnant women should gain their total gestational weight around 10-15 kilograms even though you have anemia. Hct level is less significant for me. It means iron-rich foods or iron supplements are less significant than my weight gains."* (G$_2$P$_1$A$_0$L$_1$, Age 38 years, GA 33 wk., Hb 8 g/dL)

*"When I have anemia, I must take more food for gaining my weight."* (G$_1$P$_0$, Age 21 years, GA 31 wk., Hb 8.5 g/dL)

### Sub-theme 2.2: Doubt in nutrients during pregnancy

Pregnant women indicated that iron-rich foods and iron supplements might benefit for increasing the Hct/Hb level but might not be of benefit for them.

*"I don't know about the nutrients or iron in the iron-rich foods and iron supplements. I got Ferrous Fumarate 200 mg. to treat anemia. I regularly take it three times a day: morning, noon, and evening from 12 weeks of gestation until now. The level of Hct quite swings. I mean up and down and up and down between Hct 28-31 vol%."* (G$_4$P$_3$A$_0$L$_3$, Age 36 years, GA 32 wk., Hb 10 g/dL)

They showed that they did not know about the real benefits of iron nutrients in iron-rich foods and iron supplements. They also expressed that they hesitated about nutrients during pregnancy, especially iron.

*"I feel confused about nutrients during pregnancy. I have a question as to how much iron does a pregnant woman need daily? I got Triferdine and Ferrous Fumarate. I take Triferdine one tablet once a day and Ferrous one tablet three times a day. I try to eat pork blood soup most of the week. When I checked up my Hct level, it's the same level. I don't know what's happened?"* (G$_1$P$_0$, Age 16 years, GA 27 wk., Hb 6.5 g/dL)

### Theme 3: Maternal instinct in healthy baby

Pregnant women pointed out about their maternal instinct on a healthy baby. They claimed that the characteristics of a healthy baby consisted of good appearances, no complications and birth weight more than 3,000 grams. The most significant aspect of a healthy baby is big baby.

*"I try to do the best. If you have a big baby, it shows you have good food and self-care during pregnancy. You try to compare the big and small baby. The small baby might to get more frequently sick than the big baby."* (G$_3$P$_2$A$_0$L$_2$, Age 35 years, GA 32 wk., Hb 7.8 g/dL)

Pregnant women supposed that they get social support based on the Thai context, belief and religion.

*"My husband finds a lot of information from his family, friends and internet and prays for my baby every day, when he knows I have anemia. I try to do everything, if I can for my baby."* (G$_1$P$_0$, Age 34 years, GA 30 wk., Hb 9 g/dL)

### Sub-theme 3.1: Social support based on beliefs and religion

Social support was illustrated by pregnant women that assisted them to be a healthy mom based on the Thai context, including beliefs and religion.

*"He (my husband) extremely believes what his mother and grandmother give me about local food to decrease my anemia. It's is a local vegetable; it's called "Pak Good" (Paco fern or small vegetable fern). He also prays before bedtime every day. Maybe average five days a week."* (G$_1$P$_0$, Age 34 years, GA 30 wk., Hb 9 g/dL)

Informational support from healthcare professional indicated that pregnant women got an overview on IDA such as diagnosis, causes, signs and symptoms, treatment, consequences, and follow up.

*"The nurse at the antenatal clinic told me in the first visit that I have anemia, Hct 24 vol%, and gave me information about causes, signs, protocol for treatment and impacts on me and the baby. Then, I met the doctor. She said I need to get blood transfusion and then take a blood test after that. I*

have had iron supplements since after blood transfusion until now." (G$_1$P$_0$, Age 17 years, GA 32 wk., Hb 9 g/dL)

### Sub-theme 3.2: Goal of a big baby

Pregnant women claimed their goal of pregnancy was that they wanted to get a big baby. They do the best to gain high gestational weight during pregnancy. Based on their belief and Thai context, pregnant women expressed their experiences that having a big baby came from their parents and grandparents.

*"My aim is to get a baby birth weight more than 3,500 grams. I'm not sure, is it quite high? But my mom and my grandmother told me you should take more foods to have a baby more than 3.5 kilograms. It's a healthy baby."* (G$_1$P$_0$, Age 21 years, GA 32 wk., Hb 9.8 g/dL)

*"In Thailand, if you have a big baby that means you are healthy during pregnancy and have a healthy boy too. Most people don't concern about what Hct level do you have during pregnancy. They also ask you as a common question: How much weight did you gain during pregnancy and how does your baby weigh?"* (G$_1$P$_0$, Age 22 years, GA 33 wk., Hb 8.2 g/dL)

### Theme 4: Low socioeconomics as a main obstacle

The socioeconomic aspects showed that pregnant women concerned about their income and monthly stipend during pregnancy. Pregnant women illustrated that they worried about cost of vitamin supplements and others during pregnancy with IDA. It is a main barrier to pregnant women regarding IDA.

*"I still keep money for my family rather than for myself although I have an IDA during pregnancy. I think, the iron supplement that I got from the clinic is quite enough for me and my context. I have two children. I don't want to pay more for iron-rich food. I ate a lot of rice noodles with curry no meat. It helps me to gain my weight."* (G$_4$P$_2$A$_1$L$_2$, Age 42 years, GA 34 wk., Hb 8 g/dL)

*"I cannot do my job. I work at the local restaurant. I have not enough money to pay for iron-rich food. I focus on living expenses in each month during the COVID-19 pandemic."* (G$_1$P$_0$, Age 19 years, GA 27 wk., Hb 10 g/dL)

### Sub-theme 4.1: Living expenses rising

Pregnant women expressed the living expenses are constantly rising in Thailand due to the impacts from the Thai socioeconomics, political situations and COVID-19 pandemic. They indicated that they got the same rate of salary, but the cost of living is rising, such as the price of pork meat, vegetables, milk, and gas for car or motorcycle. They have limited money to take care of their pregnancy with IDA.

*"I concern on our living expenses (my husband, son and daughter and me). The price of pork meat,*

green beans, tomatoes and milk are rising. I think, it's not good if I spend too much money for my pregnancy. I try to keep a balance. So, I take care of my pregnancy the same as previous pregnancy although this pregnancy has an IDA. I choose sticky rice with fish sauce to eat rather than milk, salad, or noodle soup. I have no choice."* (G$_4$P$_3$A$_0$L$_3$, Age 36 years, GA 32 wk., Hb 10 g/dL)

### Sub-theme 4.2: Impacts of COVID-19 pandemic

Participants indicated that the COVID-19 pandemic impacts on the lifestyle and their work. Some pregnant women changed their work outside to work from home. In addition, their income was decreased around 30-75%. They also expressed that they have adapted their lifestyle, including their expenses. They need to take care of their pregnancy and their life also.

*"I don't know how to say. I think, I cannot think about me and my pregnancy. I have not enough money because I got only 50% of my salary from my boss due to the COVID-19 pandemic. I cannot perfectly take care of my pregnancy with IDA."* (G$_1$P$_0$, Age 23 years, GA 30 wk., Hb 8.6 g/dL)

## DISCUSSION

The findings of this study reflect on their attitude, knowledge, and behavior including the self-awareness on IDA during pregnancy. Most of the pregnant women indicated that they did not have any signs and symptoms of anemia during pregnancy. They still have a common way of life as in a normal pregnancy. This experience reveals their attitudes that IDA in pregnant women is the same as a normal pregnancy. In their point of view, pregnant women with IDA and normal pregnancy got the information, treatment, and iron supplements the same as normal pregnancy. This is similar to findings of study conducted in Mumbai, India where the participants expressed their experiences of anemia as "normal during pregnancy" because they perceived weakness or fatigue might not directly impact their offspring (Chatterjee & Fernandes, 2014). Pregnant women indicated that they were more concerned on their food intake to gain higher gestational weight rather than the severity of anemia. Based on their beliefs and Thai context, most pregnant women focused on the maternal weight gain that benefited for them and their fetuses. They also pointed out that they concerned on their general foods rather than iron-rich foods and iron supplement. They revealed that they hesitated over the benefits or advantages of iron supplement or nutrients of iron-rich foods during pregnancy. These findings reflected on their low level of attitude and knowledge including the behavior of pregnant women with IDA about iron-rich foods and iron supplement. It is related to the study of factors affecting iron deficiency anemia in pregnant women that indicated the low level of knowledge and misunderstanding affecting their attitude and behavior during pregnancy, including iron

supplements and iron-rich foods as a nutrition for pregnant women (Kaljarueg, 2017; Sookdee & Wanaratwichit, 2016; Sukkai & Khiewyoo, 2012).

The self-care during pregnancy with IDA was expressed that they concerned on their food intake rather than iron-rich foods and iron supplements. It might impact on their Hct or Hb level. They also believed that if they take a lot of food it will be good so that they have high total gestational weight gain. Participants indicated that the iron supplements and iron-rich foods were not significant to treat IDA during pregnancy. They seemed to have less knowledge about the advantages of iron-rich foods and iron supplements on IDA during pregnancy and self-awareness to enhance their behavior. A previous study aimed to determine factors affecting iron deficiency anemia among pregnant women and showed inappropriate attitude of taking iron tablets and self-care about iron deficiency anemia during pregnancy, including knowledge about iron-rich foods that were significantly associated with higher rate of IDA (Sookdee & Wanaratwichit, 2016). These findings related to maternal instinct in a healthy baby. They believed that if they were healthy during pregnancy, they will have a big baby. It illustrated their social support from their families, friends, and significant persons, including healthcare professionals based on their beliefs and religion. It is quite important for pregnant women with IDA regarding their informational and emotional supports as a facilitators during pregnancy (Bilimale et al., 2010; Chatterjee & Fernandes, 2014; Senanayake et al., 2010).

In addition, the findings also illustrated the barriers to behavior of pregnant women regarding IDA, that is socioeconomics and political situation. The increasing living expenses and impacts of the COVID-19 pandemic, such as lockdown, should be a concern that impacts on their income and monthly stipend, especially IDA during pregnancy. They expressed that they have enough money to support the iron-rich foods and iron supplement such as milk, meat, and offal. They still take local nutrients with high calories that they believe would afford a high maternal weight gain such as sticky rice with fish sauce and rice noodles with curry without meat. It affected their baby birth weight. It is similar to findings that the COVID-19 pandemic affected income and household consumption due to income loss and unemployment (Hawkins et al., 2010; Martin et al., 2020).

These issues will be improved by the prenatal educational program for pregnant women with IDA that develops their iron supplements adherence and health behavior of pregnant women (Bilimale et al., 2010; Pipatkul et al., 2015; Senanayake et al., 2010; Sirisopa & Pongchaidecha, 2015). The results of this study are significant for healthcare professionals, especially nursed, that should aware and take a role as a supporter during pregnancy based on informational, emotional, tangible, and appraisal supports to enhance attitude, knowledge, self-awareness, and behavior of pregnant women with IDA (Kaljarueg, 2017; Sookdee & Wanaratwichit, 2016; Sukkai & Khiewyoo, 2012).

## CONCLUSION

The results verified to enhance better understanding the nature and perception of pregnant women on IDA, facilitators to support women for healthy behavior, and barriers to IDA in pregnancy based on a Thai context in beliefs, socioeconomics, and religion.

The findings revealed the insight of attitude and knowledge that impacts on their experiences, behavior and self-care during pregnancy with IDA. It is very useful for healthcare professionals to be aware and gain understanding of pregnant women with IDA based on their backgrounds and context. This study will be applied in clinical practice of antenatal care clinic and health promoting hospital for reconsideration of the protocol for pregnant women with IDA in terms of diagnosis, treatment, nursing care and transfer to community.

For nursing administration, the collaboration between multidisciplinary such as pharmacist, doctor and nutritionist will be established for prenatal education about IDA. In addition, the nursing clinical practice guideline (NCPG) for pregnant women with IDA will be designed based on the findings from this study and will be tested in a future clinical trial. The limitation of this study should be considered. Most of the pregnant women represented a low to medium level of education and family income, which cannot be generalized to the entire population.

## ACKNOWLEDGMENT

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Original Research

# The Older Adults Experience Caring for Grandchildren with Special Needs

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## ABSTRACT

**Introduction:** Nowadays, grandparents are still involved in the care of grandchildren. The previous research showed that the grandparent involvement in the care of grandchildren has a bad and good impact for older adults. This study aims to gain a deep understanding of the experience of older adults while caring for their grandchildren with special needs.

**Methods:** Researchers use a phenomenological approach to explore the experience based on awareness that occurs in some individuals. The participants involved in this study were six older adults. Data were collected by in-depth interview and analyzed by Colaizzi's method.

**Results:** All participants have grandchildren who attended school for special needs children in Surabaya city. This study showed all participants responded positively and related involvement in taking care of grandchildren. In addition, the decision to being a part of caring for the grandchildren came from themselves and the discussions with both parents. Most of the activities with grandchildren were spending time together. However, all participants complained of being tired and this condition can be solved by seeing grandchildren's happiness. They believed that grandchildren care is better with grandmothers or grandfathers than with servants.

**Conclusion:** It can be concluded that the experiences of the older adult taking care of grandchildren are very varied and positive for the older adults. Further researchers are advised to continue to explore more detail about the psychological influence of grandparents   taking care of their grandchildren with special needs.

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## INTRODUCTION

In general, there are challenges for families raising children with special needs (Franklin, 2020). Children who have physical, mental, and social behavioral characteristics (such as: communication disorder, social interaction difficulties, emotional disturbances and others) need special strategies and approaches in treatment (Tigere & Makhubele, 2019). On the one hand, there is a change in the pattern of the role of mothers as career women and housewives so that other family members in the family (extended family) such as grandmothers will become substitute figures for parents while caring for their grandchildren (Wahyuni & Abidin, 2015). Preliminary studies

conducted by researchers at several Sekolah Luar Biasa (Extraordinary Schools, a school for children with special needs) in Surabaya city showed that children with special needs are more cared for by their grandparents than their parents. Based on the initial data survey through interviews with the principal, information was obtained that the number of older adults with grandchildren was approximately 20 people. Various experiences make parents more comfortable if the care of grandchildren is carried out by the older adults than others, such as a babysitter. However, the description of the experience of the older adults in the care of their grandchildren is still not clearly illustrated. The purpose of this study was

to explore the older adults who are involved in the care of grandchildren with special needs.

On the other hand, the care of grandchildren has positive and negative impacts to the older adults (Fauziningtyas et al., 2018). The care of grandchildren for older adults has a positive impact on physical, psychological, social, and environmental aspects (Putu et al., 2020). Based on the other research, grandmothers and grandfathers who are involved in caring their grandchildren reported higher rate of life satisfaction and quality of life than non-grandparents. The result also show that grandmothers reported fewer depressive symptoms than women without grandchildren (Tanskanen et al., 2019).In addition, the older adults who were interviewed accepted gracefully if they were given responsibility for caring for their grandchildren. However, there are also negative effects such as fatigue and family conflict (Fauziah, 2020). The major factor that affected grandparents' health self-management who involved in taking care of grandchildren was caregiving burden (Jing & Guo, 2019).

Meanwhile, many older adults in Indonesia live with their families. The older adults who live with their families in three generations are as much as 40.64% (Statistik, 2019). Moreover, Indonesia is among the top five countries with 8.9% older adults in 2013 and will increase to 21.4% in 2050 (BPS & Jawa Timur, 2012). The number of adults aged >60 years in East Java Province is 3.6 million people (BPS & Jawa Timur, 2012). The number of older adults aged >60 years in Surabaya in 2019 is 256,007 people (Surabaya, 2019). In addition, the Central Statistics Agency (BPS) in 2017 stated that the number of children with special needs in Indonesia was 1.6 million people. However, there is no definite data regarding the number of older adults who care for grandchildren (Fauziningtyas et al., 2018).

Based on the background above, the experience of the older adults in the care of grandchildren with special needs to be explored. The description of this experience can be explored by qualitative research through in-depth interviews. Therefore, the researchers are interested in seeing a picture of that specific experience.

## MATERIALS AND METHODS

This research is a qualitative method with a phenomenological approach. The population were the older adults with grandchildren who attend an extraordinary school in Surabaya. Sampling method used purposive sampling with the following criteria: 1) older adult aged 60-74 years, 2) take care of grandchildren for 1-12 hours per day, 3) live with grandchildren, and 4) grandchildren who attend extraordinary schools. The number of participants in the study was six older people.

Data collection tools consisted of interview guidelines, voice recorder, and field notes. The interview used open questions and consisted of fourteen questions that aim to explore the experience of grandparents in caring for grandchildren with special needs. The question framework was based on the theory of family centered nursing.

Researchers conducted interviews with participants in a facing position with a fairly close distance (approximately 50-100 cm), with the consideration that the voice recorder could record the conversation clearly. The voice recorder was placed in the open with a distance of approximately 30-50 cm from the participants.

The interview process in the study lasted for 60-90 minutes for each participant, ending when the required information had been obtained according to the research objectives through saturation. In addition, field notes were used to document the atmosphere, facial expressions, behavior and non-verbal responses of participants during the interview process. After all the interviews were completed, the researcher then made a contract again with the participants for the next meeting, namely for data validation.

Furthermore, the researcher ignores all personal assumptions related to the phenomenon under study when digging research data, puts aside his personal knowledge and understanding, and tries fully to position himself as a participant and see things from the participant's perspective. This concept is called epoche or bracketing.

The data were analyzed by the Colaizzi method. The data analysis was through nine stages as follows: describe the phenomenon under study, collecting descriptions of phenomena through participant opinions; read the entire description of the participants about the phenomenon being studied, separating significant statements by giving a code to participant statements that have significant meaning listed verbatim; formulate the meaning of each significant statement; categorize each unit of meaning into one theme/cluster of meaning; integrate each theme into a complete description, validating the results of the analysis to participants, and improving the results of the analysis with the data obtained during the validation process.

This study has passed the ethical test by the Ethics Committee of the Faculty of Nursing, Universitas Airlangga.

## RESULTS

Participants in this study were six older adults consisting of one male and five female older adults. This study resulted in nine themes that were elaborated according to the research objectives to obtain a deep understanding of the experiences of the older adults and grandchildren with children with special needs. The data on the characteristics of grandparents and grandchildren are presented in the table below.

