

Family Experience of Stroke Patients Regarding Prehospital Time: A Phenomenological Study

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Abstract

Background: Stroke is a neurological disease that requires immediate treatment, and family participation is very important when a stroke occurs at home.

Purpose: This study aims to explore the pre-hospital time experiences of patients' families with stroke in Kolaka Regency.

Methods: The study is a qualitative research with a phenomenological design. A total of 8 participants from families of stroke patients were recruited using a purposive sampling approach. Source triangulation was used in this study from stroke patients. Data were collected through in-depth interviews using audio-recorded then transcribed verbatim and validated between researchers. The data were analyzed using Colaizzi method with a selective and focused analysis approach to obtain themes.

Results: There are two themes of this study, the first theme is responses of stroke and the second theme is medical treatment.

Conclusion: It is important that family members have a good response and knowledge so that when one of their family members has a stroke, they can be taken to the hospital at the right time. Our suggestion is that it is necessary to increase family knowledge about stroke to minimize the delay in stroke rescue time.

Keywords: family experience; Kolaka Regency; prehospital time; phenomenology; stroke.

Introduction

Stroke is often referred to as a brain attack. Stroke occurs when the supply of oxygen and nutrients to the brain is disrupted due to blocked or ruptured blood vessels (Bray et al., 2014). Stroke is the fourth leading cause of death in the United States. Death occurs on average 1 person every 4 minutes (Bray et al., 2014). Data from the Indonesian Hospital Association (PERSI) in 2009 showed that the main cause of death in hospitals due to stroke was 15%, meaning that 1 in 7 deaths was caused by stroke with a disability rate of 65% (Kemenkes RI, 2013). In Indonesia, the number of stroke victims increased from 8.3 percent to 12.1 percent in 2007, while stroke patients were 8.8 percent in Southeast Sulawesi (Kemenkes RI, 2014). In Kolaka Regency, there were 90 patients in 2018, 107 in 2019, and 116 in 2020, whereas illnesses associated with stroke risk factors, such as hypertension and diabetes mellitus, continue to rise in Kab. Kolaka (Dinkes Kab. Kolaka, 2020). Stroke is a disease that causes death and disability as much as 21% in 2014 (Mesiano, 2017).

Stroke is the most common neurological disease that can cause serious health problems and have an impact on motor and sensory dysfunctions (Lewis, Dirksen, Heitkemper, & Bucher, 2014). Motor disorders include impaired mobility, respiratory function, swallowing, speech, and the ability to perform daily activities as well as lifelong disability (Smeltzer, Bare, Hinkle,

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& Cheever, 2010; Wirawan & Putra, 2009).

The problem of speed of treatment is the most important aspect in stroke management. This greatly affects the amount of damage that will occur and the type of therapy that is right for the patient. Ischemia will occur in 5 minutes if one blood artery is blocked. This causes the importance of pre-hospital time treatment in patients who experience stroke symptom (Mesiano, 2017). In the guidelines for handling stroke patients by the AHA 2013, it is explained that stroke management must be carried out as fast as possible. The dispatch of the emergency team from receiving the call to being ready to depart must be less than 90 seconds. Then, the time for the emergency team to arrive at the patient's place is < 8 minutes (Edward C Jauch, Jeffrey L Saver, Harold P Adams Jr, Askiel Bruno, J J Buddy Connors, Bart M Demaerschalk, Pooja Khatri et al., 2013). Previous research has found a link between early treatment and stroke patients' brain impairment (Batubara & Tat, 2016). Based on the information above, the authors want to explore the experiences of stroke patients' families during pre-hospital time in Kolaka Regency using a qualitative phenomenological approach.

The purpose of this study was to explore the family of stroke patients experiences regarding pre hospital time in Kolaka regency. This research is expected to increase knowledge and can be a reference for further researchers, especially stroke.

The urgency of the current research is the length of prehospital time stroke patients arrive at the hospital, causing serious problems in neurological damage, especially motor damage in patients. Knowing the experience of the patient's family during pre-hospital can be used as the basis for the cause of the time delay and what the family does during the pre-hospital time so that efforts can be made to prevent delays in pre-hospital time in stroke patients and reduce the risk of neurological damage in patients. Based on this, the question of this research is "how is the family experience of stroke patients during prehospital time?"

Methods

This research is a qualitative research with a phenomenological research design that explores the universal experience that is endured by an individual towards a phenomenon faced in everyday life, with a transcendent phenomenological approach, which focuses on individual experiences that are universal, so that research questions can be answered by the experiences explored by families of stroke sufferers during prehospital time (Afiyanti & Rachmawati, 2014).

This research was conducted from June to September 2021 in Kolaka Regency, South East Sulawesi, Indonesia. The sampling technique used purposive sampling taking participants according to certain criteria to meet the researcher's target

(Grove, Gray, & Burns, 2015; LoBiondo-Wood & Haber, 2014). The sample in this study was the families of stroke patients in Kolaka, with a total of 8 participants (Afiyanti & Rachmawati, 2014). The researcher recruited participants by waiting for patients who met the inclusion criteria in the neurology department by directly explaining the purpose of the study and asking the respondent's consent to be interviewed according to the agreed place, namely an interview in one of the hospital areas or at the participant's home, until the experience data was saturated with inclusion criteria, namely: having a family of stroke patients, being willing to be respondents, and being able to speak fluently about their experiences from the time the patient experienced stroke symptoms to caring for stroke patients.

Data collection was carried out by in-depth interviews with participants with unstructured formal interviews, researchers conducted interviews with participants twice by helping participants describe experiences related to knowledge about prehospital time for stroke patients without leading a discussion that was formed from questions given by researchers while recording using a voice recorder. Interviews were conducted in the waiting room of the Neural Clinic of Benyamin Gulu Kolaka Hospital and at the participant's house for approximately 20–30 minutes. Researchers conducted interviews with stroke patients as source triangulation.