### Theme 1: Caring Engagement

Participants in this study expressed a meaningful response based on their involvement with the mother

Table 1. Grandparent Characteristics

| Participant | Gender | Education level | Profession | Religion | Marital Status | Age (year) |
|---|---|---|---|---|---|---|
| 1 | Female | Junior high school | Housewife | Islam | Married | 67 |
| 2 | Male | Senior high school | Retired | Islam | Married | 72 |
| 3 | Female | Junior high school | Housewife | Islam | Married | 66 |
| 4 | Female | Diploma III | Housewife | Islam | Married | 65 |
| 5 | Female | Diploma III | Retired | Islam | Widow | 68 |
| 6 | Female | Junior high school | Housewife | Islam | Widow | 72 |

Table 2. Grandchildren Characteristics

| Participant | Gender | Age (year) | Special condition |
|---|---|---|---|
| 1 | Male | 12 | Down Syndrome |
| 2 | Male | 16 | Down Syndrome |
| 3 | Female | 10 | Down Syndrome |
| 4 | Female | 10 | Down Syndrome |
| 5 | Male | 11 | Down Syndrome |
| 6 | Female | 14 | Down Syndrome |

and grandchildren. All participants responded positively, namely accepting anything related to involvement with the mother of the grandchildren and one sub-theme was obtained, namely that the older adults were involved in caring for their grandchildren for one full day. Statements about involvement in the mother and grandchildren were expressed by the following participants:

### Custodian

*"Currently, this child's parents are already working, so 100% of the care is with me and my wife. Actually they have a house but it is not inhabited because we chose to raise this child here."* (P2)

*"As a grandmother, I take care of all day, starting to drop off school in the morning, take care when at home and outside the house because this child with special needs requires full attention. Eating, drinking, and resting time should also be a priority."* (P4)

## Theme 2: The feeling of caring for grandchildren with special needs

### Gratitude

*"Yes, he feels grateful to be able to teach him all the time, to keep talking, if not invited to talk, his child will continue to be silent like this. So ... oh no ... just be grateful if I just give thanks for the gift of Allah SWT. Yes, if asked to sing, taught to recite the Koran, that's how it used to be if now I rarely want to talk about it like that...."* (P1)

### Happy

*"Yes, I am happy, bro, I have never had grandchildren, that only grandchildren, but yes, God gave it, yes, we accept it as it is, bro. Maybe there are people who are ashamed, but I'm not ashamed, bro, entrusted it like that, inshaAllah, bro, because it was a deposit from God, bro, my mandate, bro, I will feel guilty. Actually, I'm sorry to see a child like that, for example learning, the obstacle is lazy, bro, if you can actually learn, bro, it's just that there is less interest in learning, bro, so it's hard there, so you have to be patient...."* (P6)

### Sad

*"As a human, sometimes there is sadness, sometimes there is anger. It's sad if someone wants their grandchildren, since I was little I took care of them so there were signs 'this body is not feeling well or something,' that's sad...."* (P2)

### Annoyed

*"Sometimes I get annoyed because I can't say if I want to pee so I still use a pamper, so I don't to the point of littering the house. So he can't be independent yet...."* (P6)

### Angry

*"Sometimes I get angry because he doesn't obey, but I really love him. Angry at my grandchildren can't really be angry. He's just a matter of taking a shower is hard. He didn't even want to enter the bathroom, so we had to seduce him with a gold toy so that his grandson would go to the bathroom and take a shower...."* (P3)

### Attention

*"Yes, it's normal, it's normal, children with special needs need affection, so if their parents can't take care of it, I take care of it...."* (P5)

### Fatigue

*"That's the complaint, my legs get tired sometimes because I have gout...."* (P1)

## Theme 3: Parenting Decisions

### Self-decision

*"They (parents and grandchildren) all work so I take a stand to take care of him. If a helper is handed over, it is not certain that it will be done. There is also no coercion in the care of grandchildren...."* (P5)

### Joint decision

*"His parents work, yes, we want to happily accept them together with his siblings as well, we are very supportive, so this is a mutual agreement, while people wanted to take it in the past, but we are*

*afraid because we are not in the same heart as we are afraid that something will happen to my grandchild. I used to have a student like this but he was not active, still like that, he continued to drink, he was given medicine, he continued to sleep and was left behind, how about that? Well, I'm very scared, and I will think if there is something wrong with our grandchildren, so now we are just worried...."* (P3)

### Theme 4: Activities during parenting

#### Learning

*"Sometimes he studies, if he's in the mood we guide him, but if he is forced, he doesn't want to...."* (P3)

#### Worship

*"I thank Allah SWT for the first time, he often saw me praying five times at that time, now he is the one who tells me the time for prayer and keeps saying he wants to go to the mosque or mosque, so he wants to ask to move to the prayer room, evening prayer at the prayer room for evening prayer ' The mosque is close to me, so I follow the problem according to my wishes...."* (P2)

#### Taking a walk

*"Where have you been if you want to walk like that, if I get it, go for a walk with his brother, younger brother, his father, his mother. Yes, I sometimes walk to TP, yes, but sometimes if I want to go to Malang, like yesterday, I didn't go along, I was tired so I couldn't join...."* (P5)

#### Playing

*"Yes, I usually bathe, yes I am invited to play. Come on, don't worry, yes that's usual, I want to ask for my pan to give me a bribe..."* (P4)

#### Watching TV

*"Grandma watching TV together, sometimes you listen to radio, listen to me..."* (P6)

#### Doing homework

*"In the morning, cook, cook, there are employees, right? Yes, I did cook. This is when it's still early morning with the mother, so I'll cook later if I want to go to a new school with me, right, there is a mother in the morning too. Brother, when night sleeps with his mother, this is the little one who sleeps with me, this is the second grandchild of my child..."* (P1)

#### Selling snacks in front of the house

*"I help my son sell snacks in front of the house, I also help wholesale the ingredients when they run out. It's good to be able to fill time and increase income."* (P2)

#### Community activities

*"Yes, at home, there are RW activities, mas, if there is a recitation and at home, the mother will take care of the mother. If the recitation in the mosque is Wednesday and Friday then the routine recitation is every Wednesday, sometimes Wednesday, sometimes it's Wednesday, sometimes someone asks for Saturday or Sunday, but if there are no parents, I don't dare to die, if the parents haven't come home, I don't have the courage. Died mas still a little pity...."* (P4)

### Theme 5: Fulfillment of daily needs

#### Meeting the needs of children from parents

*"Grandchildren's daily needs are met by their parents, we (grandfathers) only buy snacks when our grandchildren ask for it."* (P2)

*"All the needs of grandchildren are met by his father because his mother does not work."* (P4)

#### Compliance with the grandchildren needs by grandparent

*"I also help meet the needs of my grandchildren because I have a pension every month."* (P4)

*"I fulfill all the needs of my grandchildren because their parents need a lot of other expenses including therapy."* (P6)

### Theme 6: Addressing complaints

#### Break

*"Yes, sleep, rest and take medicine so that we don't get tired the next day we can do what we do again, so take care of the man...."* (P3)

#### Pray

*"I always pray for my grandson. I recited a verse about illness so that my grandson's illness would be removed. In addition, the doctor also said that before taking medication, read a prayer first. I believe God will help us if we pray."* (P2)

#### Get treatment

*"Yes, you anticipate if the medicine is routine every day, you have to drink it, sometimes you get hit with food, which may be too salty, so sometimes you are alert, sometimes you fight, bro. Cholesterol is indeed from a lot of fried foods, but if you boil tempeh, it's not delicious if it's not fried. The doctor's advice is not too strict on a diet, you just have to reduce it, but sometimes chronic disease conditions change to become uncomfortable, right, the mind can also catch a cold too. Yes, if he sleeps sometimes I can definitely rest if I don't sleep, I can't...."* (P5)

### Theme 7: Attitudes and perceptions

#### Informational support

*"Yes, you already know that the neighbors often ask 'Where are you being treated?' Yes, I said therapy. So you usually just ask" 'Mom, mom?' Yes, you can do it yourself, if you don't bring up your own children, you can run away, but you can do it, Mom.*

### Receive

*"Ohhh nothing, if in my neighborhood where there is a grandmother it is commonplace to take care of the grandchild because it seems like there is a grandmother, so if you want to join her grandmother, it doesn't matter because there is a tradition here...."* (P4)

### Disregard

*"It's not important to the neighbors, although there are assumptions that there are those who tend to talk like that, but my grandson, how come I don't receive payment, not forced to, if he thinks it's good, please if not yes please...."* (P5)

### Ordinary

*"Just normal, you don't say the one who takes care of me is only the parents saying thank you. Yes, if I asked for this, it was bought because it was spoiled education. If I did that, I taught Dewe. I should just have to rest because it is still needed so I have to help. I myself am a maid in Mongol, so don't have the heart for people to be the same, how come sometimes there are people who clam up, there is something like that, because they are still able to move unless there is no strength...."* (P5)

### Gossip

*"Yes, it is common for villagers to talk about their son-in-law, but I don't care about it ..."* (P6)

## Theme 8: Family Interaction

### Harmonious

*"There is no problem, our relationship is all good...."* (P4)

### Lack of communication

*"Yes, the interaction with my son number 5 is not good, like a disobedient child because he never calls. My son-in-law often wanders around rarely at home...."* (P6)

## Theme 9: Hope

### Independent

*"Yes, he can continue to be independent on his own. If God gives him health, independence can be useful for the mother and father, just like that. Independent in any way and must be supervised by parents. We support you together, you take care of each other. Grandchildren and children are stickier to grandchildren...."* (P3)

### Healthy

*"Yes, there is a limit, it's impossible for him to be faced with becoming an engineer. no need to be grandiose the important thing is healthy...."* (P5)

## DISCUSSION

The involvement of the older adults caring for grandchildren in this study is the role of the grandparents in meeting the educational and physical needs of the grandchildren. The role of the older adults is needed in the growth and development of grandchildren. Raising grandchildren is a shared responsibility of grandparents and parents. This is in line with the previous research (Fauziningtyas et al., 2018). Moreover, about 80% of grandparents say they are happy with their grandchildren (Santrock, 2002). The fundamental value in the family structure in Asia is to place parents as parties to be held and respected (Pujiatni & Kirana, 2013). The family maintains relationships between generations, where the early generations will always leave an influence on the next generation (Santrock, 2002). In addition, participants had feelings of joy during their time with their grandchildren and some older adults experienced or had complaints when caring for their grandchildren, but these complaints disappeared when the older adults saw their grandchildren happy. This is in line with research conducted by Rista et al. which states that "Grandparenting" in Java provides positive experiences and feelings of happiness for grandparents (Fauziningtyas et al., 2018). The experience gained by the older adults can make them the right figure to provide a benchmark for family values that should be applied (Pujiatni & Kirana, 2013). Moreover, the existence of a family can achieve individual needs such as support, love, and emotions like happiness (Wahyuni & Abidin, 2015).

Furthermore, participants said that they tend to make decisions for themselves because the older adults think that their grandchildren are everything and are the successor of the family. This is in line with previous research (Wahyuni & Abidin, 2015) which states that the experience gained by the older adults makes them a figure appropriate to provide a benchmark for family values that should be applied. Decisions that are taken collectively are due to the busy careers of the parents of the child. Furthermore, a family can be decisive in making decisions on other family members (Kertamuda, 2009). Likewise, grandchildren will learn ways to achieve social roles for themselves.

Additionally, participants often spent their time doing activities with their grandchildren. The older adults also do other activities when they do not care for their grandchildren, such as participating in community activities and doing household chores. This condition is similar to Papalia and Olds (2008) who found that the grandparents' activities are often having dinner together, watching television, shopping, and practicing or playing sports with their grandchildren. According to Duvall, the developmental task at old age is to adjust the stage of retirement by changing ways of life; the older adults accept the death of a partner, friends and prepare for death, the older adults maintain the intimacy of their partner and care for each other, and carry out past life

reviews (Setiadi, 2008). Santrock (2002) said that successful aging indicates the success of the older adults in facing the changes that occur in their life. This success is characterized by the ability to perform daily activities such as homework (Peterson, 2017).

Almost all of the fulfillment of the needs of the grandchildren came from both parents and grandparent. However, some grandparents meet almost all the needs of grandchildren because their mothers are not working and the older adults have pension funds. According to Papalia and Olds (2008), more than half of grandparents spend money on the needs of their grandchildren. Grandparents take care of their grandchildren while their parents work and prepare school supplies for their grandchildren, wait for their grandchildren's school, until they come home from school and at home. The fulfillment of formal and informal support for the older adults in raising grandchildren is in the form of fulfilling financial needs in the form of money (Choi, Sprang, & Eslinger, 2016).

Participants think that there are no damning complaints, everything can be resolved. It turns out that every time a complaint comes, the older adults feel paid off when they see their cute and healthy grandchild. Psychologically, physical fatigue can be relieved by praying in overcoming the disease. This is in line with research which states that grandparents only raise grandchildren when their children work; when parents have returned from work, the grandchildren are handed back to their parents. In addition, they said that they did not only talk to their grandchildren, they could be involved in other activities. For rest hours, the older adults feel very adequate because, when their grandchildren take a nap, the older adults also take a nap so they don't feel disturbed for resting (Suyanta & Ekowarni, 2012).

The attitudes and perceptions of the participants obtained different results, that the responses from neighbors about their grandchildren were different, some were normal, some supported helping remind, and some did not care. Older adults also sometimes hear words that are not wearing from people around them but the older adults choose to ignore it and stay focused on taking care of their grandchild. Parent figures in the extended family have a meaning in regard to parenting the children (Yulion, 2013). Parents trust more when their children are taken care of by grandparents than when they have to leave with someone else. This is in accordance with research which states that various experiences make a child believe that the care of grandchildren is carried out by the older adults rather than others outside the family, such as babysitters (Pujiatni & Kirana, 2013). Each family member must support each other because of an absolute obligation; *momong* and grandchildren are natural (Bulanda & Jendrek, 2014)**.**

Good relationships and support from family can help minimize discontinuity in the older adults (Papalia & Olds, 2008). A warm relationship with children is the highest support for the older adults. Therefore, a good relationship between children, son-in-law, grandchildren and family is very good for the older adults psychologically.

Older adults are happy in continuing to care for their grandchildren because the older adults want their grandchildren to learn ways to achieve social roles for themselves. There is also a developmental task for the older adults, which is called a life review, and allows the older adults to see the past that is in their grandchildren so that the older adults are very happy if they continue to care for their grandchild because they see their old identity in their grandchild (Wahyuni & Abidin, 2015)**.**

## CONCLUSION

Overall, this study shows that all participants felt positive experiences during grandparenting. Participants expressed the same response regarding the meaning of a grandchild. They believed that grandchildren are everything, beyond their own children, a diamond, a gift and a pride. In addition, they had feelings of joy at the birth of grandchildren and the decisions of grandparenting were from themselves. Most of the activities that are often done with grandchildren are playing. The other activities were participating in community activities, taking care of the household, watching TV, and selling snacks in front of their house. On the other hand, the feeling of tiredness and negative experiences will disappear when they see their grandchildren happy and cheerful. All participants think that the care of grandchildren is better with grandparents than with helpers.

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Original Research

# Challenges of Online Education among University Students, Saudi Arabia

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## ABSTRACT

**Introduction:** Online education during COVID 19 pandemic is witnessing significant growth, particularly in higher education. The aim of the study will explore the challenges that are being encountered related to online education for nursing students.

**Methods:** A correlational study using cross-sectional approach was adopted among 150 participants selected through convenient sampling technique. Data was collected through electronic survey from undergraduate students participated voluntarily studying in College of Nursing, King Khalid University, Abha, Saudi Arabia. The survey forms (Rating Scales on satisfaction and barriers of online education) were used to collect the data. Descriptive and inferential statistics were used to analyze the data by using SPSS version 24.0.

**Results:** The results revealed nearly 92% of participants were highly satisfied with online education. The mean scores and SD related to satisfaction of online education was (37.50+ 8.50). The global perceived barriers mean scores and SD were (35.19+11.19) which indicates that they were able to quickly adopt new strategies by overcoming the limitations.

**Conclusion:** The researcher concludes with the fact that study findings support that, students had positive perception on benefits of online learning by overcoming the limitations. In conclusion, online teaching and learning can be effectively incorporated in future also using blended approach.

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## INTRODUCTION

Digital transformation is not a novel phenomenon, and it has been accompanying higher education institutions for some years now (Leszczyński et al., 2018; Kopp, Gröblinger and Adams, 2019). Digital transformation of Higher Education institutions is a topical issue that involves several stakeholders of education must feel concerned about, abilities to apply ICT in every spheres of life, thus universities must be up to the task of preparing potential professional to be able to face challenges and provide solutions (Sandkuhl, K., & Lehmann, 2017; Bond et al., 2018), and this transformation has suggested the integration of sustainable management to be able to adjust to the modifications enforced as a result of novel technologies (Abad-Segura et al., 2020) and pandemic recently. Digital transformation in the context of higher education institutions can be regarded as the summation of all digital processes required to accomplish transformation process that gives higher education institutions the opportunities to positively apply digital technologies optimally (Kopp, Gröblinger and Adams, 2019). This process also consists of adequate strategic preparation, trust establishment, thinking in processes, amalgamation and reinforcement of all parties involved, separate, collaborative and organizational knowledge (Cameron and Green, 2019). A study to assess the challenges of online

education among undergraduate University students, King Khalid University, Saudi Arabia.

COVID-19 pandemic has disrupted face-to-face teaching in University students globally. The global impact of the COVID-19 pandemic on education systems across the world has led to major and rapid changes in the provision of higher and medical education, with increasing delivery of the curriculum by online approaches. A recent synthesis of the global responses by universities to the COVID-19 pandemic noted that the majority of universities were using online learning, but with differences between countries in the rapidity and extent of the shift (Gaur et al., 2020).

This pandemic has forced global physical closure of businesses, sport activities and schools by pushing all institutions to migrate to online platforms. Online learning is the use of internet and some other important technologies to develop materials for educational purposes, instructional delivery and management of program (Fry, 2001). There are two types of online learning, namely asynchronous and synchronous online learning, are majorly compared but for online learning to be effective and efficient, instructors, organizations and institutions must have comprehensive understanding of the benefits and limitations (Hrastinski, 2008).

Designing effective online learning requires careful consideration of many inter-related factors. The factors include the previous experience and preferences of students in using online learning, the experience of the educators in the use of online learning, the available technology, the learning content and the curriculum, the instructional approach to pro-vide activities that enhance learning and the local context, such as the culture and available infrastructure resources (Zaharias and Poylymenakou, 2009). All of these factors are unique to a specific local context and optimization of online learning requires a close alignment between the different factors within each context.

The use of remote learning as an emergency measure has affected students, faculty, support staff, and administrators. The aim of this narrative review paper is to examine the challenges and opportunities faced by medical schools in implementing remote learning for basic science teaching in response to the COVID-19 crisis.

In a study conducted by (Sean, Block and Judge, 2014) regarding certified adapted physical educators' (CAPEs) advantages and disadvantages of online education. One-hundred and six CAPEs representing 29 states completed the survey in US. The age range was 22 to 67 years (M=42), 72% of respondents were female, and average years of experience ranged from 1 to 38 years (M= 12.9). Nearly 86% reported to be satisfied with the experience.

The perceived barriers of online education were studied among 211 undergraduate students enrolled in Fundamental English course. Results indicated that the levels of needs and barriers of online learners in general were moderate. There were no statistically significant differences at 0.05 level found in barriers and needs of online learners as classified by gender, computer ownership, and computer aptitude. There was a negative relationship between computer aptitude and barriers of online learners at 0.01 level (Srichanyachon, 2014).

The pandemic has posed several challenges to premedical education (e.g., suspension of face-to-face teaching, lack of cadaveric dissections, and

Table 1. Frequency & Distribution of Demographic Variables of Participants Related to Challenges of Online Education (N=150)

| Baseline Characteristics | n | % |
|---|---|---|
| Level | | |
| 3 | 32 | 21.3 |
| 4 | 19 | 12.6 |
| 5 | 18 | 12 |
| 6 | 19 | 12.6 |
| 7 | 28 | 18.6 |
| 8 | 34 | 22.6 |
| Age in years | | |
| 17- 20 | 113 | 75.3 |
| 21-30 | 19 | 12.6 |
| Above 30 | 18 | 12 |
| Gender | | |
| Female | 100 | 100 |
| Marital status | | |
| Single | 141 | 94 |
| Married | 9 | 6 |
| Area of residence | | |
| Urban | 108 | 72 |
| Rural | 42 | 28 |
| Previous Online Education | | |
| No online experience | 101 | 74.3 |
| Taken online courses | 49 | 25.7 |
| Most commonly used online tool | | |
| Blackboard collaborator | 109 | 90.8 |
| Zoom | 41 | 9.2 |
| Preference of lectures | | |
| Live | 42 | 22.6 |
| Recorded | 60 | 13 |
| Live and recorded | 48 | 64.4 |

Table 2. Mean and SD of Satisfaction Scores of Online Courses among the Students (N=150)

| Score | Obtainable Score | Mean | SD | Level |
|---|---|---|---|---|
| Satisfaction score | 10-50 | 37.60 | 8.50 | Highly satisfied |

Table 3. Mean and SD of Perceived Barriers of Online Courses among the Students (N=150)

| Barriers | Obtainable Score | Mean | SD |
|---|---|---|---|
| Teaching and learning | 5-25 | 14.55 | 4.52 |
| Communication | 1-5 | 2.27 | 1.14 |
| Use of technology | 1-5 | 2.27 | 1.13 |
| Internet | 2-10 | 5.36 | 2.16 |
| Physical | 4-20 | 10.43 | 4.33 |
| Global Score | 13-65 | 35.19 | 11.19 |

practical/laboratory sessions) but has provided many opportunities as well, such as the incorporation of online learning in the curriculum and upskilling and reskilling in new technologies. To date, many medical schools have successfully transitioned their educational environment to emergency remote teaching and assessments. During COVID-19 crisis, the preclinical phase of medical curricula has successfully introduced the novel culture of "online home learning" using technology-oriented innovations, which may extend to post-COVID era to maintain teaching and learning in medical education. However, the lack of hands-on training in the preclinical years may have serious implications on the training of the current cohort of students, and they may struggle later in the clinical years. The use of emergent technology (e.g., artificial intelligence for adaptive learning, virtual simulation, and telehealth) for education is most likely to be indispensable components of the transformative change and post-COVID medical education.

The article includes an exploration of the satisfaction, methods of evaluation and perceived barriers related to online education among students studying in college of Nursing, Saudi Arabia.

## MATERIALS AND METHODS

A correlational study using cross-sectional approach was used to fulfill the objectives of the study. The total population of the nursing students at King Khalid University is 300. The study adopted convenient sampling technique conducted among 150 undergraduate students studying B.Sc Nursing in College of Nursing, King Khalid University, Abha, Saudi Arabia. Female students above 17 years of age, who showed willingness to participate were only selected for the study.

Data was collected using tools such as baseline profile of participants and rating scale to assess the challenges of online education. The following tools were used for data collection. 1)Proforma to collect Baseline Variables of the students. It was used to collect information on background characteristics such as gender, age, experience, and characteristics related to computer skills and online teaching & learning. 2)Rating Scale on Perceived benefits, of online education among students. There are 20-items, 5-point Likert scale (5-Strongly agree, 4-Agree, 3- Not sure, 2-Disagree, 1-Strongly Disagree). The obtainable score was 20-100. Higher scores indicated positive perception and vice versa. 3)Rating Scale on Perceived barriers, of online education among students. There are 20-items, 5-point Likert scale (1- Not a barrier, 2- Somewhat a barrier, 3-Not sure, 4-Barrier, 5- Significant Barrier) under five sub components such as teaching-learning barriers (5 items), physical barriers (5 items), internet barriers (3 items), technology barriers (3 items) and communication barriers (4 barriers). The obtainable score was 20-100. Higher scores indicated more barriers and vice versa.

The study was conducted after obtaining clearance from Ethical committee, King Khalid University, Saudi Arabia approval number ECM#2020-0807. Consent was obtained from all the participants, before the data collection. Confidentiality was maintained throughout the study. Data was collected from participants through electronic google forms. Descriptive and inferential statistics were used to analyze the data by using SPSS version 24.0.

## RESULTS

A total of 150 students participated in the study. Table 1 illustrates baseline profile of the participants from College of Nursing, King Khalid University, Abha. The respondents' opinions on whether online education was satisfactory or not and whether they would prefer online from traditional learning are vividly illustrated in the Tables and Figure 1.

The present study revealed that more than half of the study participants were between the age group

Table 4. Association between Selected Variables and Satisfaction of Online Education (N=150)

| Variables | N | Mean | SD | Test statistics (ANOVA- F) | p value |
|---|---|---|---|---|---|
| Gender | | | | 1.28 | p>0.05 |
|   Female | 150 | 35.22 | 10.96 | | |
| Marital status | | | | | |
|   Single | 141 | 35.21 | 11.0 | 0.199 | p>0.05 |
|   Married | 9 | 34.76 | 14.38 | | |
| Area of residence | | | | | |
|   Urban | 168 | 35.03 | 10.67 | 0.516 | p>0.05 |
|   Rural | 82 | 35.61 | 12.56 | | |
| Previous Online Education | | | | | |
|   No online experience | 108 | 34.84 | 11.98 | 0.342 | p>0.05 |
|   Taken online courses | 41 | 35.27 | 11.01 | | |

Table 5. Correlation between Age and  Satisfaction & Age and  Barriers of Online Courses Students (N=150)

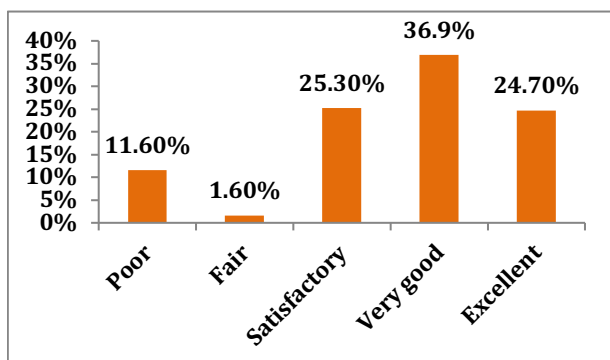| Variables | r value | p value |
|---|---|---|
| Age vs satisfaction | 0.039 | 0.375 NS |
| Age vs barriers | -0.008 | 0.856 NS |

Figure 1. Percentage Distribution of Overall Rating on Online Courses Attended by The Students

of 17-20 years (53.3%) female students (51.4%). Majority of the participants were unmarried (95.6%) with their area of residence from city (73.4%) had no online education previously. Majority of the participants utilized blackboard collaborator (90.8%) preferred live and recorded lectures (64.4%).

Table 2 denotes the satisfaction score of online education were highly satisfied with mean and SD (37.50+ 8.50) and 92% were satisfied with online education.

The perceived barriers of online courses can be highlighted in Table 3. The global perceived mean scores and SD were (35.19 + 11.19). Majority of the participants expressed teaching learning mean and SD (4.55+4.52). Physical barriers (43+4.33) internet barriers (5.36+2.16) technology barriers (2.27+1.14) and communication barriers (2.27+1.13).

Figure 1 highlights majority of the participants rated overall online education to be very good (36.90%) excellent (24.70%) good (25.30%) fair (1.60%) and poor (11.60%).

In Table 4 there were no significant association between selected demographic variables such as gender, marital status, area of residence, previous online experience, and satisfaction scores at p>0.05 level of significance.

Table 5 indicates there is a weak negative correlation between age and satisfaction (r=-0.03) which was not significant (p>0.05). Also, there is a weak negative correlation between age and barriers (r=-0.008) which was not significant (p>0.05)

## DISCUSSION

This This study reports the challenges of online education among undergraduate students studying in College of Nursing, King Khalid University, Abha, Kingdom of Saudi Arabia. The study provides valuable information for administrators and faculty to consider as they wrestle with online delivery issues such as satisfaction, barriers and needs of online learners.

Majority of the participants 92% were satisfied with online education. This research supported previous finding that the students are satisfied with the university staff and faculty members who agreed on specific online platforms to use, grading system,

assessment options, training workshops, online technical support, and more (Almusharraf and Khahro, 2020). The study results can be compared to similar study conducted among undergraduate students enrolled in Fundamental English course was moderately satisfied (Srichanyachon, 2014).

Majority of the participants expressed barriers as teaching learning. Some participants did voice concern about the lack of social interaction with teachers and students. There was also lack of personal relationship with teachers, lack of visibility with students. Physical barriers such as too much of eye strain, neck problems and typing problems were expressed by few participants. Another study also reveal similar finding that communication problem and physical barrier were another barrier for online learning (Baticulon et al., 2021). Communication barriers were expressed mean scores and SD (2.27+1.13). Lack of communication skills were expressed by students in another study (Gupta et al., 2016). Similar findings are also reported in study conducted by (Srichanyachon, 2014) who reported that students found the barriers of online learning general in terms of communication barriers. Even though they are experiencing online education satisfaction, but they also encounter barriers with the new method of learning due to limited face to face direct communication.

Internet barriers such as frequent connectivity issues were expressed by students residing in remote areas, technology barriers such as navigation of portal, submitting assignments, increased load. This situation also similar to other study conducted by (Baticulon et al., 2021; Roslan and Halim, 2021) that technological constraint also experience by medical students which pertain to hardware, software, and internet connectivity. Another study also have similar finding that the use of technology as well as connectivity become detention in successfulness of online learning, along with the availability of internet devices (Efriana, 2021) It is true that, to successfully accomplish the task related to technology one must be skillful and confident in working with computers, which is further facilitated by accessibility and availability of the lap tops/ desktops, practicing in day today life which is mandatory in the institutions of higher education. In the current study, moderate scores in perceived barriers may be due to the fact that, online education during covid-19 pandemic was first of its kind. Therefore, the students may be more anxious even though it was realized that, it was the only option which is available and feasible to continue learning to achieve the best outcome among the students. Many students were also more concerned about availability of the technology support for all especially those who are residing in villages and remote areas. At the same time, they also responded that, this in the only option which is available when traditional class room teaching method is not possible due to various circumstances, such as the

current lockdown situation, facing major disaster, natural calamities etc.

In this research there was negative correlation between age and satisfaction with online courses, between age and barriers of online courses. Similar study also depicts there was a negative relationship between computer aptitude and barriers of online learners (Srichanyachon, 2014). This finding was not supported previous study (Baticulon et al., 2021) that students with older age found it difficult with self evaluation on online learning. Another study (Rabin et al., 2020) found that age provide contribution to barriers which leads to dissatisfaction in online learning. From this finding we can state that in some cases ages were not correlated with barriers and satisfaction where younger generation found excitement with new technology of learning where older generation may find it difficult to adapt with the new method.

## CONCLUSION

Online technology education should take advantage of the perceived need to facilitate a wide variety of learner needs and capabilities. The coronavirus infection 2019 (COVID-19) pandemic is profoundly affecting emotional wellness. In conclusion, online education has found highly satisfied among undergraduate students. Faculty and institutions can take the results of this study into consideration for future development.

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Original Research

# The Effectiveness of a Nurse-led Team-Based Hypertension Management among People with Uncontrolled Hypertension in a Community Hospital, Thailand

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## ABSTRACT

**Introduction:** Uncontrolled blood pressure of people with hypertension remains a major public health issue. The purpose of this research was to evaluate the effectiveness of a Nurse-led Team-based Hypertension Management Program (NTHMP) among people with uncontrolled hypertension.

**Methods:** This quasi-experimental one-group pre-posttest design research was done to evaluate the effectiveness of a NTHMP in a community hospital in Thailand. The sample was thirty people with uncontrolled hypertension who received outpatient care in a community hospital in Thailand. They participated in three months NTHMP which included 1) team-approached health education, 2) medication administration support, 3) motivation interviewing on behavioral adjustment and 4) home blood pressure monitoring for three months. Outcomes of the program; systolic blood pressure, diastolic blood pressure, hospital admissions with signs of hypertensive urgency were analyzed by using frequency, percentage, mean, standard deviation, and repeated measured ANOVA.

**Results:** The results indicated that people with uncontrolled HT had lower systolic blood pressures and diastolic blood pressure compared with baseline levels (p<0.001), and no hospital admissions.

**Conclusion:** This program provided evidence for nurses to manage blood pressure control in people with hypertension within a collaboration with multidisciplinary team members in the community hospital.

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## INTRODUCTION

Hypertension (HT) exerts a staggering worldwide burden on human quality of life and healthcare system resources via contribution to increased mortality and risk of cardiovascular diseases, chronic kidney disease and stroke globally (World Health Organization, 2019). Worldwide, raised blood pressure (BP) is estimated to cause 7.5 million deaths, about 12.8 % of the total of all deaths (Basile & Bloch, 2019). In general, lifestyle management is recommended for people with mild HT (average BP = 140–159/90– 99), low-risk for cardiovascular diseases and no co-morbidities (Whelton et al., 2018). Antihypertensive drug with lifestyle management was used for lowering BP in the moderate HT (Flack

& Adekola, 2019; Thai Hypertension Society, 2019). The new ACC/AHA hypertension guidelines indicated the goal of hypertensive care is that people with HT have an SBP of 130 mmHg or lower and DBP of 80 mmHg or lower (Flack et al., 2019). However, the Thai Hypertension Society indicated the patient's BP should initially be lowered to under 140/90 mmHg and if the patient shows good tolerance to treatment then it should be further treated to <130/80 mmHg (Thai Hypertension Society, 2019). Therefore, people with HT who can manage their medication taking and behavioral life style well until they achieve a BP < 140/90 mmHg are defined as having controlled HT, while others having a BP > 140/90 mmHg two times continuous have uncontrolled HT.

On the Health Disease Control (HDC) dashboard of the Ministry of Public Health (MOPH), data during 2017-2019, it was found that the prevalence rate of controlled HT was 35-50% in a cumulative data of district, provincial, and national levels (Health Data Center, 2020). These data affected Bang Rakam Hospital, a small community hospital in Phitsanulok province, Service area 2, MOPH which rethought and made a new plan to improve quality of hypertensive care.

Unhealthy lifestyle choices and non-adherence to medication are major causes of uncontrolled hypertension and are a high risk to progress to cardiovascular disease, chronic kidney disease and stroke that could threaten health and endanger life (Williams et al., 2018). Acute signs of very high blood pressure, which is called "hypertensive urgencies" have signs of stroke that threaten sudden death (Bakris, 2019). Practicing a healthy lifestyle; physical activity, healthy diet, restricted alcohol consumption, salt restriction, avoidance of tobacco use, and stress reduction and adherence to anti-hypertension medication are recommended in hypertension care (Alsaigh et al., 2017; Flack et al., 2019; Whelton et al, 2018).

Promoting lifestyle behavior changes among people with HT aimed at lowering BP to normal level is herculean. In the review, it was found that health education and practice on the DASH program (Seangpraw et al., 2019), aerobic exercise training (Bersaoui et al., 2020), supervised walking (Mandini et al., 2018), mindfulness (Ponte Márquez et al., 2019), small group discussion and feedback about hypertension (Thongdang & Promsiripaiboon, 2015), and self-care management program (Plaiyod, Panpakdee, & Taikerd, 2012) are helpful for lowering blood pressure among people with hypertension. Self-monitoring blood pressure (SMBP) significantly reduced office blood pressure and improved medication adherence (Muhammad, Jamial, & Ishak, 2019). SMBP at home may increase patient engagement and improve BP control (Ho, Carnagarin, Matthews, & Schlaich, 2018). SMBP and co-interventions (including systematic medication titration, health education, or lifestyle counselling) leads to clinically significant BP reduction (Tucker et al., 2017). A technique proved to have benefits to promote appropriate behaviors and decrease blood pressure levels among HT is motivational interviewing (MI). It was found that MI is powerful in reduction of SBP or DBP and weight reduction (Ozpulat & Emiroglu, 2017), improves the adherence to a low-sodium diet, adherence to self-care behaviors, regular use of antihypertensive medications, increases or maintains physical activity (Silveira et al., 2019), evaluation of changes in daytime sleepiness, and cessation of smoking and cessation of drinking (Dechkong, 2017). It elicited behavioral changes by helping clients to explore and resolve ambivalence (Rollnick & Allison, 2004).

At the primary care level in district hospitals, the healthcare team of hypertension management includes a physician, pharmacist, physical therapist and professional nurse. At this setting, a nurse who trained to be nurse practitioner (NP) usually acts as case manager, whereas the physician focuses on prescribing medication (Proia et al., 2014). Although hypertensive guidelines are recommended, a paradigm shift from fragmented care to a team approach is aimed at improving the quality of hypertensive care management (Flack et al., 2019; Thai Hypertension Society, 2019). Team-based care was able to increase the proportion of people with controlled BP and reduced both SBP and DBP, especially when pharmacists and nurses were part of the team (American College of Cardiology/American Heart Association Task Force, 2017). Team approach could be kept viable on hypertension management, the organizational leader must be committed and willing to allocate the necessary resources (World Health Organization, 2019). People with HT should be active partners, working with the health team to create a self-individualized plan (Patel et al., 2016).

Therefore, this research integrates concepts of hypertension management and team-based care to develop a Nurse-led Team-based Hypertension Management Program (NTHMP) aimed at improving blood pressure among people with uncontrolled HT.

## MATERIALS AND METHODS

A one-group quasi-experimental repeated measure design was used as protocol. The program's effectiveness was tested by comparing the differences in SBP and DBP levels at before, the first and second month after the programmed interventions, and three months post-intervention of the sample. The number of hypertensive urgency and hospital admission by the sample post intervention was counted to calculate the effectiveness of the developed program.

The population was uncontrolled HT of chronic care clinic in Bang Rakam Hospital, a community hospital in Phitsanulok province, Service area 2, Ministry of Public Health, Thailand. They were 598 patients who met the inclusion criteria; 1) had BP>140/90 mmHg two times and over 2) received hypertensive medication, and 3) able to participate in the program. If they had HT complication such as stroke, chronic kidney disease, and heart disease, they were excluded. If they changed hypertensive medication and/or moved to receive another health serviced and/or could not participate in all activities of the program, they were withdrawn. The sample size calculation of Polit and Beck using power analysis was employed to reduce the risk of type I error. The minimum level of significance ($\alpha$) to estimate the number of sample size was 0.05 with the power of 0.80 (1-ß), which would yield a sample size of n=30. They were 598 patients who met the inclusion criteria, the investigator used simple random sampling for sample selection. The researcher listed all of the population members initially, and then each member was marked from 1 to 598. Random Number

Generator Software, an internet application, was used for simple random sampling. The researcher followed the direction of generator software until receiving 30 selected numbers. The selected numbers were compared to an organized list for getting name and phone numbers of the sample. The professional nurse of the chronic care clinic who acted as coordinator, invited the selected sample to participate in the research project by phone call. If any sample was not willing to participate in the project, the researchers could select a new number by generator software.

There were two types of instruments used in this research: an intervention instrument and a collected instrument. They were tentatively developed by focus group among health providers and people with uncontrolled HT which was the prior step of this research project (Oba & Chutipanyaporn, 2018).

First, the intervention instrument was the care process of the NTHMP or the program, including:

### Team-approached health education

It was designed at the time of OPD visit divided into four sessions (30-45 min/session) for group health education. A physician taught on DASH dietary practices, a physical therapist worked on increasing individualized physical activity, a pharmacist taught how to take medication correctly and regularly, and a Thai traditional practitioner demonstrated stress reduction practices. After each session, there were open discussions on the practice which took around 15-20 minutes/session.