Data analysis was carried out manually using the Colaizzi approach, namely by listening to participants' verbal descriptions, reading verbatim transcripts, grouping significant statements into themes, and writing down descriptions and interpretations experienced by participants regarding phenomena (Afiyanti & Rachmawati, 2014). Trustworthiness is the responsibility or accuracy and accuracy of the data generated from qualitative studies (Afiyanti & Rachmawati, 2014). Trustworthiness in this study was obtained through triangulation of sources with the truth of the data through interviews with stroke sufferers. The researcher cannot make observations because the process experienced by the participants has passed.

This study was approved by ethics of KEPK IAKMI SULTRA with Number 74 / KEPK-IAKMI / VI / 2021. Before asking participants' consent, the researcher first explained the purpose of the study after obtaining written consent. The researcher then began to collect data by considering the ethical principles of research in the form of autonomy, beneficence, non-maleficence, confidentiality, and justice. The data collection process was carried out with ethical principles, namely: providing an explanation to the participants regarding the purpose of the study and explaining that the data obtained were intended for research purposes only, the identity of the participants will be kept confidential, participants have the right to withdraw from this study if they are not willing to become research respondents.

Results

The study produced two themes response to stroke and medical care. The sub-themes are described below.

The responses of stroke

The response to stroke is divided into three sub-themes, sub-theme 1 is affective response, sub-theme 2 is knowledge (cognitive), and sub-theme 3 is intervention by families at home.

Sub-theme 1 Affective Response is divided into three sub-sub themes, namely family emotional response, patient emotional response, and family's assessment of stroke symptoms. The family's emotional response is identified with panic, confusion, crying. These are described by keywords through participant statements as follows:

"it turns out that maybe my feelings are afraid, because I am also a panic person, moreover, yes, I panicked because of a slight illness I immediately took action" (P3)

"....this tongue immediately ran in, we were all outside, we immediately went inside, we, we were confused because the tongue couldn't speak, so we were confused about what we wanted to do.." (P5)

"...I'm confused what to do, I said Astaghfirullah I cried seeing her..." (P8)

This is confirmed by the triangulation participants

"He didn't know what he wanted to do, he just cried, he said Astaghfirullah, because he called my name right, he said Ros, Ros, why are you like that" (Pt2)

The emotional response of patients : fear, refusing to go to the hospital, are described as follows:

"I'm afraid like now he will be covid, Covid-19, afraid of covid later, afraid of having his blood drawn..." (P7)

"had refused, had refused, later there was like a month..." (P7)

Family assessment of stroke symptoms with General condition & Awareness, Musculoskeletal symptoms, Urinary symptoms, and Gastrointestinal symptoms.

General condition and awareness is described by keywords through participant statements as follows:

".....already peeing here.., no, it's not like he's unconscious, so he was rushed to the health center, arrived at the health center, he checked his blood pressure, 150 that day, so he said it took a long time to be checked..." (P1)

"Weak, after a while about half an hour he threw up, he really felt like throwing up..." (P3)

"dizzy, dizzy, fell from, in front of the house, uh at first it didn't go like this, it didn't immediately a bit limp, then his mouth bent, yes not long after, after eating bananas, after eating bananas, immediately dropped, not long after the drop was brought to the hospital" (P4)

"No symptoms, just fell in front of the shop.... all of a sudden, uh, I got it right away, I was also surprised, I immediately picked it up ..." (P6)

Musculoskeletal symptoms is described by keywords through participant statements as follows:

"Anyway, the left side died until now....the right one didn't that's why I'm surprised" (P3)

"What I was surprised about was that when I took the first hospital, the body wasn't stiff, it was just, only the tongue that couldn't talk, couldn't move" (P5)

"....She has his eyes closed, then, uh, the left side, the hands and feet if he wants to lift half to death" (P7)

"I saw that his mouth was crooked and he was silent....don't know what to do...." (P8)

This is reinforced by triangulation of participant triangulation:

"At first I didn't know it was a stroke, at first it was sudden, that's why I am, why is my body getting sluggish, it's on the left or right, I'm confused, isn't this a symptom of a stroke or not" (Pt1)

Urinary symptoms is described by keywords through participant statements as follows:

"At first he couldn't get up, I saw that he couldn't even pee, so I finally took him to the health center" (P1)

Gastrointestinal symptoms is described by keywords through participant statements as follows:

"It's dawn, he thinks he's just sleeping, later he wants to go pee can't wake up, seen vomiting too" (P1)

This is reinforced by triangulation of participant triangulation :

".. the second time I was hit again, hit again here (shown to show), so I was hit, so I lay down, I can't shake, threw up, vomited." (Pt1)

Sub-theme 2 is knowledge (cognitive) which is described by the participants' statements as follows:

"Yes, I know.. stroke.. just go up pressure with cholesterol" (P4)

"Not yet, we didn't know it said it was a stroke... because we panicked, because we didn't know anyway..." (P5)

"I don't know yet, because this is why my sister rarely gets sick, when she gets sick, it drops right away....." (P6)

"Oh, it's still half-assed because you have to be checked again by the doctor, eh, eh, but what's really wrong with Mom, history indeed high blood and sugar, so maybe when you have a lot of thoughts that trigger, yes it happens" (P7)

Sub-theme 3 is intervention by families at home consists of sub-sub themes of first aid and care.