### Medication taking support

The pharmacist checked the remaining medication of participants at each visit. If the pharmacist found out that some participants took medicine irregularly, then she wrote a small note in the patient's record for NP and the physician reviews and educated them on how to take the antihypertensive drug correctly.

### Home blood pressure monitoring (HBPM)

The nurse practitioner demonstrated how participants can measure their own BP and suggested the time measured should be based on two measurements taken in the morning or two measurements taken at night over a preferred period of seven days. After learning from the NP, the participant practiced to measure their blood pressure in the correct position, how to read the results, and how to record the outcome by writing in a notebook.

### Motivation interviewing on behavioral adjustment

The nurse practitioner applied the four steps of motivational interviewing (MI); engaging, focusing, evoking, and establishing, which was developed by Miller and Rollnick for helping participants explore and resolve their ambivalence problem as well as promoting behavioral adjustment (McNeil, Addicks, & Randall, 2017).

Second, the collecting instrument was a form for recording the participant's office SBP and DBP at before, first month, second month, after the programmed interventions, and three months post-intervention as well as the number of hypertensive urgencies experienced by each patient. This parameter was collected from their medical records.

The intervention instrument and the collecting data were evaluated for content validity by three independent experts: a medical doctor, a lecturer, and professional nurse. A consensus form of agreement was developed with a scale ranging from +1 = not relevant, +2 = item need some revision, +3 = relevant but need minor revision, +4 = very relevant, and included an opened-ended option for expert suggestions. This consensus form was based on the content validity index (CVI) technique. The values of the CVI calculations for two research instruments were 1.00.

Researchers coordinated with the hospital director for asking permission to conduct the research. After permission was given, simple random sampling was used to find the participants as explained in detail in the samples section earlier. After respondents' agreement via mobile phone, researchers made an appointment with them for clarifying the objectives, intervention, and signed their ethic consent at the chronic care clinic before staring the program. There were 30 people with uncontrolled HT participated in this research. The researchers ran the NTHMP and collected the data at the chronic disease clinic as follow:

At the first day of the program, after 30 participants' baseline blood pressure levels (SBP and DBP) were collected by automatic blood pressure machine of chronic care clinic, two sessions of group health education, antihypertensive drug and self-monitoring blood pressure demonstration were done in a hospital meeting room. The health educators were a pharmacist and researchers (NP) which took 20 and 30 minutes, respectively. These two activities were completed before participants met the physician for routine check-up and medication prescribing.

At first month visit, participants' blood pressure was collected by the chronic care clinic automatic blood pressure machine . Pharmacists checked each participant's remaining antihypertensive medications and asked about how to take each medication. Two sessions of group health education, DASH diet and benefits of physical activity and muscle-strengthening practice were done in a hospital meeting room. The health educators were a physician and physical therapist which took 30 and 20 minutes, respectively. Then, one by one, participants met the principle researcher who acted as NP the counseling room of the chronic disease clinic. NP review participants' BP home records and applied individual face to face brief MI of around 5-15 minutes/participant before participants met the physician.

At second month visit, the participants' blood pressure was collected by the chronic care clinic automatic blood pressure machine. The pharmacists

checked each participant's remaining antihypertensive medications. One session of group health education, neck massage and foot soaking by Thai traditional practitioner was done for 30 minutes in a hospital meeting room. Then, the NP reviewed participants' BP records for identifying their performances. NP performed brief MI with participants one by one before participants met the physician.

At third month visit or after intervention, participants' blood pressure was collected by the chronic care clinic automatic blood pressure machine. Pharmacists checked each participant's remaining antihypertensive medications and asked about how to take each medication. NP reviewed participants' BP records for identifying their behavioral change. NP evaluated the participant behavioral adjustments and motivated them to continue their appropriate behaviors. Therefore, the intervention was delivered for three months. There were no respondent drop out during the intervention.

At three months post-intervention (three months after completing the intervention), thirty participants' blood pressures were collected by the chronic care clinic automatic blood pressure machine.

The SBP and DBP data were analyzed by using mean and standard deviation. The difference of the average mean of SBP and DBP was analyzed using repeated measured ANOVA. The number of hypertensive urgencies and the number of admissions reported for the sample were counted and percentages were analyzed.

Ethics clearance for this research was obtained from the Ethics Committee for Research and Human Studies of Naresuan University in Thailand (number COA No.240/2014, October 3, 2017). The researchers provided details of the study to the participants prior to obtaining informed consent. Confidentiality was assured by code numbering in all data and only the lead investigator was able to identify names with individual participant responses. The researchers obtained written consent and participants understood they could withdraw from the study at any time without penalty to assure protection of participant rights.

## RESULTS

Table 1 shows personal data of 30 participants: mostly were male (63.3%) and female (36.7%). Their ages were between 20-29 years (3.3%), 40-49 years (6.7%), 50-59 years (46.7%), and >60 years (43.3%). They finished primary school level (80.0%), secondary school level and technical school (10.0%), and bachelor's degree level (10.0%). Their occupations were farmer (56.7%), merchant (3.3%), general contractor (23.33%), office worker (13.3%) and unemployed (3.3%). They were diagnosed with HT for 1-5 years (76.7%), 6-10 years (20.0%) and >10 years (3.3%).

Table 2 displays the blood pressure before, first month, second month, after intervention, and three months post- intervention of people with uncontrolled HT. The results showed both SBP and DBP were significantly lower than at before intervention levels (p<0.001).

Table 3 shows post intervention, blood pressure level ranges demonstrating greater the number of participants with levels of higher BP decreased. At three months post- intervention both SBP and DBP are mostly still in the same range with at post

Table 1. Demographic Characteristic of Participants in Nurse-led Team-Based Hypertension Management Program (NTHMP)

| Demographic characteristic | Number | Percent |
|---|---|---|
| Sex | | |
| Male | 19 | 63.3 |
| Female | 11 | 36.7 |
| Age (year) | | |
| 20-29 | 1 | 3.3 |
| 30-39 | - | - |
| 40-49 | 3 | 6.7 |
| 50-59 | 14 | 46.7 |
| >60 | 13 | 43.3 |
| Education | | |
| Primary school | 24 | 80.0 |
| Secondary school /Technical school | 3 | 10.0 |
| Bachelor's degree | 3 | 10.0 |
| Occupations | | |
| Farmer | 17 | 56.7 |
| General contractor | 7 | 23.4 |
| Office worker | 4 | 13.3 |
| Merchant | 1 | 3.3 |
| Unemployed | 1 | 3.3 |
| Duration of HT | | |
| 1-5 years | 23 | 76.7 |
| 6-10 years | 6 | 20.0 |
| >10 years | 1 | 3.3 |

Table 2. Systolic Blood Pressure and Diastolic Blood Pressure of People with Uncontrolled HT Before, First Month, Second Month, After Intervention, and Three Months Post-Intervention (N=30)

| Blood pressure (mmHg) | Mean | S.D. | Type III SS | df | F | p-value |
|---|---|---|---|---|---|---|
| Systolic BP | | | | | | |
| Before intervention | 144.55 | 10.34 | | | | |
| 1st month | 131.23 | 12.86 | 2818.26 | 1 | 25.46 | 0.000*** |
| 2nd month | 130.18 | 12.94 | | | | |
| after intervention | 125.48 | 12.89 | | | | |
| 3 months post-intervention | 132.10 | 11.28 | | | | |
| Diastolic BP | | | | | | |
| Before intervention | 90.38 | 5.06 | | | | |
| 1st month | 78.85 | 7.98 | 2160.08 | 1 | 51.52 | 0.000*** |
| 2nd month | 78.55 | 11.18 | | | | |
| After intervention | 74.38 | 8.29 | | | | |
| 3 months post-intervention | 79.03 | 7.63 | | | | |

*** $p < 0.001$

Table 3. Amount and Percentage of Blood Pressure among People with Uncontrolled HT Before, After Intervention, And Three Months Post- Intervention

| BP Ranges (mmHg) | Before intervention | | After intervention | | Three months post- intervention | |
|---|---|---|---|---|---|---|
| | n | % | n | % | n | % |
| Systolic | | | | | | |
| 101-120 | | | 12 | 40.0 | 8 | 26.7 |
| 121-140 | 13 | 43.3 | 16 | 53.3 | 17 | 56.7 |
| 141-160 | 15 | 50.0 | 1 | 3.3 | 5 | 16.6 |
| 161-180 | 2 | 6.7 | 1 | 3.3 | | |
| Total | 30 | 100 | 30* | 100 | 30 | 100 |
| Diastolic | | | | | | |
| 61-70 | | | 8 | 26.7 | 2 | 6.7 |
| 71-80 | | | 16 | 53.3 | 16 | 53.3 |
| 81-90 | 21 | 70.0 | 4 | 13.3 | 9 | 30.0 |
| 91-100 | 9 | 30.0 | 2 | 6.7 | 3 | 10.0 |
| Total | 30 | 100 | 30* | 100 | 30* | 100 |

*) no admission in hospital with signs and symptoms of hypertension urgency

intervention. In addition, no participants were admitted into the hospital with signs and symptoms of hypertensive urgency until at three months post-intervention.

## DISCUSSION

The results indicated that people with uncontrolled HT had lower systolic blood pressures and diastolic blood pressure compared with baseline levels ($p < 0.001$), and no hospital admissions. It indicates that NTHMP could be able to lower risk of cardiovascular disease, chronic kidney disease, and stroke as well as improving quality of hypertensive care. The four reasons for this effectiveness of program are as follows:

First, the nurse practitioner, a leader of NTHMP, designed the group health education by inviting the healthcare team of a community hospital to provide knowledge and skills into four topics, DASH diet, increasing physical activity, stress relaxation, and medication taking. These four topics were selected by evidence based which could be effective to lower blood pressure (Dechkong, 2017; Ozpulat et al. 2017; Silveira et al., 2019). DASH diet, a health education, was taught by a physician because there was no dietician position in small community hospitals in Thailand. In the belief that a physician is

knowledgeable in the treatment of diseases, participants obeyed and followed the advice of the physician, which allowed them to adjust their eating behaviors until their blood pressure levels were reduced. Previous reviews found the modified DASH diet (Guo et al., 2021), progressive muscle relaxation technique (Kep, 2018), and the mindfulness-based stress reduction program (MBSR) (Lee et al., 2020) can markedly decreased systolic and diastolic blood pressure of hypertension patients. In addition, the intervention group who received a supportive educational program by an interdisciplinary health are team had significantly lower SBP and DBP than those of the control group (Rerkluenrit, Shi, & Pramuansup, 2018). Therefore, group health education of NTHPM helped participants to have knowledge on diet consumption, adequate physical activities and stress relaxation technique which they could apply in their daily life and might result in blood pressure reduction.

Second, most of the participants in this research were low economic status. The nurse practitioner taught how participants could measure their own blood pressure and how to record and interpret the outcome. This research provided blood pressure machines for each participant to measure their blood pressure at home during intervention. Home blood

pressure records helped participants identify their current blood pressure and remind to adjust their diet and physical activities day to day. Participants' blood pressure records were reviewed by NP at first, second and third month visit for clarifying daily BP at home. The participants who measured more blood pressure learned more on how to control behavioral change related to their blood pressure. There is supporting evidence that BP measurement at home helps remind patients to continuously take antihypertensive and leads to better control of BP (Thai Hypertension Society, 2019). Short-term home blood pressure monitoring significantly reduces office blood pressure and improves medication adherence (Muhammad et al., 2019). SMBP and co-interventions lead to clinically significant BP reduction (Tucker, et al, 2017). So, HMBP helps participants to keep their blood pressure at target level and to prevent dangerous high blood pressure level.

Third, from systematic review and meta-analysis of non-adherence of antihypertensive drug, it was found that non-adherence to antihypertensive medications was noticed in 45% of the subjects studied and a higher proportion of uncontrolled BP (83.7%) (Melaku et al., 2017). This research planned to solve non-adherence of antihypertensive drug by cooperating with a pharmacist who is a member of the health team, to monitor antihypertensive taking of participants at their second-third visits. These activities helped participants take antihypertensive drug correctly and effectively and to ensure that all participants had received the full range of antihypertensive drug which could be effective to decrease blood pressure. Prior research found educational intervention alone may not improve patients' BP control and medication adherence to antihypertensive medications. Pharmacist-led interventions improved BP control and medication adherence through education, counseling, or a combination of both (Reeves et al., 2020). The medication taking monitoring was done by a pharmacist to lower blood pressure of participants through education and counseling.

Fourth, from literature review, it was found that MI is powerful for behavioral change among persons with hypertension (Dechkong, 2017; McNeil, Addicks, & Randall, 2017; Silveira et al., 2019). In this research, NP applied face to face brief MI around 5-15 minutes/participant to ensure that all participants understood the necessity of behavioral change. MI did not waste the participant's time because it was performed while the patient was waiting to see a doctor. Similarly, a research found that motivational interviews can be used in the acquisition of a healthy nutrition habit by hypertensive individuals, the increase in their exercise levels, and regulation of blood pressure (Ozpulat, et al, 2017). From meta–analysis reviews, interventions based on MI only or those with coaches were the most effective in hypertension improvement and MI (face to face delivered) was more effective than phone delivered

(Zomahoun et al., 2017). MI by NP helped participants to confirm that they could have diet consumption, physical activities, and perform stress relaxation suitable for their lifestyle, which could lead to blood pressure reduction.

HBPM was proven to have high potential to improve BP control but its devices are more expensive for low-income clients which is not affordable as well as a high gain of hospital support. This technique could be recommended to be applied in cases of high-income people with HT. Nevertheless, the interested people may use self-blood pressure devices in sub-district health promotion hospitals (SHPH) nearby their homes.

MI on behavioral adjustment is a good technique which helps participants by thinking and planning for their lifestyle changes. Nurses in OPDs and NPs in the primary healthcare system could learn the application of MI or be trained this technique via technology communication (IT) or extraordinary learning resources and find out the proper time to play this role.

It is a good opportunity of NP in SHPH, which had no pharmacist working in order to work on medication taking support, especially in older adults and those with low health literacy.

NTHMP was applied in a small community hospital, which had lack of a dietitian who is the expert on diet consumption. NP and physician take more time to work on diet lifestyle changes of the participants.

## CONCLUSION

The overall results showed that NTHMP was effective in lowering SBP and DBP and prevented hypertensive urgency episodes among people with uncontrolled HT. NTHMP is effective due to the design of the program, including team-approached health education, medication taking support, HBPM and MI on behavioral adjustment. The key successes of the program were participation among health providers and people with uncontrolled HT.

To strengthen the program testing approach, a two-group pre-posttest experimental design should be applied. Nurses in community hospitals/primary healthcare level could apply a nurse-led team-based hypertension management for people with uncontrolled HT by increasing other outcomes such as self-management skill, body mass index, and stress scale to clarify the approaches' effects on lifestyle modification. To extend the role of NPs on hypertensive care, a study on people with non-adjusted antihypertensive drug to continue their lifestyle practices and prevent the complications should be done.

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Original Research

# Teenagers' Safety Smartphone Use Model Based on Health Promotion Theory

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## ABSTRACT

**Introduction:** Smartphones and teenagers in the age of technology are two very close things. Uncontrolled use of smartphones can create serious problems for teenagers, namely addiction. This research aims to build a safe smartphone use model for teenagers using a health promotion theory.

**Methods:** This study was an explanatory study with a cross-sectional approach. The study population was 11-18 year old teenagers in Surabaya, Indonesia who use smartphones actively. The respondents were 185 teens recruited by simple random sampling. Variables include teenager factors, technology factors, environmental factors, teenagers' thinking, self-control, commitment, and the level of smartphone use. The instrument used was an on-line questionnaire distributed through social media and then analyzed with partial least squares. The statistical afforded material for focus group discussion followed by 15 teenagers, 15 parents and 5 health workers in order to improve the model.

**Results:** The results showed that the level of smartphone use was affected by self-control (t=2.303; p=0.022) and commitment (t=2.967; p=0.003). Self-control is influenced by adolescent factors (t=3.065; p=0.002), environmental factors (t=2.934; p=0.004) and teenagers' thinking (t=2.522; p=0.012), also self-control affects teenagers' commitment for using smartphones (t=3.953; p=0.000).

**Conclusion:** The model formed emphasizes the importance of establishing self-control through adolescent thinking and environment factors so that they can commit to using smartphones safely.

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## INTRODUCTION

The use of smartphones by teenagers in the era of the Covid-19 pandemic is a necessity because all teenagers have undertaken on-line learning for school. Teenagers use smartphones actively as a means of meeting the needs of interaction with peers and most importantly for online school learning activities (Lenhart, 2015). Teenagers are required to be able to use smartphones appropriately and wisely so that they do not experience gadget addiction, especially smartphones (Cocorada, Maican, Cazan, & Maican, 2018). The number of smartphones in use in the world today is about six billion and is forecast to grow by several hundred million in the pandemic era (O'Dea, 2021). In Indonesia, 90% of high schools students own and use a smartphone (Machmud, 2018; Nurhayati, 2021). Teenagers in the city of Surabaya are detected using smartphones for more than 10 hours per day, which can be grouped into excessive smartphone use. Teenagers who use

smartphones with high intensity have the potential to refuse activities because they tend to withdraw from social interaction (Fitryasari, Tristiana, & Yusuf, 2020). Self-control is the main key so that adolescents do not experience addiction (Fauzi, Yusuf, & Mundakir, 2019). Good self-control will determine the right decision-making behavior, because the ability to read the situation and be selective about environmental influences fosters good self-control abilities (Bandura, 2002; Gufron & Riswanita, 2010). Adolescents aged 12-25 years are in a transitional phase from childhood to early adulthood and are required to be able to go through an adaptation process to be able to control themselves towards true adulthood (Kementerian Kesehatan RI, 2015; Prawirohardjo & Sarwono, 2005). The ability of self-control helps adolescents to filter out various adverse situations and conditions (Gufron & Riswanita, 2010). Smartphone addiction

can occur due to an individual's failure to control himself (Sun, Liu, & Yu, 2018).

The ability of adolescents to control the use of smartphones in this study uses the perspective of the Health Promotion Model theory which focuses on the formation of self-control that affects adolescent commitment by conditioning existing thoughts through interpersonal stimulation from the environment, including health workers (Murdaugh, Parsons, & Pender, 2018). The novelty in this model is adding the variables of self-control ability and interpersonal stimulation of health workers so that adolescents are able to form a high commitment to healthy behavior, using smartphones safely. Previous studies state that self-control in children and adolescents can be a predictor of the level of smartphone use and prevent addiction (Lee, 2015; Servidio, 2019; Troll, Friese, & Loscheldera, 2021). This study aims to build a safe smartphone use model for adolescents based on health promotion theory.

## MATERIALS AND METHODS

This study used an explanatory research design with a cross sectional approach. The study population was teenage smartphone users in Surabaya during the COVID-19 pandemic. Respondents were obtained through a purposive sampling technique and obtained 185 teenagers as research samples. Respondents were selected based on inclusion criteria of teenagers aged 11-18 years, actively using smartphones, and participating in online learning from school. Variables include teenager factors, technology factors, environmental factors, teenagers thinking, self-control, commitment, and the level of smartphone use. The research was conducted in two stages. The first stage is a meta-analysis of teenagers' factors, technological factors (smartphones), environmental factors, teenagers thinking, self-control, commitment, and level of smartphone use. The results of the meta-analysis obtained structural models and strategic issues. The results of the first stage became the material for the second stage of research. Focus Group Discussion (FGD) involving teenagers, parents, and health workers. The data was then compiled to develop a safety smartphone use model for adolescents.

The instrument used for the first phase of research is a questionnaire developed by the researcher based on the previous questionnaire and theory. The teenagers factor instrument consists of demographic data (gender and age) and emotional intelligence questionnaire. The emotional intelligence questionnaire adopted from Goleman (2003) consists of five indicators: recognizing one's own emotions, managing emotions, motivating oneself, recognizing other people's emotions and building relationships (Killian, 2012). Technological factors consist of instruments to determine ownership of internet and smartphone-based tools, access to smartphone use and social media.

Ownership of internet-based devices and smartphones includes indicators of the number of smartphone devices owned, types of devices and types of data packages used to access smartphones. Access to smartphone use consists of three indicators, namely the length of smartphone use in one day, the most frequent time to access a smartphone, and the reason for using a smartphone. Social media consists of the types of social media that are often accessed and the activities carried out while accessing social media. The technological factor questionnaire was developed from a questionnaire developed by Oktario (2017).

The environmental factor instrument consisted of a questionnaire about parental and teacher control, demands for schoolwork, peer influence and interpersonal stimulation from health workers. The questionnaire on parental and teacher control was modified from Li, Li, & Newman (2013) which consisted of indicators of attention, restriction and supervision. The school assignment demand questionnaire was developed from Alfin (2017) which has been modified and consists of online school material indicators, online assignments, and online exams. The researcher modified the peer influence questionnaire based on the concept of peer function according to Santroc (2003). The interpersonal stimulation questionnaire from health workers was compiled from the concept of the role of health workers (Potter & Perry, 2007).

Table 1. Respondents' Characteristics

| Teenagers Characteristics | Category | n(%) |
|---|---|---|
| School ownership | Public | 134 (72.4) |
| | Private | 51 (27.6) |
| Home area (in Surabaya) | East | 83 (44.9) |
| | North | 16 (81.6) |
| | West | 45 (24.3) |
| | South | 11 (5.9) |
| | Central | 30 (16.2) |
| School area (in Surabaya) | East | 69 (37.3) |
| | North | 20 (10.8) |
| | West | 34 (18.4) |
| | South | 12 (6.5) |
| | Central | 49 (26.5) |
| School Grades | 7th | 2 (1.1) |
| | 8th | 4 (2.2) |
| | 9th | 6 (8.6) |
| | 10th | 21 (11.4) |
| | 11th | 121 (65.4) |
| | 12th | 21 (11.4) |

Table 2. Distribution of Teenagers' Factor

| Variable | Category | n(%) |
|---|---|---|
| Gender | Male | 125 (67.6) |
| | Female | 60 (32.4) |
| Age (years) | 13 | 5 (2.7) |
| | 14 | 12 (6.5) |
| | 15 | 17 (9.2) |
| | 16 | 101 (54.6) |
| | 17 | 34 (18.4) |
| | 18 | 16 (8.5) |
| Emotional Intelligence | Low | 85 (45.9) |
| | High | 100 (54.1) |

Table 3. Distribution of Technology's Factor

| Variable | Category | n(%) |
|---|---|---|
| **Smartphone ownership** | | |
| Amount | 1 | 134 (72.4) |
| | 2 | 47 (25.4) |
| | >2 | 4 (2.2) |
| Device type | Handphone | 184 (99) |
| | Laptop | 49 (26.5) |
| | Tablet | 9 (4.8) |
| Data packaged used | Daily | 10 (5.4) |
| | Weekly | 14 (7.5) |
| | Monthly | 98 (52.97) |
| | Home-Wifi | 92 (49.7) |
| **Access smartphone use** | | |
| Length of use (hour/day) | Mean | 8.04 |
| | SD | 5.05 |
| Most frequent time | Morning | 37 (2.0) |
| | Noon | 86 (46.5) |
| | Afternoon | 65 (35.1) |
| | Evening | 120 (64.86) |
| | Midnight | 30 (16.2) |
| Reason for use | School assignment | 159 (85.9) |
| | Browsing | 155 (83.7) |
| | Communication | 163 (88.1) |
| | Social Media | 159 (85.9) |
| | Leisure time | 141 (76.2) |
| | Playing game | 98 (52.9) |
| | Business | 36 (19.4) |
| | Self-actualization | 19 (10.2) |
| | Lifestyle | 28 (15.1) |
| | Watching Korean movies | 1 (0.5) |
| **Social media access** | | |
| Application | Facebook | 21 (11.3) |
| | WhatsApp | 167 (90.3) |
| | Line | 68 (36.7) |
| | Instagram | 160 (86.4) |
| | Snap-chat | 16 (8.6) |
| | You tube | 133 (71.8) |
| | TikTok | 22 (11.8) |
| Frequent activity | Status Update | 53 (28.6 |
| | Photo Upload | 28 (15.1 |
| | Comment/like | 112 (60.5 |
| | Profile update | 31 (16.7) |
| | Browsing | 162 (87.5) |
| | Chatting | 9 (4.8) |

The adolescent self-thinking instrument consists of four indicators, consist of benefits, obstacles, beliefs, and the impact of smartphone use on adolescents. This instrument was developed based on the concept of health promotion and a smartphone using a questionnaire (Murdaugh et al., 2018; Van Deursen, Bolle, Hegner, & Kommers, 2015). The adolescent self-control instrument consists of three indicators, namely cognitive control, behavioral control, and decision making modified from the Self Control Model and a smartphone using a questionnaire (Li et al., 2013; Van Deursen et al., 2015). The smartphone use instrument was developed from the smartphone addiction scale instrument according to Haug

(2015). All questionnaires have been tested for reliability and validity as a pilot sample on 30 respondents. The test results show that the components of the questionnaire are valid and reliable (p>0.73).

Data collection at the first stage was performed using an online questionnaire via a Google form and is distributed through social media. A written explanation of the objectives, benefits and procedures of the research is clearly informed. All respondents who agreed to participate in the study had to obtain parental consent by signing an online informed consent, and consent was confirmed by telephone. The second stage of the research was FGD which involved 15 teenagers, 15 parents and 5 health workers. The FGD was conducted by describing the results of the first phase of the research and discussing the main questions (Table 1).

Analysis of the data obtained in the first stage was analyzed using the Partial Least Square (PLS) test. PLS is used to analyze the influence between variables which is determined by the t-statistic value (t>1.96), while the direction of influence is determined by the path coefficient (-/+). The result will be used as material (question) for FGD. The data of the FGD were recorded, transcribed, and analyzed using the Braun and Clarke Thematic Analysis approach. These stages were understanding the data, generating initial codes, searching for themes, reviewing themes, defining, and naming themes and producing the report. The results were then compiled to develop the models.

Ethics clearance has been approved and obtained from the Ethics Committee of the Faculty of Nursing Universitas Airlangga with the number: 2018-KEPK.

## RESULTS

The characteristics of the respondents are described in table 1, the majority of teenagers attend public schools located in East and Central Surabaya, most are currently studying at the 11th grade (2nd of Senior High School) and live in eastern and western Surabaya. Tables 2, 3 and 4 describe the distribution of research variables. Table 2 describes the teenagers' factors, most of them were male and aged 16 years with varying levels of emotional intelligence from low to high. Table 3 details that almost all teenagers have a smartphone-based device, especially mobile phones with monthly data packages used and also home wifi. Respondents on average use smartphones for more than 8 hours a day, especially during the noon-day and night. The reasons for using smartphones mostly were to communicate, do schoolwork, access social media, and browse information. The most frequently accessed social media by respondents are WhatsApp and Instagram. Most smartphone usage activities are for browsing and giving comments or likes on social media. Table 4 illustrates that the influence of parents, demands for school assignments and

Table 4. Distribution of Environmental Factor, Teenager's Thinking, Self-Control, Commitment, and Smartphone Usage

| Variable | Category (n(%)) | | |
|---|---|---|---|
| | Low | Middle | High |
| Environmental factor | | | |
| Parent's influence | 24 (13) | 47 (25.4) | 114 (61.6) |
| Teacher's influence | 89 (48.1) | 45 (24.3) | 51 (27.6) |
| School assignment demand | 4 (2.2) | 65(35.1) | 116 (62.7) |
| Peer's influence | 47 (25.4) | 71 (38.4) | 67 (36.2) |
| Health worker's interpersonal stimulation | 61 (33) | 45 (24.3) | 79 (42.7) |
| Teenager's thinking | | | |
| Advantages | 3 (1.6) | - | 182 (98.4) |
| Barriers | 9 (4.9) | - | 176 95.1) |
| Belief | 0 (0) | - | 185 (100) |
| Effect | 4 (2.2) | - | 181(97.8) |
| Self-control | | | |
| Cognitive | 30 (16.2) | 81 (43.8) | 74 (40) |
| Behavior | 5 (2.7) | 53 (28.6) | 127 (68.6) |
| Commitment | | | |
| Decision-making | 6 (3.2) | 57 (30.8) | 122 (65.9) |
| Level of gadget addiction | | | |
| Impaired physical activity | 55 (29.7) | 94 (50.8) | 36 (19.5) |
| Overuse | 87 (47) | 68 (36.8) | 30 (16.2) |
| Withdrawal | 92 (49.7) | 61 (33) | 32 (17.3) |
| Anticipatory | 113 (61.1) | 56 (30.3) | 16 (8.6) |
| Cyberspace oriented | 91 (49.2) | 61 (33) | 33 (17.8) |
| Tolerance | 39 (21.1) | 81 (43.8) | 65 (35.1) |

Table 5. Final Model of Hypothesis Test on The Development of Teenagers' Safety Smartphone Use Model

| Variable | Path-coefficient | t | p-value | |
|---|---|---|---|---|
| Teenager's factor (X1) → Teenager's thinking (Y1) | 0.293 | 3.970 | 0.000 | Significant |
| Teenager's factor (X1) → Self-control (Y2) | 0.272 | 3.065 | 0.002 | Significant |
| Teenager's factor (X1) → Commitment (Y3) | 0.165 | 2.244 | 0.025 | Significant |
| Teenager's factor (X1) → Smartphone usage (Y4) | -0.055 | 0.933 | 0.351 | Insignificant |
| Technology's factor (X2) → Teenager's thinking (Y1) | 0.039 | 0.519 | 0.604 | Insignificant |
| Technology's factor (X2) → Self-control (Y2) | -0.248 | 4.094 | 0.000 | Significant |
| Technology's factor (X2) → Commitment (Y3) | 0.024 | 0.250 | 0.803 | Insignificant |
| Technology's factor (X2) → Smartphone usage (Y4) | 0.612 | 10.331 | 0.000 | Significant |
| Environment factor (X3) → Teenager's thinking (Y1) | 0.224 | 3.294 | 0.001 | Significant |
| Environment factor (X3) → Self-control (Y2) | 0.217 | 2.934 | 0.004 | Significant |
| Environment factor (X3) → Commitment (Y3) | -0.092 | 0.940 | 0.348 | Insignificant |
| Environment factor (X3) → Smartphone usage (Y4) | -0.030 | 0.476 | 0.634 | Insignificant |
| Teenager's thinking (Y1) → Self-control (Y2) | 0.218 | 2.522 | 0.012 | Significant |
| Teenager's thinking (Y1) → Smartphone usage (Y4) | -0.073 | 1.114 | 0.266 | Insignificant |
| Self-control (Y2)→ Commitment (Y3) | 0.372 | 3.953 | 0.000 | Significant |
| Self-control (Y2)→ Smartphone usage (Y4) | -0.183 | 2.303 | 0.022 | Significant |
| Commitment (Y3 → Smartphone usage (Y4) | -0.201 | 2.967 | 0.003 | Significant |

interpersonal stimulation from health workers according to respondents has a high value as an environmental factor in smartphone use, while the influence of teachers has a low value. Meanwhile, teenagers' thinking, which consists of four categories, has almost all high scores related to the benefits, barriers, beliefs, and consequences of using smartphones. Teenagers' self-control variables both cognitively and behaviorally are dominated by high criteria, although there is a small proportion of teenagers' cognitive control with low scores. Meanwhile, the youths' commitment to decision making in the use of smartphones is high. Smartphone users are described in the level of gadget addiction which is described in six indicators with the dominance of low addiction levels in almost all categories, however obtained data shows that the tolerance indicator has a number that needs to be

considered because it is classified as a high addiction level.

Based on table 5, the research hypothesis can be explained. Teenagers' factors have an effect on increasing teenagers thinking (t=3.97; 0.293; p=0.000), increasing self-control (t=3.065; 0.272; p=0.002) and increasing teenagers' commitment (t=2.244; 0.165; p=0.025), but has no effect on smartphone use (t=0.933; p=0.351). Technological factors have an effect on decreasing self-control (t=4.094; -0.248; p=0.000) and increasing the use of smartphones (t=10.331;0.612; p=0.000) however, it has no effect on teenagers' thinking (t=0.519; p=0.604) and commitment (t=0.25; p=0.803). Environmental factors have an effect on increasing thinking (t=3.294; 0.224; p=0.001) and self-control (t=2.934; 0.217; p=0.004), but have no effect on commitment (t=0.940; p=0.348) and smartphone

Table 6. Result of Development Model of Teenagers' Safety Smartphone Use

| Variable | Things to develop |
|---|---|
| Teenagers' factor | Assessing teenager emotional intelligence, especially self-emotional management, self-motivation in smartphone use |
| Technology factor | Assessing smartphone's access (availability of devices and internet data packages, length of screen time, types of content and reasons for use) that can be used by teenagers |
| Environment factor | Assessing the important role of peers (content accessed, activity on social media), information provided by health workers and parental control in smartphone use |
| Teenagers' thinking | Identify level of the teenager's understanding of the benefits, beliefs, barriers and impacts of smartphone use related to academic and non-academic activities<br>Stimulating positive teenager thinking in the safe use of smartphones |
| Teenagers' self-control | Identify the level of teenager self-control abilities, both cognitive and behavioral in smartphone use<br>Stimulating teenager self-control in using smartphones safely |
| Commitment | Identify the teenager's commitment especially decision making based on usage priorities<br>Building a positive commitment of youth in using smartphones safely |
| Smartphone's use | Identify the frequency of use in one day and the level of dependence of teenagers in smartphone use |
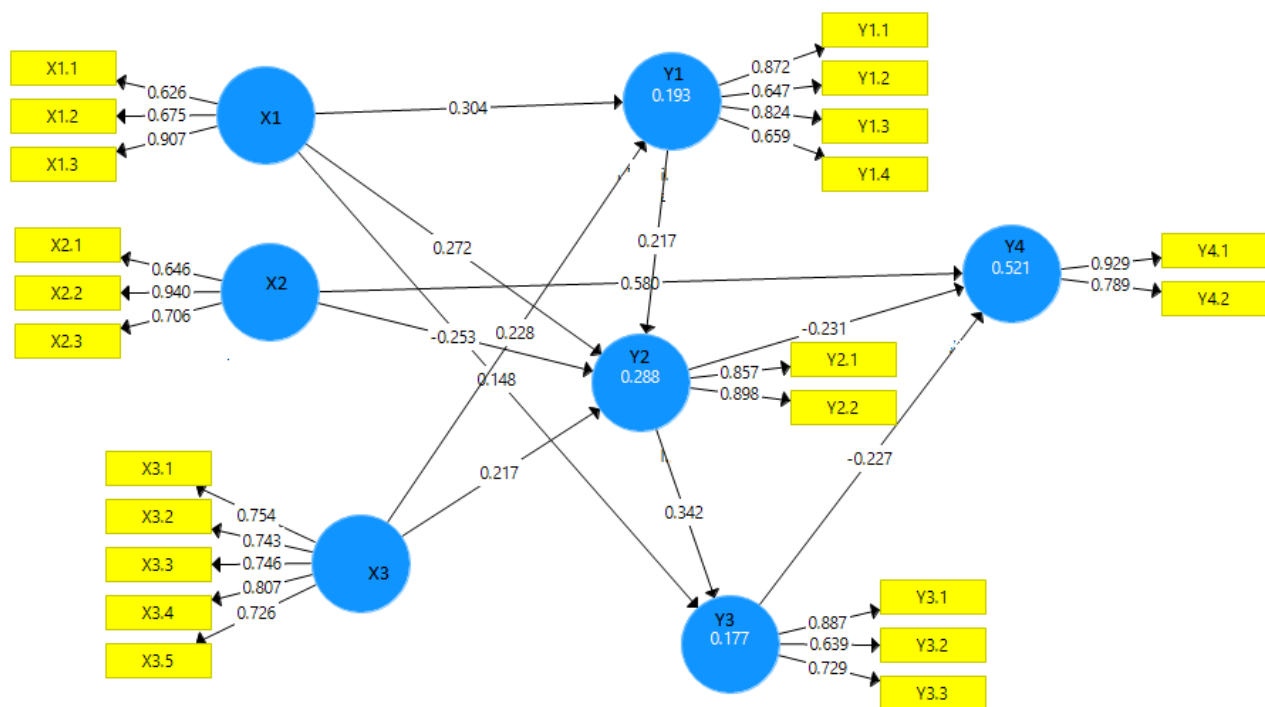


Figure 1. The Development of Teenagers' Safety Smartphone Use Model

use(t). =0.476; p=0.634). Teenagers' thinking has an effect on increasing teenagers' self-control (t=2.522; 0.218; p=0.012) but has no effect on smartphone use (t=1.114; p=0.266). Self-control has an effect on increasing commitment (t=3.953; 0.372; p=0.000) and decreasing smartphone use (t=2.303; -0.183; p=0.022). Commitment has an effect on reducing the use of smartphones in teenagers (t = 2.967; -0.201; p = 0.003). The findings can be explained whereby the model emphasizes the importance of establishing self-control through teenagers' thinking so they can commit to using a smartphone safely. Teenagers' thinking will be formed through controlling environmental factors, especially the influence of peers and interpersonal stimulation from health workers and by optimizing teenagers' individual factors, especially emotional intelligence.

Based on Figure 1, it can be explained that teenagers' factors and environmental factors affect the formation of teenagers thinking by 19.3%, and together with technological factors can increase the formation of self-control by 28.8%. Meanwhile, teenagers' commitment is built from teenagers' factors and self-control of 17.7%. Eventually, technology factors, self-control and teenagers' commitment control the use of smartphones by 52.1% in teenagers

During the FGD, it can be concluded that several things that must be developed in this model are: 1) Assess teenagers' factors, technology and the environment, 2) Identify the level of teenagers' thinking, self-control ability and teenagers' commitment related to smartphone use, 3) Provide stimulation to create positive teenagers thinking and self-control in the safe use of smartphones, 4) Build a

positive commitment for using smartphones safely (Table 6).