Sub-sub theme 1 first aid: lifting, bringing to the health center, bringing to the hospital, slapping the face, measuring blood pressure, taking medicine, given coconut water, not being taken to the hospital. Which is described by the participants' statements as follows:

"finished, after I picked it up first anyway, I picked it up and took me straight to the health center... Oh yes, Maghrib..." (P2)

"I said that my sister's blood pressure was right, I had a midwife's sister, her blood pressure was 180"

and immediately went up, how come it's never like this, maybe it's because of the wrong food? ...he is taking amlodipine with paracetamol" (P3)

"Immediately taken to the health center there was no sleep that day, tired, immediately went up 1 time his blood pressure was the same" (P4)

"Appointed, because I can't walk.. Can't walk. Two people are appointed, yes my brother... No action was given" (P4)

"Like coconut, coconut water in, coconut water..... No more taking medicine... I said this, oh you'll just rest " (P5)

"Yes, suddenly, uh, I got it right away, I was also surprised, I immediately picked it up, all the people came, please, go straight to the Puskesmas, go to the Puskesmas directly to be referred" (P6)

"Oh, yes, I slapped his cheek anyway, his face was crooked, so someone slapped his mouth, his mouth... So, to be aware, let him come back, it's crooked, his mouth is bent, after being slapped, he was slapped a little, uh, back to normal mouth (P6)

"what's that day, calm down first so that it doesn't get worse later, keep it up, calm down, rest, sleep, I offer you to the hospital, come on..." (P7)

This is reinforced by triangulation of participant triangulation :

"suddenly I went to the hospital, RSBG hours, yes at 4 in the morning I had a rapid test at the hospital, the results were negative I was admitted to the ER, I was treated for 1 week at the RSBG hospital" (Pt2)

Sub-sub-theme 2 is care: feeding, providing comfort, telling rest/sleep. Which is described by the participants' statements as follows:

"Only drinking water with rice was given to him because he had not eaten since that morning.... Nothing, immediately taken action to the puskesmas" (P1)

"...but it was still shaking why was this, so he asked for help to get it like food and drink warm water" (P3)

"Ah, is that the day, calm down first so that the condition doesn't get worse, then go ahead, calm down, rest, sleep... I'm already sleeping, so I offered to go to the hospital" (P7)

Medical treatment

Theme 2 is medical care which consists of sub-themes distance of health facilities and time delay. Distance to health facilities: 300 m, 1 km, 4 km, Which is described by the participants' statements as follows:

"The distance from the house to the puskesmas is about 4 kilos ... About 30 minutes.." (P1)

"Yes, I live in Watuliandu about how many meters it is in, Pattimura to approximately 300.. 300 meters close in just a few minutes" (P3)

"More than 5 kilos I think, four, four kilos... It's not a good road, it's almost one hour..." (P5)

"No, one kilometer, Yes, how is the puskesmas with the Benjamin Guluh hospital, how many meters is it, maybe there is one kilo, one kilo" (P6)

The time delay is divided into the time delay until getting first aid at the hospital and the referral time delay (from primary health care to the hospital).

Time delay at home until first aid at the hospital: 2 hours 30 minutes, 30 minutes, 1 hour, 2 hours, 1 month, which is described by the participants' statements as follows:

"thirty minutes in, it means that from the time I got hit, I got to the puskesmas about two and a half hours" (P1)

"ten minutes, right, ten minutes can't you arrive, only maybe a little longer than the two hours given..." (P3)

"How long is that day in, mmm, an hour maybe. He was treated right away and brought home. The next day he was taken to the Kolaka hospital for a check.... the gap between one house and the health center " (P4)

"Not enough for half an hour, not enough for half an hour, very fast, that's fast, ma'am, fast, fast movement, I was going to take a shower at that time, really fast, just move fast, I have to be fast, I was just about to take a shower, I I don't know if I said ade, it turns out that there was a faint in front of it" (P6)

"the hour. It's not enough for one hour, how many seconds, yes for what reason, the car was taken... Not enough for one hour, how many minutes, yes, how much, erm because it's fast, please help quickly" (P6)

"I think there will be a month later, I think in about a month, treatment is at home, in therapy, the therapy is starting to get better, he can raise his hand, talking about it has started not too umm.." (P7)

The delay time for referral from primary health care to hospital (referral): 30 minutes, 1 day, Which is described by the participants' statements as follows:

"The time lapse maybe 2 hours, then they were taken to the puskesmas ... The distance from the house to the puskesmas was about 4 kilos" (P1)

"Didn't spend the night, was immediately referred, oh one night I guess, one night... I didn't even know it was a midwife, there was no cure" (P5)

"Not enough for half an hour, not enough for half an hour, really fast, that's really fast, ma'am, fast, fast movement, I was about to take a shower at that time, really fast, just move fast, I have to be fast, I was just about to take a shower" (P6)

Discussion

The responses of stroke

There are three responses to stroke, namely affective responses, knowledge (cognitive), and actions taken by families at home before being taken to health services. Families and patients both experience affective responses in the form of emotional response. This study shows that a person's psychological response when he sees his family having a stroke can be in the form of fear, panic, confusion, surprise and crying. This is

an emotional response to anxiety that occurs in a person when there is an anxiety stimulus, such as a study that aimed to see cortisol and anxiety levels in family members of patients treated in the ICU with the result saying that a third of family members experienced anxiety after their loved ones entered the ICU. Many family members also experience depression and post-traumatic stress (Beesley et al., 2018). Knowing that a family member has an acute illness has an emotional impact on a person. Other studies also show that 70% of families of stroke patients experience severe anxiety because of the conditions experienced by families of stroke patients (Sulistyoningsih & Ai, 2018). Increased emotion and crying is a process of forgiving oneself when the family has a stroke (A'la, Yosep, & Agustina, 2017). An association between disease representation and distress exists in stroke patients, a meta-analysis showed that stroke patients' perceptions of strong disease identity, acute/chronic times, and emotional responses were significantly and positively associated with anxiety and depression (Pai, Li, Tsai, & Pai, 2019).

This study also shows that the emotional response of the sufferer himself is the fear of being taken to the hospital due to COVID-19. A qualitative study that aims to determine the understanding of Community Emergency Preparedness for Cardiovascular Disease and acute stroke during the COVID-19 Pandemic, obtained information that participants reported concerns about virus transmission, corona in the ambulance and in the hospital. Community members' attitudes and perceived behavioral control to seek emergency cardiovascular care are affected by the COVID-19 pandemic (Robles et al., 2021).

This study also showed that after a stroke occurred, there was a family assessment of the general condition and awareness, symptoms of stroke, urinary symptoms, gastrointestinal symptoms, and musculoskeletal symptoms suffered by the patient, such as: unable to urinate, vomiting, unconsciousness, weakness, feeling unwell, weakness, weak extremities, crossed eyes, facial asymmetry, and aphasia. According to a study that stroke patients experience several things when having a stroke, namely numbness, tilted face, slurred speech, saliva coming out of the mouth and paralysis (Luan, Yang, Huang, & McDowell, 2021). Sudden speech difficulties and sudden weakness on one side are the most frequently identified symptoms (Krishnamurthi et al., 2019). Speech/language impairment was the only factor independently associated with patient first aid (Soto-Cámara et al., 2019).

This study also shows that the family's knowledge (cognitive) is knowing, doubtful/not sure, and not knowing. A study showed that the better the family's knowledge about pre-hospital stroke detection, the faster the time of arrival at the hospital (Ainiyah, Izzah, Zahroh, Bistara, & Faizah, 2021). There is a relationship between family knowledge

about risk factors and early symptoms of stroke and family behavior in the early treatment of stroke. The higher the value of family knowledge, the better the behavior of the family (Rosmary & Handayani, 2020). The patient's interpretation of symptoms is also important: when they think the situation cannot be self-managed, first aid is reduced to 253 minutes (Soto-Cámara et al., 2019).

Intervention by the family at home are to provide first aid and care. The first aid given included lifting the patient, bringing him to the puskesmas, bringing him to the hospital, slapping his face, measuring blood pressure, taking medicine, being given coconut water, not being taken to the hospital. Treatment given by feeding, providing comfort, telling rest/sleep. One study reported that they would call an ambulance, the most appropriate course of action, if they saw someone suffering from stroke symptoms (i.e., impaired vision, speech problems, numbness or one-sided weakness). The second most common course of action is to advise the person to see a doctor instead of consulting a doctor immediately, About 1/3 would recommend bed rest and 1/10 would suggest drinking water (Luan et al., 2021).

Participants who recognized more stroke symptoms performed each action more frequently, indicating a positive relationship between symptom recognition and action. With regard to calling an ambulance, any additional symptoms are recognized. It is likely that calling an ambulance is the most frequent course of action (Luan et al., 2021). However, this study shows that the average patient's family immediately takes stroke sufferers using their private vehicles.

Home care of the patient is the most common response to participate in regular or increased physical activity followed by eating more fruits and vegetables/having a healthier diet and quitting smoking, reducing salt intake, and a small percentage not knowing how to reduce the chance of having a stroke (Krishnamurthi et al., 2019). Knowledge of relatives that stroke is a disease that requires immediate treatment (Ningsih, Andarini, & Rachmawati, 2020). Misjudgment of symptom onset or poor awareness of stroke symptoms and emergency pathways (Pulvers & Watson, 2017). This includes family support when having a stroke, the support provided by the family can improve the patient's quality of life (Maryam, Resnayati, Riasmini, & Mambang Sari, 2018).

Medical treatment

The second theme is medical care, which consists of the distance from the health facility to the house and the time lag for receiving therapy in the hospital. The distance of health facilities is 300 m, 1 km, 4 km in the results of this study. A study revealed that there was no effect of location distance on the delay in arrival of patients after an acute ischemic stroke in the UGD (Ningsih et al., 2020). The results showed that the time lag at home to the hospital was 2 hours 30 minutes, 30 minutes, 1 hour, 2 hours,

1 month, while the time lag from referral was 30 minutes and 1 day. A review article revealed that the average time to admission and the percentage of stroke patients arriving before the logistically critical 3 hours have shown a slight increase in the last two decades. The main factors that affect prehospital time are related to emergency medical lines, stroke symptoms, patient and bystander behavior, patient health characteristics, and awareness of stroke treatment (Pulvers & Watson, 2017). Severe stroke is one of the reasons patients are quickly taken to the hospital. Other factors associated with early arrival were related to stroke symptoms, stroke subtype, comorbidities, behavior or perception of patients and/or observers at stroke onset, and stroke onset time (Pulvers & Watson, 2017). The top three factors associated with late arrival were the general practitioner or primary care facility was visited first, referral from another hospital, and living alone (Pulvers & Watson, 2017).

The results of this study indicate that family knowledge is one of the causes of patients being immediately taken to the hospital, but because of covid 19, there is a fear of patients going to the hospital. Another important supporting factor is the delay in referral from primary care to the hospital so that patients are late in getting help.

Conclusion

Family experience in carrying out treatment during prehospital stroke is very important, where knowledge about stroke needs to be considered in prehospital stroke management. The more family knowledge increases, the sooner stroke patients are brought to the hospital. So as to reduce patient treatment delays, primary care also needs attention. Specifically in terms of making referrals to hospitals, in this study, training for primary care workers needs to get attention so as not to delay bringing patients to the hospital. After this research was conducted, the recommendation from the researchers was increasing the knowledge of the families of patients who are at risk of stroke is very important as well as a good training for primary health workers in following up stroke patients.

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The Effect of Earmuff and Earplug Use on Preterm Infants Towards Oxygen Saturation and Pulse

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Abstract

Background: A bright circumstance, cold temperatures with loud noise and many activities around can influence oxygen saturation and pulse in preterm baby.

Purpose: This study aimed to identify the effect of using earmuffs and earplugs on the physiological response of preterm infants.

Methods: This crossover study involved 15 medically stable preterm infants treated in a closed incubator. It used the consecutive sampling technique where the babies' physiological response using Neonatal Pulse Oximetry was observed for 30 seconds every 15 minutes for two hours of using earmuffs and earplugs.