## DISCUSSION

The safe use of smartphones in teenagers in was determined by two important variables with a negative relationship, namely teenager self-control and teenager commitment. High self-control and commitment can reduce or limit the use of smartphones in teenagers. Self-control as a result of cognitive considerations that are embodied in behavior in achieving certain goals (Gufron & Riswanita, 2010). Teenagers in this study had high self-control in using smartphones with the aim of doing school assignments and communicating with family, friends, and teachers. In addition, teenagers in the FGD process also stated that it is very important to limit the time they use smartphones in one day because they realize that using the device too much can affect their physical condition, such as eyes feeling tired, laziness in doing other activities and being bound to always using a smartphone. Understanding the main purpose of using internet-based tools is to form good self-control behaviorally so that teenagers are able to use smartphones without becoming addicted. The results of this study are in line with the results of research on school-age teenagers in South Korea, that self-control is related to the level of smartphone addiction (Cocorada et al., 2018; Sok, 2019; Sun et al., 2018). Good self-control also fosters teenager's commitment in making decisions to use smartphones with clear goals. The data also shows that more than 80% of teenagers use smartphones to do schoolwork and search for information on the internet (Lenhart, 2015; Muflih, Hamzah, & Purniawan, 2017). Data collection was carried out during the Covid-19 pandemic, where all teenagers went to school online (using internet-based tools). This situation strongly leads teenagers to use smartphones for the sake of learning at school and not just for the sake of having fun or spending their free time. During the FGD, teenagers said they were committed to being disciplined in limiting the use of smartphones by installing an application that functioned to remind them of the length of time of use, asking parents for help to remind them if they were too active with smartphones, teenagers were also very happy to remind each other not to use a smartphone for too long outside of school activities.

Self-control in teenagers is influenced by teenagers' thoughts related to the benefits, barriers, beliefs, and consequences of smartphone use. Thought is the beginning of the process of self-regulation. The inability to build self-regulation can lead to the risk of smartphone addiction in teenagers (Van Deursen et al., 2015). Self-regulation helps teenagers to be able to identify the problems they face and determine the selection of appropriate actions in solving problems (Alhidayah, 2017; Bandura, 2002). Teenagers in this study think about the benefits and believe that the use of smartphones is very helpful in completing school assignments, communicating, and interacting virtually with family, friends, and teachers. Variations in the internet network that are not smooth are expressed as obstacles experienced and related understanding due to the use of smartphones that are not related to completing school assignments fosters self-regulation skills in the form of self-control in smartphone use. The obstacles faced are one of the triggers for the creativity of smartphone users (Chun, 2018). The results also explain that teenagers use smartphones for pleasure, such as interacting through social media, playing games, and filling their spare time, but the thoughts are formed that smartphone use should be used for learning activities which make teens have good self-control and are committed to limiting their time of use of smartphones without having to experience heavy gadget addiction.

Teenagers' thinking as the basis for the formation of self-control is influenced by teenager factors and environmental factors. One of the dominant environmental factors is the presence of interpersonal stimuli, in the form of information about the use of smartphones from outside the teenager. The majority of information sources are from parents, internet, schools (school health unit) and health workers who come to school. Teenagers are an age who are thirsty for information and getting information from the right sources will help them have the right mindset regarding smartphone use. The findings of this study support the Health Promotion Model Theory, that the right input of information on individuals will foster thoughts related to benefits, beliefs, consequences, and obstacles in deciding an action. This study explains that sources of information from parents, schools (UKS) and health workers are sources of appropriate and accountable information. During the FGD the youth conveyed that the information they received and was very helpful for teenagers, including how to use smartphones, good content or sites for teenagers to access related to school assignments, seeking entertainment, increasing knowledge, how to limit smartphone use, information about the impact of excessive smartphone use, and how to overcome dependence on smartphone use. Teenagers who get the right information will be helped in developing the right thinking. Although thinking does not directly make teenagers use smartphones safely, the thoughts help teenagers have good self-control to commit and decide to use smartphones safely and not experience addiction.

The limitation of this study was that it only involved teenagers in big cities who have wide and good internet access, so it requires additional respondents in small cities to be more generalized for all teenagers in both big and small cities in Indonesia. However, the results of this study have highlighted that good self-control can be one of the factors that prevents smartphone addiction in teenagers.

## CONCLUSION

The model emphasizes the importance of self-control in forming teenagers' commitment to using smartphones. High self-control is the result of teenager thinking that will be formed through controlling environmental factors, especially the influence of peers and interpersonal stimulation from health workers and by optimizing teenagers' individual factors, especially emotional intelligence. This model can be the basis for providing guidelines for the safe use of smartphones for teenagers.

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Original Research

# Nurses' Role in Taking Care of Gestational Diabetes Mellitus Patients: A Qualitative Study

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## ABSTRACT

**Introduction:** Gestational Diabetes Mellitus (GDM) is becoming one of the major public health problems. It is important to screen the GDM and for the case to be managed by nurses. Nurses are needed to care for pregnant women with GDM, and the work experience of nurses is directly related to the assistance and quality of care provided. However, nurses face some barriers in understanding the GDM and providing good management thereof. This study explored the experiences of nurses of caring for GDM patients.

**Methods:** This study was a phenomenological approach qualitative research. Participants were 10 nurses who provide care for pregnant women with GDM selected by purposive sampling technique with sampling criteria. Data analysis used the Colaizzi method.

**Results:** There were five categories, e.g. empathy, inspiration to find ways to treat patients very well, feeling of ambivalence, self-preservation to develop potential, and the impact on the nurses of caring for GDM.

**Conclusion:** Sustaining the nursing workforce and improving their working experiences are essential to meet the care needs of pregnant women with GDM. Nurses should understand to promote empathy, and there is a need to improve the job satisfaction and morale of nurses. At the institutional level, policy makers should make efforts to improve the nursing clinical practice environment, increase the nursing management role, the maternity nursing education and training, achieve a proper skill mix of the health workforce, and, overall, attract, prepare and sustain nurses regarding caring for pregnant women with high risk GDM.

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## INTRODUCTION

GDM is defined as glucose intolerance with onset or first recognition during pregnancy. The definition does not require any return to normal glucose levels following delivery. Thus, GDM simply represents relatively high glucose levels at one point in the life of a young woman (Buchanan et al., 2012). GDM is a form of hyperglycemia. In general, hyperglycemia results from an insulin supply that is inadequate to meet tissue demands for normal blood glucose regulation. Studies conducted during late pregnancy, when, as discussed below, insulin requirements are high and differ only slightly between normal and gestational diabetic women, consistently reveal reduced insulin responses to nutrients in women with GDM. Studies conducted before or after pregnancy, when women with prior GDM are usually more insulin resistant than normal women (also discussed below), often reveal insulin responses that are similar in the two groups or reduced only slightly in women with prior GDM. However, when insulin levels and responses are expressed relative to each individual's degree of insulin resistance, a large defect in pancreatic ß cell function is a consistent finding in women with prior GDM (Buchanan et al., 2012; Plows et al., 2018). GDM also adds an intrauterine environmental risk factor to an increased genetic risk for the development of obesity, diabetes and/or metabolic syndrome in childhood. As regard mother complications, GDM is a strong risk factor for the development of permanent diabetes later in life (40% in 10 subsequent. years) and GDM in successive pregnancies (35%), increasing with the age and

weight of the mother. An important intervention on long-term metabolic benefits for both mother and offspring has been attributed to breastfeeding. In the offspring a protective role was seen against excessive fat accumulation, protection against childhood infections, cardiovascular diseases and type 2 diabetes, while in women an association between lactation and low concentrations of glucose and insulin and a better tolerance to glucose was seen and a significant delay in the appearance of type 2 diabetes in women with GDM (Alia et al., 2019).

Although obstetricians-gynecologists (OBs/GYNs) serve many women as their primary care provider and are often the sole physician that women see regularly during their reproductive years, a pregnancy complicated by GDM should alert not only OB/GYNs, but also other primary care providers to take the preventive actions during the inter- and postpartum periods. Appropriate early postpartum care for women with prior GDM includes screening for continued abnormal glycaemia and risk for progression to diabetes. However, this care should also include ongoing (lifelong) counseling on the risk for future pregnancies complicated by GDM, the risk for progression to diabetes over the life of the woman, and on the importance of lifestyle changes to reduce these risks. The National Diabetes Education Program (NDEP) recommends that all providers who care for women with prior GDM screen all women as well as provide or refer these patients to early treatment and prevention interventions (Oza-Frank et al., 2014).

The impact of GDM will be seen after several years if it is not handled now and triggers an increase in the incidence of GDM. Therefore, screening or early detection is needed to capture GDM so that it can be managed as well as possible, especially in mothers with risk factors. Early detection will help pregnant women to improve maternal welfare both during and after pregnancy (Djihanga & Muflilah, 2020). A study related to the experience of pregnant women with GDM explained the inability to achieve optimal maternal roles in patients with GDM (Wulaningsih et al., 2020). Early detection in health services, especially for antenatal care, is also one of the work programs of the American Diabetes Association (ADA) to prevent complications that may occur during the delivery process later (Djihanga & Muflilah, 2020).

Nurses understand the importance of GDM screening. All of the nurses who encounter patients with high risk can assist in teaching and preparing for treatment (Djihanga & Muflilah, 2020). However, GDM screening is often missed because patients do not seek to achieve systematic health services for the implementation of screening. Patients come to a health facility when they have experienced the effects of GDM on their pregnancy. In addition, resources and facilities in health facilities are also often limited so that the practice of comprehensive ANC examination is not in accordance with the theoretical concept because it only focuses on physical examination, history taking, Leopold maneuver and laboratory examination of HB, leukocytes, proteinuria. Meanwhile, GDS examinations and even fasting GDs were not examined. This is related to the competence of resources and workload experienced by health workers, especially nurses (Sahu et al., 2021; Wulaningsih et al., 2020).

Nurses should understand their role in caring for patients. Regulatory agencies and accrediting bodies expect clinical staff nurses to understand their roles in all aspects of care, including caring for patients. Nurses should be knowledgeable about three major areas related to patients: (a) human subjects protection, including informed consent and the role of the institutional review board; (b) requirements of study participation; and (c) procedures for reporting conflicts between protection of the patient and requirements of study participation (Connelly, 2009). Based on the background of this study, the aim of this study was to analyze nurse role experience of caring for gestational diabetes mellitus patients.

## MATERIALS AND METHODS

This was a phenomenological approach qualitative research. Data collection was carried out through in-depth interviews with a voice recorder and field notes. Participants were selected based on research needs with the principle of appropriateness and adequacy. Participants in this research were nurses taking care of GDM patients. The data collection was finished in the ten participants when the categorization of data was saturated. Data saturation was reached when there is enough information to replicate the study when the ability to obtain additional new information has been attained, and when further coding is no longer feasible. Besides, the availability of time and resources in research is also taken into consideration in ending data collection. This research instrument was the researchers themselves. Purposive sampling technique with sampling criteria was used. The inclusion criteria in this study were 1). Nurses who have provided care for high-risk mothers with GDM. 2) Living in the Central Java Province. 3). Willing to become a participant by agreeing to informed consent. The exclusion criterion was nurses on leave. Data analysis used the Colaizzi method. The inclusion of additional steps as follows: 1). Transcribing all the subjects' descriptions. 2). Extracting significant statements (statements that directly relate to the phenomenon under investigation). 3). Creating formulated meanings. 4). Aggregating formulated meanings into theme clusters. 5). Developing an exhaustive description (a comprehensive description of the experience as articulated by participants). 6). Additional step-researcher interpretative analysis of symbolic representations from the articulation of the symbolic representation (which occurred during participant interview). 7). Identifying the fundamental structure of the phenomenon. 8). Returning to participants for validation (Edward & Welch, 2011).

Table 1. List and Characteristics of Participants

| Participant | Age | Gender | Education | Work Experience | Religion | Marital Status |
|---|---|---|---|---|---|---|
| P1 | 25 | Male | Bachelor | 1 years | Muslim | Married |
| P2 | 24 | Female | Bachelor | 2 years | Muslim | Married |
| P3 | 30 | Female | Bachelor | 2 years | Muslim | Married |
| P4 | 20 | Female | Diploma | 9 years | Christian | Single |
| P5 | 29 | Male | Diploma | 7 years | Muslim | Married |
| P6 | 32 | Female | Diploma | 11 years | Christian | Married |
| P7 | 37 | Male | Diploma | 17 years | Muslim | Married |
| P8 | 31 | Male | Diploma | 14 years | Muslim | Married |
| P9 | 23 | Female | Bachelor | 2 years | Muslim | Married |
| P10 | 49 | Female | Diploma | 10  years | Muslim | Married |

Table 2. Socio-Demographic Characteristics of Participants

| Characteristics | n | % |
|---|---|---|
| Age | | |
|   20-30 years | 6 | 60.0 |
|   31-40 years | 3 | 30.0 |
|   41-50 years | 1 | 10.0 |
| Gender | | |
|   Male | 4 | 40.0 |
|   Female | 6 | 60.0 |
| Education Level | | |
|   Diploma | 6 | 60.0 |
|   Bachelor | 4 | 40.0 |
| Work experience | | |
|   1-5 years | 2 | 20.0 |
|   6-10 years | 7 | 70.0 |
|   > 10 years | 1 | 10.0 |
| Religion | | |
|   Muslim | 8 | 80.0 |
|   Christian | 2 | 20.0 |
| Marital Status | | |
|   Married | 9 | 90.0 |
|   Single | 1 | 10.0 |

Data were collected between November 2019 and February 2020 using in-depth interview with nurses who care for diabetes patients. Interviews were conducted by one of the research team who already had a basic understanding of qualitative research. Before selected as a participant, participants were given the research information about title, purpose, benefit, participant participation, reward and more information if there was an adverse event, then they gave a statement of informed consent as to voluntary participation. The validity of the data in this research was tested and included credibility, dependability, and conformability. The study was declared to have passed the ethical review by the Research Ethics Committee, Faculty of Health and Nursing Science, Karya Husada University. Data were collected using interview guide and participants answered the questions for 30-45 minutes. Data were collected once meeting with the participant. Before the in-depth interview, the author-built trust from the participant, so they gave truthful information about their experience. After data were collected, we analyzed the keywords and themes found from the research.

## RESULTS

Based on the criteria for inclusion participating as many as 10 nurses were obtained. In-depth interviews were conducted with participants and showed mixed results about nurses' role experience of caring for GDM. This study obtained as many as five themes of the sub-categories, which have been arranged as below.

Table 1 and Table 2 shows the characteristics of participants were predominantly female (60.0%) and the age was majority 20-30 years (60.0%). Diploma was the highest education level in the participants (60.0%), the experience of nursing was dominated in range 6-10 years (70.0%). Muslim was the highest religion in participants and 90.0% of participants were in married status. The themes are shown in Table 3.

### Theme 1: Empathy

Nurses have a sense of empathy for the patients they treat with GDM. Nurses have awareness in carrying out their duties and functions in providing nursing care. The following are participant answers expressed as follows: P2-10: "Every patient has the same right to get optimal nursing care, so I have to provide holistic care." P5-15: "I can feel the suffering of patients with GDM, being pregnant with a condition where there is an increase in blood sugar levels can make the mother experience anxiety, sadness. So I need to provide better service."

Table 3. Thematic Analysis of the Participants

| Keyword | Sub Theme | Theme |
|---|---|---|
| The patient is the same | Awareness in carrying out duties | |
| Feeling patient's suffering | | |
| Optimal nursing care | Providing nursing care | Empathy |
| Holistic care | | |
| Giving better service | | |
| Give best service | Patient's condition | Inspiration to find ways to treat patients very well |
| Finding something new | High risk pregnancy | |
| Help mother with high risk | | |
| Caring is not easy | Finding many challenges | |
| Have to understand patient | | |
| Uncomfortable feeling | | Feeling of ambivalence |
| Finding many problems | Emotional feeling | |
| Difficult solving | | |
| Proud to be nurse | Develop competencies | Self-preservation to develop potential |
| Giving optimal caring | | |
| Helping patient and family | Positive impact of many aspects | The impact on the nurses of caring for GDM |
| Provide service to patient | | |

## Theme 2: Inspiration to find ways to treat patients very well

Nurses thought that they must be able to find better ways to treat patients with GDM, stated by the participants as follows: P6-15: "I always think how to find a way to encourage patients with high risk especially GDM, to help them through difficult times during pregnancy." P5-15: "The best service must be provided to patients with GDM, nurses must change their perspective to find something new in providing nursing care to high-risk patients."

## Theme 3: Feeling of ambivalence

Nurses have contrasting feelings about themselves and the patients whom they care for. The following are participants' statements: P8-16: "Carrying out the role as a nurse is not easy, there are many challenges but in the main is understanding patients who have different characters. Sometimes I feel uncomfortable when treating patien ts who can't be given advice, that's where my emotional feelings arise." P1-15: "Often there is a feeling of ambivalence in caring for high-risk patients, there are many problems within the patient that must be resolved but it is difficult to contradict my feelings."

## Theme 4: Self-preservation to develop potential

Nurses realize that this profession is a noble profession to continuously develop existing competencies and potentials. This is stated by the participants as follows: P7-13: "I am very proud to be a nurse, when caring for patients I feel I can develop my own potential to provide the best service." P10-14: "Caring for high-risk patients, espe cially GDM, made me realize that, as a nurse, I must be able to preserve myself to develop my potential in order to provide optimal nursing care."

## Theme 5: The impact on the nurses of caring for GDM

The actual service of nurses has a positive impact on many aspects of practice, as stated by the participants as follows: P3-16: "Efforts made by nurses have a positive impact on patients and families, including psychology the patient does not experience anxiety during pregnancy with GDM." P5-12: "The smallest thing to provide services to patients with high risk has a very significant impact, where patients feel capable and confident that they will recover."

## DISCUSSION

### Theme 1: Empathy

Pregnancy is a normal physiological process. The majority of pregnancy is accepted by the mother as something that has to be lived with. But the experience of the mother diagnosed with diabetes during pregnancy is a special experience for the mother and a serious challenge to maintain and undergo pregnancy. Therefore, it is very necessary to do prenatal care for the mother and fetus to align processes to avoid pregnancy complications and decrease the incidence of morbidity or perinatal and maternal mortality (Schellinger et al., 2017).

The nurses spoke about several experiences that captured the meaning of the theme of "empathy," and was illustrated with descriptions of the caring for GDM patients. Abby described the feelings she experienced concerning maternity patients when she "provides holistic care." This was also described as "so I need to provide better service." Empathy can be thought of as an individual's identification with and response to an event (Wilson & Kirshbaum, 2011). Empathy can further be viewed as an emotion felt by nurses when they place themselves in the patient's situation, personifying the experience and treating the patient as they would want to be treated. Empathy

involves alleviation of pain, avoidance of suffering, and promotion of a new level of health (Mattsson et al., 2013) and nurses will try to deliver patient care so these concepts can be achieved.

The result of this study shows that the cause of GDM is due to hereditary factors, immunological factors, and diabetes acquired during pregnancy. Empathy is needed by nurses in providing care to high-risk patients, GDM. Empathy toward patients and families contributes to the emotions of caring provided by nurses.

## Theme 2: Inspiration to find ways to treat patients very well

Diabetes is a common complication of pregnancy. Patients can be separated into two, namely those who had previously known diabetes and those who are diagnosed with diabetes during pregnancy (gestational). Maternal factors obtained in mothers with GDM are hypertension, preeclampsia, and increased risk of caesarean section (Huang et al., 2020).