Results: The result of repeated ANOVA analysis showed that there is no significant difference of pulse repetition frequency before, during, and after using the earmuff and earplug to preterm infants. Meanwhile, statistically, there was a difference in the mean of oxygen saturation during and after using the earmuff with $p = 0.019$.

Conclusion: The use of ear protection (earmuff and earplug) could assist and support premature infants in maintaining physiological condition. Earplugs are considered better than earmuffs for maintaining a preterm infant's physiological condition.

Keywords: earmuffs; earplugs; premature; physiological responses.

Introduction

Preterm birth is one of the contributors of high neonatal mortality rate in Indonesia, making Indonesia as a country with the 5th leading preterm birth accounted for 675,700 people. While being nurtured, the physical conditions of the treatment room such as the light, the sound, the temperature, the activities nearby, and the room arrangement have a certain impact on the infant's development (Altimier et al., 2015). The NICU room is frequently illustrated as a noisy place due to unexpected noise from the alarm, ventilators, phone, and staff conversation which are truly susceptible to preterm infants (Beal, 2006).

American Academy of Pediatric recommends a noise level of <45 dB in the NICU room, yet the noise level often exceeds this standard. A sudden loud noise has proven to trigger immediate physiological effects such as increased heart rate, blood pressure, respiration and sleep cycle issue, and an increase on the intracranial pressure (ICP) as well as affecting the development of long-term neurodevelopment like language and hearing development (Wachman & Lahav, 2016). Noise contributes to sleep disorders, hearing damage, and decreased oxygen saturation that could have negative impacts on the development of the nervous system (Ranganna & Bustani, 2011). An attempt to reduce noise received by each infant can be accomplished by using earmuffs or earplugs that are designed to adjust the infants' head or using a tool to muffle noises on the incubator cover (Almadhoob & Ohlsson, 2020).

Based on the preliminary research, the noise level of the room ranged

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from 55 to 90 dB. While inside the incubator, its level ranged from 58 to 75 dB. The measurement was conducted using the 4-in-1 digital multifunction environment meter. This condition is unquestionably not in line with the American Academy of Pediatric recommendation that limits noises in NICU rooms to around 45 Db. Therefore, most of the preterm infants in the incubator are not protected from the noises around. This study aimed to identify the effect of using earmuffs and earplugs on the physiological response of preterm infants. Earmuffs and earplugs are individual interventions that reduce noise up to 22dB compared to general interventions by modifying the environment which only reduces noise by 6–8 dB.

Methods

Design

This study used a crossover study design where respondents received more than one intervention (Polit, D.F., Beck, 2016). With this research design, the research subjects had control over themselves. This study was carried out from September to November 2017. Each respondent with an odd number initially used earmuffs (treatment A), while each respondent received an even number used earplugs (treatment B). This treatment using earmuffs and earplugs was completed in two hours. There was a break (washout phase) between the first and the second treatment to avoid the effect of the first treatment on the next treatment. The treatment was stopped for 24 hours and hereafter, each respondent received a reverse treatment. Respondents with odd numbers received treatment B whereas treatment A was given to respondents with even numbers. The effect of the treatment was then compared.

Setting and Sample

This study was conducted in the Perinatology rooms of several hospitals in Riau province: Petala Bumi Hospital, Bangkinang Hospital, Selasih Kerinci

Hospital, Eria Bunda Mother and Child Hospital, and Mother and Child Hospital of Andini, Pekanbaru. Those hospitals were chosen because the noise intensity at each hospital is not yet consistent with the American Academy of Pediatric recommendation. This is known from noise level measurements carried out by researchers in the perinatology room in each hospital. The population of this study was premature infants who had been undergoing treatment at the neonatal care in 5 hospitals in Riau Province. Inclusion criteria for this research were: infant with gestational age between 28 to less than 37 weeks, infant had been treated in a Neonatal Intensive Care minimum in 2 days, infant did not use any mechanical ventilation and was under a tight control of blood gas analysis, infant was in level 2 that needed a higher level of care and infant was under a closed incubator treatment. Based on the inclusion criteria and preliminary research, the sample size was determined using the paired mean difference formula. 15 Preterm infants were taken as samples using a consecutive sampling technique and none of the samples was dropout.

Instruments

In this study, the researchers used the Anderson Behavioral State Scale (ABSS) with a kappa value of 0.85, which has been used by previous researchers (Syahreni, 2010). To ensure the instrument validity of oxygen saturation and pulse frequency, the researchers used the measuring tools utilized by the hospital in which they had been initially calibrated. Observation sheets A and B were also used. Observation sheet A encompassed data of respondents' characteristics including gender, gestational age, and chronological age. Whereas observation sheet B covered data on physiological function such as oxygen saturation and pulse frequency based on the measurement time. The tools utilized in the study were 1) Earmuffs from Em's 4 Bub that is designed to protect babies from noises. It was equipped with a headband to fit babies' head. 2) The earplugs used was child-sized soft moldable