Maternal glucose levels are unstable and can cause fetal death in utero, which is a typical occurrence in women with diabetes. A fetus exposed to hyperglycemia tends to asphyxia and acidosis although the exact mechanism is unclear, but is thought ketoacidosis has close links with the death of the fetus. When maternal or blood glucose levels are within normal limits, the death of the fetus in the uterus is rare (Alberico et al., 2017). Hyperinsulinemia that occurs in the fetus will increase the metabolic rate and oxygen needs to deal with situations such as hyperglycemia, ketoacidosis, pre-eclampsia and vascular disease, which can reduce blood flow and oxygenation placenta-utero fetus. The frequency of fetal death in utero or stillbirth ranges from 15-20%. An attempt to avoid the sudden death of the fetus in the womb is to terminate the pregnancy a few weeks before term (Alia et al., 2019).

Some of the things above explain that GDM patients need to receive good care. Nurses have intuition and inspiration to treat patients well. Inspiration was identified when nurses observed the strength and resilience they detected in their maternity patients. Inspiration can also be felt by nurses in the experience of caring for GDM patients. "The best service must be provided to patients with GDM, nurses must change their perspective to find something new in providing nursing care to high-risk patients." The statement about inspiration to find ways to treat patients very well is a process of being mentally stimulated to do or feel something, creating a motivating reaction typically experienced when facing challenges in the process of goal attainment (Straume & Vitterso, 2012).

## Theme 3: Feeling of ambivalence

Maintaining the pregnancy did not make the mother desperate to retain the fetus and mother's health. Various efforts have been made to maintain the mother and the fetus in good condition and wellbeing. The experience of the mother to keep the extra pregnancy is to maintain fetal maturity by way of checkups to the hospital (Alia et al., 2019). Another effort made by the mother is doing movement exercises during pregnancy, doing routine blood sugar control and continuously making efforts at healthcare treatment (Alia et al., 2019; Dhingra & Ahuja, 2016).

Nurses discussed struggling with their feelings during their experiences of caring for high risk GDM patients. Feelings of ambivalence were described by questioning why nurses were subjected to the contrasting feelings about themselves and the patients whom they care, when a participant stated "Carrying out the role as a nurse is not easy, there are many challenges in the main is understanding patients who have different characters. Sometimes I feel uncomfortable when treating patients who can't be given advice, that's where my emotional feelings arise."

Each nurse participant discussed similar issues related to ambivalence, the issues the struggles nurses when faced with their own emotions In relation to this, ambivalence may be emotionally distressing when nurses are asked to behave in a manner contradictory to their beliefs.

Ambivalence is defined as the state of having mixed feelings, mixed beliefs, or contradictions of thoughts and feelings (Petty & Krosnick, 2014). When discussing ambivalence in patient care, nurses described a sense of doubt as to whether or not the care rendered was appropriate for the situation. In nursing care view, a holistic human being is an individual. In a holistic concept, the human figure is seen as a whole, which is able to adapt as a whole.

## Theme 4: Self-preservation to develop potential

Women with a history of DM should use effective contraception to reduce pregnancy which is accompanied by hyperglycemia. Long-term management with low-dose combined oral contraceptives did not appear to increase the risk of diabetes after pregnancy. An intra-uterine device (IUD) is the most effective contraceptive as it is metabolically neutral. Conversely, the use of progestin-containing contraceptives during lactation may increase the risk of diabetes (Kiley & Griffin, 2015).

Nurses' interviews revealed thoughts of "trying to manage, just taking care of today, so that you could go back to caring for the woman pregnant with GDM," illustrating self-preservation. One discussed her feelings about being able to continue with practicing in this specialty: "Caring for high-risk patients, especially GDM, made me realize that, as a nurse, I must be able to preserve myself to develop my potential in order to provide optimal nursing care."

Self-preservation can be defined as self-protection from harm, regarded as a basic human instinct of survival and is a coping strategy that allows for an understanding and processing of what takes place in our world. The construct of self-preservation helps

nurses deal with the emotional demands of patients, their families, and patient outcomes, either good or bad. Self-preservation is part of the process nurses employ to shield themselves from what can deeply hurt them. Research studies found distancing and disconnecting from patients facing a troubling situation is common with nurse self-preservation and self-protection (Lipp, 2011).

**Theme 5: The impact on the nurses of caring for GDM**

According to the nurses interviewed, caring for high risk GDM patients had an impact on them, both physically and psychologically. It makes them scared of becoming sick. Consequently, the nurses reported feeling that they had high motivation, both physically and psychologically. Discussing about the impact of practice, one said : "The smallest thing to provide services to patients with high risk has a very significant impact, where patients feel capable and confident that they will recovery."

Nurses' experiences with practical knowledge affect the nursing process. Expert nurses with practical knowledge have more positive attitudes toward patients than do less experienced nurses (Spencer et al., 2012). Nurses should have more training to receive quality improvement education and continued training to improve their professional capabilities. Moreover, their working spirit needs to be regularly regenerated to inspire them to take care of older people. Furthermore, nurses should be aware of the psychological and physical impact of caring for older people, and there is a need to revitalize nurses' positive experiences and feelings to improve their job satisfaction.

## CONCLUSION

In this study, nurses showed complex experience for taking care of patients with high risk of GDM. They expressed the view that the patients were somewhat more experienced. The attitude of nurses caring for GDM patients gave the impact of themselves and patients. Implications of the findings allow for the opportunity to hear stories about nurses and their patients. Personal and emotional stories of lived experiences provide the ability to create strategies to improve quality of life for the patient and for nurses, as well as adding to the identity of the practice of nursing.

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Original Research

# Effects of Aerobic Exercise on Depression and CD4 Counts in People Living with HIV

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## ABSTRACT

**Introduction:** HIV patients often experience psychological and physical disorders which greatly affect the adherence of people living with HIV/AIDS (PLWHA). This study aimed to assess the effects of aerobic exercise on the levels of depression and CD4 cell count of HIV patients.

**Methods:** This study used a pre-post quasi-experimental design with a control group. The sampling technique was consecutive sampling, with a total sample of 52 HIV respondents. Depression level was measured using the Beck Depression Inventory (BDI), while CD4 count was measured using the Pyma analyser. The aerobic exercise intervention was given three times a week with a duration of 20-30 minutes each for four weeks. The collected data were analysed using a paired sample t-test and an independent sample t-test.

**Results:** The results showed a significant difference in the mean value of depression before and after the intervention of aerobic exercise (M = 25.15 and M = 22.46, respectively) with p = 0.001. Similarly, there was a significant difference in the mean of CD4 counts between the control group (M = 303.38) and the intervention group (M = 305.38) after the intervention with p = 0.031.

**Conclusion:** Aerobic exercise is effective in reducing depression levels and increasing CD4 counts in HIV patients. Immune system cells circulate more rapidly and there is a boost in the production of macrophages, cells that can attack bacteria.

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## INTRODUCTION

Human Immunodeficiency Virus (HIV) is a virus that attacks the immune system and which can be contagious and deadly. HIV can occur due to several risk factors, including alternating drug injection equipment (drugs, alcohol, psychotropic substances and additives), free sex (heterosexual, homosexual) without a condom, transmission from infected mothers to children, perinatal and through transfusions (Kemenkes, 2017).

Various impacts can arise for HIV sufferers such as physical, social, emotional and spiritual problems. Most People Living with HIV/AIDS (PLWHA) experience changes in emotional status, one of which is depression. Demirel et al. (2018) stated that 31% of HIV/AIDS sufferers in Turkey experienced depression and up to 19% of them experienced mental disorders. The prevalence of depression in Indonesia is quite high, around 17-27%. Furthermore, approximately 5-10% of the general population experiences depression. The causes of depression in PLHWA patients are low CD4 count, adherence to ART, lack of physical activity, and community stigma (Demirel et al., 2018)

HIV directly destroys CD4 T cells (Cluster of Differentiation 4) which functions as body immunity and causes a primary infection which further accelerates the decrease in the number of CD4 lymphocytes in the blood. If the virus attacks CD4 T cells until their number drops below 200 per microliter, the body's immunity will be lost and become AIDS. Dianatisanab et al. (2018) stated that a CD4 cell count of <500 cells/ml or <200 cells/ml in PLWHA will cause severe depression. Factors that influence CD4 counts in PLWHA are baseline CD4 counts, medication adherence level, depression, and tuberculosis infection (Dianatinasab et al., 2018).

The number of people infected with HIV in 2012 was 35.3 million people and increased in 2018 to 37.9 million people worldwide; most of these people were at the age of 15-49 years old (UNAIDS, 2019). In

Indonesia, there were 640,443 PLWHAs in 2018. The Indonesian Ministry of Health stated that the number of HIV/AIDS cases had reached 18,442 cases in 33 provinces with 3,708 deaths (Kemenkes, 2017).

Aerobic exercise is a physical activity that uses leg and arm muscle movements which are known to have many benefits. Regular movement can increase the release of neurotransmitters that is mediated by activation of Brain-derived Neurotrophic Factor (BDNF). Increased BDNF, VEGF, and IGF-1 as neurotrophic factors in the hippocampus are useful for nerve cell growth, increase regulation of stress hormones, namely cortisol on the hypothalamic-pituitary-adrenal (HPA) axis and decrease the release of pro-inflammatory cytokines so that depressive symptoms can be reduced and cells in the immune system will circulate more quickly in the body. There may also be a boost in the production of macrophages, which are cells that attack bacteria, which can increase CD4 counts in PLWHAs (Nosrat et al., 2017).

A study by Heissel et al. (2019) found that to assess aerobic exercise activity for depression and CD4 cell count, the evaluation could be done at week four. The study showed different results between the control group (SMD = -0.84, 95% CI = -1.57, -0.11, p = 0.02) and the intervention group (SMD = 0.90, 95% CI = -1.63, -0.30, p = 0.004, p < 0.001). Exercise can reduce symptoms of depression and anxiety in PLWHA. This therapy can also affect the CD4 count of HIV patients (Heissel et al., 2019).

The results of the study by Nosrat et al. (2017) showed significant differences in depression levels in both groups (F = 2.63, p = 0.05) and (F = 7.40, p < 0.001), with greater increases in resistance training compared to the control. Meanwhile, a study by Dianatisanab et al. (2018) found that after the aerobic exercise intervention programme, a significant difference in CD4 cell count was found between the two groups (p = 0.01). This means that aerobic exercise is effective in reducing levels of depression and increasing the CD4 count of HIV patients (Nosrat et al., 2017)

This study differs from previous studies in the type and design of the study, population, number of samples, place of study, and the variables measured. The researchers conducted the quasi-experimental research with a pre-post-test design with a control group. The population involved were males and females. The number of samples was also different, namely 52 patients diagnosed with HIV stage 1 and 2. These patients had their CD4 count checked first and were assessed for depression levels using Beck Depression Inventory (BDI) before receiving aerobic exercises. Research variables have never been carried out in a study that involves two variables, namely depression and CD4 cell count.

Providing aerobic exercise interventions to increase circulation in HIV patients is easy, effective and economical for all patients to do and has no side effects. Based on these descriptions, the researchers were interested in conducting a study to investigate the effects of aerobic exercise on depression levels and CD4 cell counts in HIV patients.

## MATERIALS AND METHODS

This study used a quantitative method with a pre-post-test design with a control group. The sample size was calculated using a sample size formula to test the hypothesis for a mean of two populations (Notoatmodjo, 2005). This study involved 26 respondents each in the intervention and control groups, with a total of 52 respondents. These respondents were HIV patients undergoing outpatient treatment at the Voluntary Counselling and Testing (VCT) clinic. A consecutive sampling technique was used to recruit the samples. Consecutive sampling is a sampling technique that is performed by selecting all individuals encountered and meeting the criteria until the desired sample size is met (Jannaim & Asrizal, 2018).

The inclusion criteria of this study were: 1) HIV patients at stage 1 and II; 2) age >18 years old; 3) able to communicate well; 4) at least those who have been adhering to taking ARV drugs >6 months; 5) patients with a CD4 count >200 / ml; 6) patients who come with a companion who lives in the same house; and 7) patients who were depressed (moderate, severe).

Before conducting the research, the researcher first composed a research permit and research ethics approval letter from the Health Research Ethics Committee of the Faculty of Medicine, Diponegoro University which was addressed to the VCT Clinic Sobat Kupang. The Health Research Ethics Committee of the Health Polytechnic, Ministry of Health Kupang approved the study with a reference number of LB.02.03/1/0062/2020. After obtaining the research permit, the researchers began to conduct the study.

The researcher gave the Beck Depression Inventory questionnaire and filled it out to measure the level of depression. The instrument was written in the Indonesian language and had been tested for its validity and reliability with a Cronbach's alpha of 0.923, meaning that the measuring instrument was very reliable. The CD4 count was assessed using PIMA Analyzer before and after the intervention in both groups. The researchers identified respondents based on the predetermined criteria. The researchers explained the procedure for the research process, namely the first meeting of all samples was carried out by filling out a questionnaire on the demographic data of the respondents, assessing the level of depression, checking CD4 counts and teaching aerobic exercise techniques for 20-30 minutes.

This aerobic exercise intervention was given once at the beginning of the meeting, after which the researcher gave the SOP and the video of this exercise to be performed at home and monitored by a companion who lived in the same house as the respondents. Furthermore, the respondents filled out the checklist sheet that was provided by the researcher after the initial intervention. The exercise

Table 1. Differences in the depression level between intervention and control groups (pre- and post-test; N = 52)

| Type of group | Depression category | Frequency | | Mean | | Mean difference | SD Difference | Dependent t-test p-value |
| | | Before (%) | After (%) | Before (SD) | After (SD) | | | |
|---|---|---|---|---|---|---|---|---|
| Intervention | Mild | 4 (15.4) | 11 (42.3) | 25.15 (5.48) | 22.46 (5.62) | -2.69 | 0.14 | 0.001 |
| | Moderate | 16 (61.5) | 10 (38.5) | | | | | |
| | Severe | 6 (23.1) | 5 (19.2) | | | | | |
| Control | Mild | 5 (19.2) | 6 (23.1) | 24.12 (5.99) | 25.00 (6.99) | 0.88 | 1.00 | 0.179 |
| | Moderate | 16 (61.5) | 13 (50.0) | | | | | |
| | Severe | 5 (19.2) | 7 (26.0) | | | | | |
| Independent t-test p-value | | | | 0.341 | 0.001 | | | |

Table 2. Differences in CD4 counts between the intervention and control groups (pre- and post-test; N = 52)

| Type of group | Category | n | % | Mean | | Mean difference | SD Difference | Dependent t-test p-value |
| | | | | Before (SD) | After (SD) | | | |
|---|---|---|---|---|---|---|---|---|
| Intervention | Increase | 19 | 73.1 | 300.46 (58.70) | 305.46 (61.36) | 5.00 | 2.66 | 0.031 |
| | Standing | 4 | 15.4 | | | | | |
| | Decrease | 3 | 11.5 | | | | | |
| Control | Increase | 12 | 34.6 | 302.81 (62.98) | 303.38 (61.40) | 0.57 | -1.58 | 0.523 |
| | Standing | 5 | 19.2 | | | | | |
| | Decrease | 9 | 46.2 | | | | | |
| Independent t-test p-value | | | | 0.890 | 0.000 | | | |

was carried out three times a week for four weeks. The aerobic exercise in this study consisted of three-movement sessions, namely: 1) Warm-up; slowly approaching the extent of joint movement, then hold for 8 counts in 10 seconds and finally relax, until the respondent feels a sufficient stretch without pain for 5-10 minutes involving the joints and muscles of the upper, in the lower body as well as the left and right sides of the body, without bouncing and breathing regularly; 2) core movements; raising hands forward, upward, sideways, backward, hand movements opening and crossing, pushing and pumping forward, upward and sideways, punching hand movements, forward, sideways, upward, downwards and crosses, one-handed or two-handed swinging motion, clapping, among others, the hands' clap, hands pat the thighs and shoulders; walk in the place, take a step or two, jump a foot or two to the side, forward and back, raise the knee, kick, back, forward, and sideways; and 3) Cooling (Grace et al., 2015).

The data was processed into a computer program system. The results were analysed using univariate and bivariate analysis. Univariate analysis was carried out on respondent characteristics data (gender, age, education, marital status, number of opportunistic infections (OIs), type of ARV, risk factors, initial CD4 count), while bivariate analysis was performed on the results of the Beck Depression Inventory value and CD4 count in the control group and the intervention group using the dependent samples t-test and independent samples t-test.

## RESULTS

### Respondent Characteristics

The results showed that the majority of respondents were aged 26-46 years old (n = 43; 65.4%), male (n =

27; 51.9%), high school graduates (n = 23; 44.2%), and unmarried (n = 31; 59.6%). Furthermore, 29 respondents had the type of ARV drug with the Evafirenz (EFV) based type (55.8%) and the other 23 had Nevirapine (NVP) based medicine (44.2%). As many as 51 respondents (98.1%) did not experience opportunistic infections or opportunistic infections <2, while the remaining (1.9%) had opportunistic infections ≥ 2 types of infections.

### Depression Level

#### *Before the aerobic exercise intervention*

The incidence of depression among HIV patients as shown in Table 1 was 23.1% in the intervention group and 19.2% in the control group. The overall mean of depression before the intervention was 25.15, which means that the level of major depression has the lowest score of 16 and the highest score of 36. From the results of the p-value in Table 1, it could be concluded that the incidence of depression between the control group and the intervention group is equivalent or has the same variance with a p-value >0.05.

#### *After the aerobic exercise intervention*

In the intervention group, the average level of depression was mild depression (42.3%) while in the control group, the highest level of depression was moderate depression (50.0%). The mean value of depression in the intervention group was 22.46, indicating a mild level of depression level, while in the control group, the mean value was 25.00, indicating a moderate level of depression. A significant change in the level of depression after the aerobic exercise intervention was indicated by a p-value <0.001.

### Differences between the intervention and control groups

The depression level of HIV patients who received the aerobic exercise intervention decreased significantly by -2.69 with a p-value <0.05. Meanwhile, in the control group that did not receive the intervention, there was no significant change; the change was 0.88 with a p-value >0.05. Based on these results, it can be concluded that there was a significant change in the level of depression before and after the aerobic exercise in the intervention group.

**CD4 Cell Counts**

### Before the Aerobic Exercise Intervention

The intervention group and the control group had CD4 values of >200ml/dL. The overall mean of CD4 cell count of HIV patients before the intervention was 300.4 for the intervention group and 302.81 for the control group. From the results of the p-value, it can be concluded that the incidence of depression between the control group and the intervention group is equivalent or has the same variance with p-value >0.05.

### After the aerobic exercise intervention

There were differences in the CD4 counts between the control group and the intervention group after receiving aerobic exercise intervention. In the intervention group, the average CD4 count was 305.46, while in the control group, the average CD4 count was 303.38. A significant change in the CD4 cell counts after the aerobic exercise was indicated by a p-value <0.001.

### Differences between the intervention and control groups

The analysis of differences in the mean values of CD4 counts between the control group and the intervention group showed that the CD4 count of HIV patients who received the aerobic exercise intervention increased significantly by 5.00 with a p-value <0.05. Meanwhile, in the control group who did not receive the aerobic exercise intervention, there was no significant change. The change was 0.57 with a p-value >0.05.