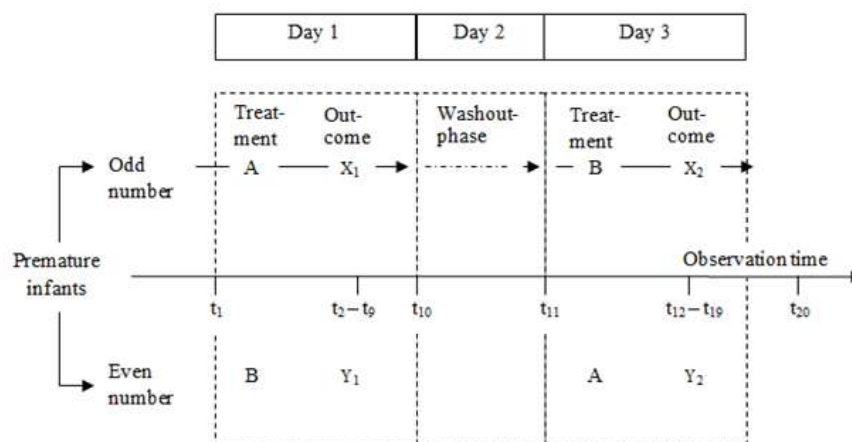


Figure 1. Cross-Over Design

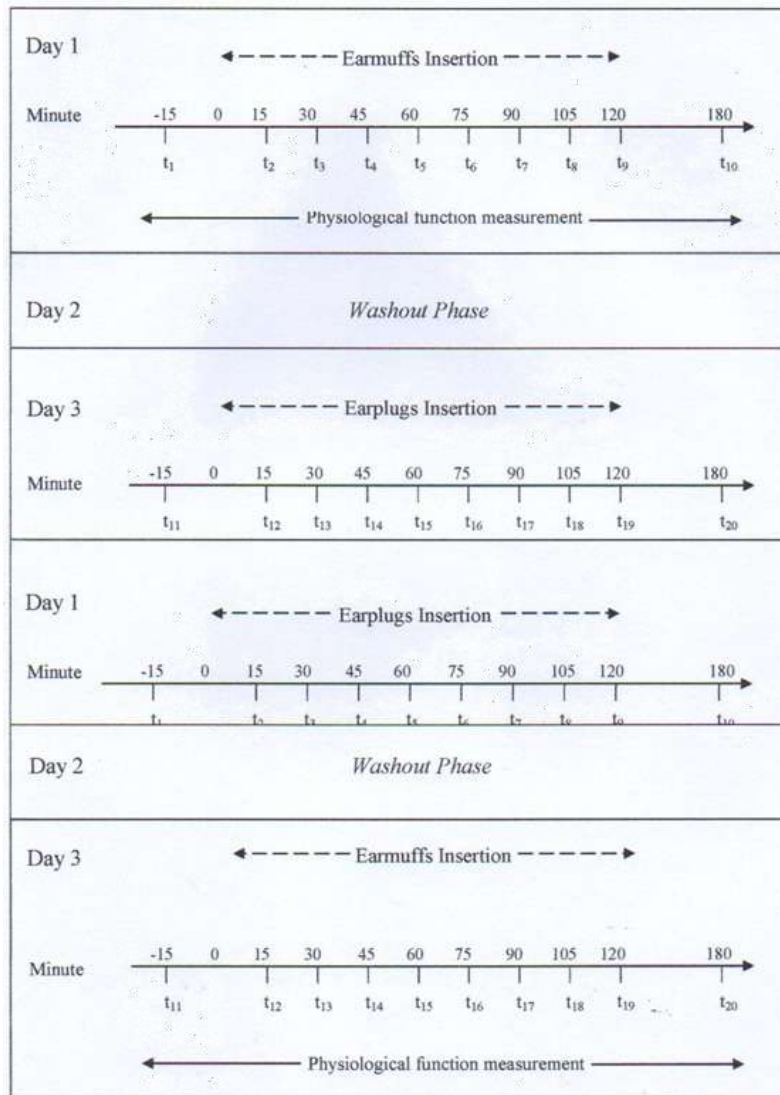


Figure 2. The Measurement on Physiological Function of Respondents with Even Number

silicone from Mack's Earplugs produced by McKeon Products, Inc. USA which has complied with the Environmental Protection Agency (EPA) standard with ANSI S.319 as hearing protection equipment. 3) Neonatal pulse oximeter used in the nursery 4) The 4 in 1 digital multi-function Environment Meter to measure noise level of a room. This tool is designed by combining the function of a sound level meter, light meter, humidity meter and thermometer.

Data Collection and Procedure

The following is the data collection process: 1) First, the infants were given an odd and even number. On the first day, babies with odd number used earmuffs while the ones with even number used earplugs. 2) Second, the physiological function was measured by recording the result of measurement of the oxygen saturation and pulse frequency from the monitoring screen on at (t₁), which was 15 minutes before inserting the earmuffs, every 15 minutes for 2 hours of wearing earmuffs (t₂-t₉), and after

60 minutes, the earmuffs were removed (t₁₀). 3) The second day was the washout period when the infants did not wear any earmuff or earplug. 4) On the third day, infants with odd number wore earplugs while the ones received even number wore earmuffs. 5) Physiological function measurement was accomplished on the third day. The oxygen saturation and pulse frequency were recorded from the monitoring screen at (t₁₁); that was 15 minutes before inserting the earmuffs, every 15 minutes for 2 hours of wearing earmuffs (t₁₂-t₁₉), and after 60 minutes, the earmuffs were removed (t₂₀).

Data Analysis

Univariate analysis was conducted to understand the frequency distribution as well as to check the percentage and proportion of each variable. The characteristics of variables analyzed in this study include gender, gestational age, chronological age, oxygen saturation, and pulse frequency. Gender was explicated by using frequency distribution and

Table 1. Respondent Distribution Based on Their Characteristics, Oxygen Saturation, and Pulse Frequency (n=15)

Variable	Mean \pm SD	Median (min-max)	95% CI
Gestational age	32.33 \pm 2.38	32 (28–36)	31.02–33.65
Chronological age	7.22 \pm 5.60	6 (2–25)	4.16–10.36
Oxygen saturation Earmuffs			
Before	96.67 \pm 1.50	97(94–99)	95.83–97.49
During	96.53 \pm 2.64	97(90–100)	95.07–97.99
After	96.00 \pm 2.33	96 (92–99)	94.71–97.29
Oxygen saturation Earplugs			
Before	96.67 \pm 2.64	98 (91–100)	95.20–98.12
During	97.09 \pm 1.67	97.5 (93–99)	96.16–98.01
After	95.80 \pm 2.81	96 (90–100)	94.24–97.35
Pulse frequency Earmuffs			
Before	141.13 \pm 19.56	135 (100–167)	130.30–151.96
During	140.45 \pm 14.67	139.75 (121.13–161)	132.32–148.57
After	139.2 \pm 15.03	135 (115–174)	130.87–147.52
Pulse frequency Earplugs			
Before	147.53 \pm 16.94	146 (130–186)	138.15–156.91
During	142.38 \pm 16.25	147.38 (112–162)	133.38–151.38
After	146.60 \pm 17.45	147 (117–172)	136.93–156.26

Table 2. Respondent Distribution Based on Gender (n=15)

Variable	Frequency	Percentage (%)
Gender		
Male	8	53.3
Female	7	46.7

Table 3. The Comparison of the Mean of Oxygen Saturation Before, During, and After Using the Earmuffs and Earplugs (n=15)

Oxygen Saturation of Preterm Infants		Mean \pm SD	95% CI	p value
Earmuffs	Before	96.67 \pm 1.496	95.838-97.495	0.506
	during	96.53 \pm 2.642	95.070-97.997	
	after	96.00 \pm 2.329	94.710-97.290	
Earplugs	before	96.67 \pm 2.636	95.206-98.127	0.017
	during	97.09 \pm 1.674	96.165-98.019	
	after	95.80 \pm 2.808	94.245-97.355	

Note: Repeated Anova Test

percentage which are considered as categorical data. Meanwhile, numerical variables such as gestational age, chronological age, oxygen saturation, and pulse frequency were analyzed using the mean, median, standard deviation (SD), as well as the minimum and maximum value at the 95% significance level ($\alpha = 0.05$). The statistical test in the bivariate analysis is determined based on the assumptions that must be met for each statistical test using repeated measures ANOVA and Pairwise comparison test. All variables were tested for their normality by using the Shapiro Wilk test.

Ethical Consideration

The study was approved by the Health Research Ethics Committee, Faculty of Nursing Indonesia University, Jakarta, Indonesia (approval no.191/UN2.F12.D/HKP.02.04/2017) and written informed consent was obtained from each participant before data collection was conducted.

Results

Respondent characteristics analyzed in this study

Table 4. The Comparison of the Mean of Oxygen Saturation Before, During, and After Using Ear-muffs (n=15)

Oxygen Saturation of Preterm Infants		Mean Difference (95%CI)	p value
Earmuffs	Before vs during	0.133(-1.603-1.870)	1.000
	Before vs after	0.667(-0.983-2.316)	0.871
	During vs after	0.5339(-0.964-2.031)	1.000
Earplugs	Before vs during	-0.425(-1.846-0.996)	1.000
	Before vs after	0.867(-1.080-2.813)	0.739
	During vs after	1.292(0.193-2.391)	0.019

Note: Pairwise Comparison Test

Table 5. The Comparison of the Mean of Pulse Frequency Before, During, and After Using the Ear-muffs and Earplugs (n=15)

Pulse Frequency of Preterm Infants		Mean	SD	95% CI	p value
Earmuffs	Before	141.133	19.555	130.304-151.963	0.893
	during	140.450	14.668	132.327-148.573	
	after	139.200	15.029	130.877-147.523	
Earplugs	before	147.53	(16.9)	138.154-156.912	0.116
	during	142.38	(16.2)	133.386-151.381	
	after	146.60	(17.4)	136.938-156.262	

Note: Repeated Anova Test

were described based on the type of data, numerical and categorical data. Numerical variables consisting of gestational age, chronological age, oxygen saturation, and pulse frequency were analyzed using the mean, median, standard deviation (SD), as well as the minimum and maximum value at the 95% significance level ($\alpha = 0.05$).

The number of male premature infants was almost the same as the females as illustrated in the following table.

The result of bivariate analysis on the comparison of the mean of oxygen saturation before, during, and after using the earmuffs and earplugs using repeated ANOVA test shows that the highest mean of oxygen saturation of premature infants using earmuffs was before the earmuffs used. The second highest mean was obtained during the use of earmuffs and lastly after its use. Further, the statistical test result done to compare oxygen saturation before, during, and after using the earmuffs designates that H_0 was rejected. This implies that there was no significant difference in the oxygen saturation of premature infants before, during, and after using the earmuffs ($p=0.506$). Moreover, the highest mean of oxygen saturation on premature infants with earplugs was gained while using the earplugs. The second highest mean was before using earplugs and the lowest was after using earplugs. The results can be seen in Table 3 below.

The result of the pairwise comparison test to compare the mean of oxygen saturation before, during, and after using the earplugs indicates that the mean of oxygen saturation statistically had at least two different means ($p=0.017$). The significance value of the comparison for the second and the third measurement was < 0.05 ($p=0.019$). There was a

different mean of oxygen saturation during and after using the earplugs. Further detailed result can be seen in Table 4 below.

The highest mean of pulse frequency on premature infants with earmuffs was gained before the earmuffs were used. The second highest mean was obtained during the use of earmuffs. After its use, the mean was lower. The result of the statistical test used to compare the mean of pulse frequency before, during, and after using the earmuffs shows no significant difference ($p=0.893$). Meanwhile, the mean of pulse frequency of preterm infants from the highest to the lowest was obtained consecutively before, after, and during the use of earplugs. The statistical test employed to contrast the mean of pulse frequency before, during, and after using the earplugs also results in no substantial difference with $p=0.116$. The result is further explicated in the following table below.

Discussion

Respondents in this study were premature infants who were nursed at several hospitals in Pekanbaru and its neighborhood such as Petala Bumi Hospital, Bangkinang Hospital, Selasih Kerinci Hospital, Eria Bunda Mother and Child Hospital, and Mother and Child Hospital of Andini, Pekanbaru. The samples in this study were infants who were born fewer than 37 weeks with an average gestational age of 32.33 weeks. Premature infants were born with organ immaturity so that the environment as well as the use of medical tools in the hospital room are excessive stimulus and can cause prolonged stress on the preterm infants (Tilly Reid, 2001). The

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noise intensity of the treatment rooms for infants in this study was high with an average noise level of 56,31 dB. According to [Hassanein et al. \(2013\)](#), cardio-respiratory equipment alarms could increase noise intensity to 73 dB, endotracheal suctioning to 68 dB, and the sound of telephone ringing to 83 dB. Reducing the noise received by infants is one of the ways that can be done to diminish sensory stimulation ([Pineda, 2015](#)).