## DISCUSSION

**Aerobic Exercise on the Level of Depression**

After the aerobic exercise intervention was carried out in the intervention group, the results of the tests showed that the depression level of HIV patients was significantly different. So, it could be concluded that aerobic exercise intervention was proven to be able to reduce depression levels in HIV patients. The results of this study are in line with the research conducted by Heissel et al. (2019) which showed that there were significant differences in the level of depression before and after the intervention with a p-value of 0.000.

Andreany stated that there was an effect of aerobic exercise on the level of depression with a p-value of 0.0002, which means that it was significant for the level of depression. Physical exercise that is performed can increase endorphin activity. Increasing endorphins will strengthen the body's natural immunity and improve mood and encourage body activity. Psychologically, the ability to show movement during exercise will increase self-confidence and self-esteem which affects mood. Regular physical exercise can help with faster recovery from stressors, thereby decreasing depression symptoms (Al-Qahtani et al., 2018).

Conceptually, a stressful situation in an individual will stimulate the hypothalamus to release neuropeptides that will activate the ANS (Autonomic Nerve System) and the pituitary to secrete corticosteroids and catecholamine which are hormones that react to stressful conditions. Increased levels of glucocorticoids will interfere with the immune system which causes the CD4 to decrease and make individuals more susceptible to infections and health conditions.

Increased levels of glucocorticoids will interfere with the immune system which causes the patient's CD4 to decrease and makes the patient more susceptible to infection and worsening health conditions (Benton & Karnik, 2019). There are several ways to handle depression in patients, one of which is to provide training in the form of therapy, such as exercising and developing constructive copings to prevent depression in HIV patients (Safira et al., 2014).

**Aerobic Exercise on the CD4 Counts**

After the aerobic exercise intervention was carried out in the intervention group, the results of the tests showed that the CD4 count of HIV patients was significantly different. The results of this study are in line with research conducted by Dianatinasab et al. (2018) which showed the effect of aerobic exercise on increasing CD4 cell count (p<0.001).

Similarly, Yasirin et al. (2014) also stated in their study that there was an effect of aerobic exercise in the intervention group with a CD4 count of 1.7 cells / mm3. In the paper published by the Journal of the American Medical Association, it is stated that there is no drug now or in the future that promises to definitely provide and maintain health better than a habit of living constantly with exercises (Yasirin et al., 2014).

Metabolism is also related to endurance. Substances that function to maintain the stability of the body's immunity also come from the metabolic process. The results of protein metabolism function to maintain endurance. Protein substances come from foods that are eaten. The increase in CD4, which is part of the immune system, includes the impact of protein metabolism.

Aerobic exercise can increase metabolism in the body, including protein metabolism, so that it has an impact on the quality of the immune system. Immune

system cells circulate rapidly in the body and there may also be a temporary boost in the production of macrophages - cells that attack bacteria. A decrease in CD4 cells from HIV sufferers who are not normal must be balanced with treatment in the form of drugs as well as exercise to increase metabolism in the body (Naoroibam et al., 2016). The results of this study prove the research hypothesis which states that giving aerobic exercise interventions can reduce depression levels and increase CD4 counts in HIV patients.

This study has limitations since it did not control for several confounding variables, such as other comorbidities or the use of drugs in HIV patients that may affect the patient's level of depression and CD4 cell count.

## CONCLUSION

Based on the results of this study, it can be concluded that there is a significant change in the level of depression after the application of aerobic exercise between the control group and the intervention group with a p-value of < 0.05. Similarly, there is a significant difference in CD4 cell counts between the intervention group and the control group after the intervention with a mean difference of 5.00 and 0.57, respectively. They were significant mean differences in the mean values of depression and CD4 counts between the intervention group and the control group before and after the intervention of aerobic exercises. Aerobic exercise had effects on reducing depression levels and increasing CD4 counts in HIV patients.

For the nursing profession it is recommended that nurses to be able to provide one alternative action, namely aerobic exercise in reducing depression levels and increasing CD4 cell counts. Nurses can increase their knowledge and skills by learning various non-pharmacological therapies as independent actions of nurses. Families can be involved in the exercise so that they can assist the patient in doing the exercise. For further researchers the results of this study can be used as a basis for further researchers to conduct more studies by controlling the confounding variables and adding a larger sample size with a longer period of intervention.

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Original Research

# Parents' Psychological Aspect in Caring for the Child During COVID-19 Pandemic

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**ABSTRACT**

**Introduction:** COVID-19 is unprecedented, especially for parents with children aged 2-12 years old who are prone to infection due to their activities. The psychological condition of parents will be affected as they are worried about their children being infected with COVID-19.

**Methods:** This study aims to identify and analyse the psychological aspects of parents who are caring for children during the COVID-19 pandemic.

**Results:** The results showed that as many as 236 parents (80.9%) showed an emotional anxiety response. The social reaction to the COVID-19 situation was more likely to be a positive response (73.8%) rather than a negative response.

**Conclusion:** The reactions that occur in parents who have pre-school and school-aged children regarding the COVID-19 were anxiety and worry. Reactions arise due to the information obtained being less verifiable, namely social media.

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## INTRODUCTION

The World Health Organization (WHO) has reported more than 2 million cases of Corona Virus Disease (COVID-19) in more than 210 countries and regions, resulting in 195,755 people dying and 781,109 people recovering (Bhattacharya et al., 2020; Nakoe et al., 2020). In Indonesia, two cases of confirmed COVID-19 were announced in March 2020, and it increased significantly to reach 1790 confirmed cases, in which there were 113 new cases per day, with 170 deaths, and 112 people recovered (Djalante et al., 2020; Ministry of Health, 2020). The unpredicted COVID-19 situation has created stress, and it is likely to affect people (World Health Organization, 2020), especially parents caring for children in the school-aged group (Brown et al., 2020; Moscardino et al., 2021). A previous study has proven that the COVID-19 emergency resulted in a worrying period for families,

increasing difficulties in managing daily activities, especially free time and structured activities (Colizzi et al., 2020). Since the phenomenon of the COVID-19 pandemic affects people's psychological and daily lives (Buzzi et al., 2020), family living conditions suddenly change in the home environment, and, thus, the role of parents' education for children is more important than ever. Children expect parents who can provide support and pay attention to their development and provide new learning experiences, especially for toddlers and pre-schoolers (Jiao et al., 2020). Many parents also have to work from home, so managing time to work and accompanying children becomes very problematic. This situation can significantly increase the risk of experiencing stress and negative emotions in parents, with the effect of decreasing the welfare of children (Sprang & Silman, 2013).

The psychological wellbeing of parents and children is a major concern with the quarantine regulation due to COVID-19. This creates fear and anxiety in both parents and children (Liu et al., 2020). Most of the studies conducted during the pandemic and since the beginning of the COVID-19 outbreak examined the psychological consequences on the general population, especially on the elderly and children (Brooks et al., 2020). A survey in China found that the psychological effects on children during the COVID-19 pandemic, such as fear, inattention and irritability, were the most severe symptoms (Jiao et al., 2020).

Several factors influence the psychological response of parents and children including structural aspects of the home and family as well as the environment. The subjective experience of parents, stress and adjustment to quarantine, affect the welfare of parents and children which can make parents stressed and can interfere with children's wellbeing (Abidin, 1992; Madigan et al., 2018; Wong et al., 2021). The COVID-19 pandemic increases the psychological problems of parents, especially stress at the individual and community level, which has a negative impact on the emotional wellbeing and behavior of children and parents (Dalton et al., 2020). This study aims to identify and analyse the psychological aspects of parents who are caring for children during the COVID-19 pandemic.

## MATERIALS AND METHODS

A cross-sectional approach was used in this study. The samples were taken by purposive sampling technique which consisted of parents or guardian with children aged 2-12 years as many as 325 people, from more than seven provinces in Indonesia. The inclusion criteria of the participants in this study were: (1) parents or guardians who have children in aged 2-12 years old; (2) living together with the children and caring for them; (3) being able to fill in the Google Form; and (4) agreeing with the terms and conditions of this research. Meanwhile, those who were not eligible for the inclusion criteria will be excluded from this study. The dependent variable of this study was parents' psychological aspects and caring for children in the school age group was the independent variable.

The data were collected online in July 2020 by utilising Google Forms as a tool to distribute the questionnaire. We reached the participants through WhatsApp groups by sharing the Google Form link. The questionnaire instrument contains the characteristics, beliefs and sources of information as well as the psychosocial (emotional and social) responses of the respondents.

The used instrument in this study was a questionnaire which was developed from the instrument protocol from Health Department ((Kemenkes, 2020). Several questions were directed to measure the socio-demography of participants, in particular: Child's Age, Child's Gender, Origin,

Table 1. Characteristics of respondents (N= 325)

| Characteristic | n | % |
| --- | --- | --- |
| Child's age: | | |
| Toddler | 202 | 62.2 |
| School Age | 123 | 37.8 |
| Child's Gender: | | |
| Male | 173 | 53.2 |
| Female | 152 | 46.8 |
| Origin: | | |
| East Java | 230 | 70.8 |
| Central Java | 36 | 11.1 |
| West Java | 26 | 8.0 |
| Jakarta | 9 | 2.8 |
| Bali | 9 | 2.8 |
| DIY | 4 | 1.2 |
| South Sumatera | 3 | 0.9 |
| The other | 8 | 2.4 |
| Parent Status: | | |
| Parents (Mother or Father) | 319 | 98.2 |
| Another Guardian | 6 | 1.8 |
| The belief of COVID-19 Existence | | |
| Believe | 307 | 94.5 |
| Do not believe | 18 | 5.5 |
| Information Source: | | |
| Social Media | 249 | 76.6 |
| Health Worker | 76 | 23.4 |
| Psychological Response/ Emotional: | | |
| Unconcern | 62 | 19.1 |
| Anxiety | 263 | 80.9 |
| Social Response: | | |
| Positive | 240 | 73.8 |
| Negative | 85 | 26.2 |

Parental Status. Specific questions related to the psychological response were (1) the belief of COVID-19 existence divided into two categories: believe and do not believe; (2) Information Resource consisted two options: social media and health worker; (3) Psychological Response or emotion was measured into unconcern and anxiety; and (4) Social Response included positive and negative.

Data were analysed by univariate analysis, bivariate with Chi-square and multivariate using linear regression. All data analysis was performed statistically using SPSS version 26 for Windows (SPSS, Inc, Chicago, Ill) and significance was set at $p < 0.05$.

The research has been approved by the research ethics committee of STIKES Ngudia Husada Madura (681/KEPK/STIKES-NHM/EC/VII/2020) on July, 23rd 2020.

## RESULTS

Most of the respondents were mothers (88.0%), from East Java (70.8%), which was classified as the red zone for the spread of COVID-19. The majority of participants believed in the existence of COVID-19 (94.5%), sources of information about COVID-19 were from social media (42.8%). Respondents in this study had children of pre-school age (44.3%) with sex mostly male (53.2%). Most of the respondents were likely to have experienced psychological responses

(anxiety) (80.9%) rather than unconcern response (19.1%). Social response to the COVID-19 situation was more likely to be positive response (73.8%) than negative response (26.2%). Detailed information about the characteristics of respondents is depicted in Table 1.

The analysis of the relationship between parental status and respondent's belief with psychological responses showed that there were 261 (81.8%) and 258 (84%) participants who experienced an anxiety emotional response, worried that a family member had contracted COVID-19. The results of statistical tests showed that there was a significant relationship between parental status and respondents' psychological responses (p-value = 0.014) as depicted in Table 2. In addition, the belief of COVID-19 existence showed a significant value among parents who believe compared to those who do not believe (p-value=0.001).

## DISCUSSION

The COVID-19 situation has been a stressor for families as the disease is creating uncertainty and novelty (Brown et al., 2020; Chung et al., 2020). The life condition of families has been restricted and led to experience some stressors and emotional feelings (Morelli et al., 2020). The stressors come from several factors including managing children for 24 hours, having had to work from home, the reduction of wages and the fear of COVID-19 infection (Morelli et al., 2020; Spinelli et al., 2020). These impacts influence the family system and stimulate parenting stress; even those who are not exposed to the virus can feel the indirect effect of the COVID-19 pandemic (Bavel et al., 2020; Chung et al., 2020). Our study proved that two psychological factors (parental status and the belief of COVID-19 existence) have shown a significant association with the parental condition when caring for their children during the pandemic.

The status of parents is highly likely to have an association with the psychological state of parents caring for their children (p=0.014; $X^2$=83) in which most parents felt anxiety about the exposure of children to the COVID-19 virus. This finding has correlation with a previous study that most of parents reported high level of anxiety of COVID-19 infecting their children when they do physical outdoors activities (McCormack et al., 2020). The parents' anxiety encouraged them to make some restrictions for their children, particularly limited access to the public areas, and this drove the parents to follow the health recommendations, such as physical distancing (Tremblay et al., 2016). Long-term effect of the parents' anxiety is the child's boredom and the desire to get out of the house, which triggers the parents to be more frustrated in caring for them. Then, this situation will turn into a family stress and harsh parenting. To prevent the forecast stress situation, it is better for the parents to manage their psychological care by balancing the way they handle their anxiety about the situation and their children's wellbeing. The role of health practitioners is needed to be a consultant for the parents on how to cope with this situation.

The second significant factor is the parents' perception about the existence of COVID-19 itself. In present study, we evaluate that the more parents believe about the COVID-19 pandemic, the more they felt worry about the disease. Generally, the COVID-19 pandemic has a psychological effect and becomes a heavy stressor. A common response in times of crisis is anxiety which arises because of fear or feeling uncomfortable. Anxiety about the spread of COVID-19 can happen to parents as they hear news or information related to the increasingly rapid spread of the Corona virus and the increasing number of

Table 2. The Relationship between Respondent Status and the Psychological (Emotional and Social) Response of Parents during the COVID-19 Pandemic (N=325)

| Variables | Psychological Response (Emotional) | | $X^2$ | p-value |
| --- | --- | --- | --- | --- |
| | Unconcern | Anxiety | | |
| | n (%) | n (%) | | |
| Child's Gender: | | | | |
| Male | 35(20.2%) | 138 (79.8%) | 1.174 | 0.672 |
| Female | 27(17.8%) | 125 (82.2%) | | |
| Parental Status: | | | | |
| Parent | 58(18.2%) | 261 (81.8%) | 0.111 | 0.014* |
| Another Guardian | 4 (66.7%) | 2 (33.3%) | | |
| Child's Age: | | | | |
| Toddlers | 33 (16.3%) | 169 (83.7%) | 0.633 | 0.143 |
| Pre-School | 29 (23.6%) | 94 (76.4%) | | |
| The belief of COVID-19 Existence: | | | | |
| Believe | 49 (16%) | 258 (84.0%) | 0.073 | 0.001* |
| Do Not Believe | 13 (72.2%) | 5 (27.8%) | | |
| Information Source | | | | |
| Social Media | 48 (19.3%) | 201 (80.7%) | 1.058 | 1.000 |
| Health Worker | 14 (18.4%) | 62 (81.6) | | |

* Chi-square test, p<0.05

patients. A qualitative study stated that participants were afraid of contracting COVID-19 both for themselves and their families (Sumakul & Ruata, 2020). Another study has also proved that the anxiety of COVID-19 tends to make people feel fear and the common concern of the fear is because of the health condition of their loved ones (Mertens et al., 2020).

The gender of children has not shown any significant relevance with the psychological parents in caring for their children during the pandemic. Theoretically, the gender of children influences the way parents treat, communicate and behave to the children by which the tendency is to be more protective to a girl than boy (Mascaro et al., 2017). From this phenomenon, we can assume that under some circumstances, such as crisis and pandemic, the psychological effect on parents, specifically the anxiety feeling, will equally appear both for sons and daughters. Aside from gender, the age of children was also not considered as a factor related to the psychological state of parents. The parents showed the same psychological response when caring for toddlers and school age children. The reason for this is because parents and children have a strong inner and emotional connection. Thus, parents will feel more worried if their child is sick or contracted with a disease regardless how old their children are.

According to the information source, this study confirmed that there is no relationship between the psychological status of parents with how the get to know the information about COVID-19. In fact, various information about COVID-19 has spread massively from various media rather other sources (Ahmadi et al., 2021; Prasetyawati et al., 2021). Social media through electronic media presents various kinds of news, both actual, trusted and hoax news or information. Fake news or hoax news is news that is spread by certain parties with various interests. There are several factors that make a person or group believe in the spread of hoax news, especially about the trending COVID-19. The factors in question are limited knowledge and if the news is in accordance with the opinion of the recipient or reader (Chumairoh, 2020).

## CONCLUSION

The psychological state of parents caring for children during COVID-19 pandemic has been correlated by two factors: the parental status and the belief of COVID-19 existence. The reactions that occur in parents who have pre-school and school-aged children regarding COVID-19 are anxiety and worry. This study suggests that managing the psychological health of parents is essential while caring for children during a crisis situation, such as a pandemic since it will correlate with the parenting pattern and can prevent harsh parenting. It is a must for health practitioners to provide psychological education sessions for the parents about how to cope with the stressors when caring for children in a pandemic situation.

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Table 1. Effects of plant growth regulator types and concentrations on embryogenic callus induction from leaf tip explants of *D. lowii* cultured in ½ MS medium supplemented with 2.0 % (w/v) sucrose under continuous darkness at temperature of 25 ± 2 °C after 60 days of culture

Table 3. Maternal and child health care-seeking behaviour for the last pregnancy in women aged 15 – 45 years old

| Type of care | Age Groups (Years) | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | <30 | | 30 - 39 | | 40 - 45 | | All Age | |
| | n | % | n | % | n | % | n | % |
| Place for antenatal care | | | | | | | | |
| Village level service (Posyandu, Polindes or Poskesdes) | 1 | 9.1 | 1 | 4.6 | 1 | 3.5 | 3 | 4.8 |
| District Level service (Puskesmas/Pustu) | 2 | 18.2 | 7 | 31.8 | 1 | 3.5 | 10 | 16.1 |
| Hospital, Clinics, Private Doctor or OBGYN | 1 | 9.1 | 4 | 18.2 | 2 | 6.9 | 7 | 11.3 |
| Private Midwife | 7 | 63.6 | 10 | 45.5 | 25 | 86.2 | 42 | 67.7 |
| Place of Birth | | | | | | | | |
| Hospital | 5 | 50.0 | 5 | 22.7 | 4 | 13.8 | 14 | 23.0 |
| Birth Clinic/Clinic/Private health professional | 5 | 50.0 | 15 | 68.2 | 21 | 72.4 | 41 | 67.2 |
| Puskesmas or Pustu | 0 | 0.0 | 2 | 9.1 | 0 | 0 | 2 | 3.3 |
| Home or other place | 0 | 0.0 | 0 | 0 | 4 | 13.8 | 4 | 6.6 |
| Ever breastmilk | | | | | | | | |
| No | 1 | 9.1 | 1 | 4.6 | 1 | 3.5 | 3 | 4.8 |
| Yes | 10 | 90.9 | 21 | 95.5 | 28 | 96.6 | 59 | 95.2 |
| Exclusive breastfeeding | | | | | | | | |
| No | 4 | 36.4 | 10 | 45.5 | 18 | 62.1 | 32 | 51.6 |
| Yes | 7 | 63.6 | 12 | 54.6 | 11 | 37.9 | 30 | 48.4 |

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