Premature infants born before 28 weeks' gestation also have an immature auditory system. Premature infants are unable to coordinate autonomic response towards the environment and tactile stimulation until 32–34 weeks of gestation. They need more energy to optimize the immature organs. The infants do not have a strong ability to adapt, thus assistance and support by using earmuffs or earplugs could help reduce noise intensity received by the baby. Nurses play a role in diminishing noise intensity and create a healing environment which allows the infants to maintain energy for their growth and development.

The mean chronological age of respondents in this study was 7.26 days. The increase in the chronological age of premature infants is expected to enable them to respond to any stimuli received from the surroundings just as what occurs in the neonatal care. In this study, the preterm infants were at least 2 days old to be able to be involved in the study with an estimate that they had passed the transition period and had received minimum treatment or medical intervention as the first attempt to save life.

Gender is not a factor that influences premature infants. The research result shows that there were almost similar numbers of male and female infants. This is in accordance with a study conducted by [Joshi & Tada, \(2017\)](#) revealing that there is no significant effect of gender to pulse frequency, respiratory rate, or oxygen saturation.

The average of oxygen saturation of premature infants in this research proves no significant difference before, during, and after using the earmuffs. It is consistent with a study by [Duran et al. \(2012\)](#) reporting no significant difference of oxygen saturation to 20 babies using earmuffs involved in the study with $p=0,55$. The measurement was carried out during babies' rest where they did not receive any treatment that could disturb the babies. That measurement agrees with [Abdeyazdan et al., study \(2014\)](#) disclosing a decrease on oxygen saturation that occurred to the control group (without earmuffs) was due to an increase on activities in the room such as medical visits (e.g. doctor check-ups and routine treatment given to babies) which eventually cause a higher noise level. This is where nurses have an important role to provide earplugs to premature babies so that they are not disturbed by environmental activities around them.

The use of earplugs, on the other hand, shows significant differences during and after its use. An increase in oxygen saturation during the use of

earplugs indicates that the earplugs do not interfere with the position of the premature infants. The use of earplugs consistent with the infants' age will not interfere the treatment routine nor cause any obstacle, resuscitation process, and not injure the infants ([Eman A, 2017](#)). In addition, adjusting sleeping position both in supine or quarter prone position affords comfort and increases the infants oxygen saturation ([Utario, 2017](#)).

The result of this study also designates that there is no significant difference of the mean of pulse frequency before, during or after using the earplugs or earmuffs. The mean of pulse frequency is 140.45 for earmuffs and 142.3 for earplugs. Grounded on the researchers' observation, the premature infants' pulse frequency is not too fluctuated as the study is conducted when the infants are taking a rest. This suggests that during the study, the infants do not receive any intervention, especially the ones that could stimulate pain disrupting physiological stability. The strength of this research is that the equipment used complies with the Environmental Protection Agency (EPA) standard, which has ANSI S.319 as hearing protection equipment. These earmuffs and earplugs can reduce sound entering the ear (Noise Reduction Rating – NRR) by 22 decibels. However, the limitation of this study lies in the difficulty of finding samples that match the established criteria. Nurses are expected to put earplugs on premature babies as an intervention to overcome the noise of the care environment.

Conclusion

The use of earplugs on preterm infants could significantly improve oxygen saturation. It explicates that the earplugs do not interfere with the infants' position. Additionally, the use of earplugs on preterm infants is better compared to earmuffs. The use of earplugs consistent with the infants' age will not interfere the treatment routine nor cause any obstacle, resuscitation, and not injure the infants. However, there is no significant difference in the mean of pulse frequency before, during or after using the earplugs or earmuffs.

Declaration of Conflicting Interests

The authors declare no conflict of interest in this study.

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Data availability statement

The datasets generated during and/or analyzed during the current study are available from the corresponding author on reasonable request.

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an emotional response to anxiety that occurs in a person when there is an anxiety stimulus, such as a study that aimed to see cortisol and anxiety levels in family members of patients treated in the ICU with the result saying that a third of family members experienced anxiety after their loved ones entered the ICU. Many family members also experience depression and post-traumatic stress (Beesley et al., 2018). Knowing that a family member has an acute illness has an emotional impact on a person. Other studies also show that 70% of families of stroke patients experience severe anxiety because of the conditions experienced by families of stroke patients (Sulistyoningsih & Ai, 2018). Increased emotion and crying is a process of forgiving oneself when the family has a stroke (A'la, Yosep, & Agustina, 2017). An association between disease representation and distress exists in stroke patients, a meta-analysis showed that stroke patients' perceptions of strong disease identity, acute/chronic times, and emotional responses were significantly and positively associated with anxiety and depression (Pai, Li, Tsai, & Pai, 2019).

This study also shows that the emotional response of the sufferer himself is the fear of being taken to the hospital due to COVID-19. A qualitative study that aims to determine the understanding of Community Emergency Preparedness for Cardiovascular Disease and acute stroke during the COVID-19 Pandemic, obtained information that participants reported concerns about virus transmission, corona in the ambulance and in the hospital. Community members' attitudes and perceived behavioral control to seek emergency cardiovascular care are affected by the COVID-19 pandemic (Robles et al., 2021).

This study also showed that after a stroke occurred, there was a family assessment of the general condition and awareness, symptoms of stroke, urinary symptoms, gastrointestinal symptoms, and musculoskeletal symptoms suffered by the patient, such as: unable to urinate, vomiting, unconsciousness, weakness, feeling unwell, weakness, weak extremities, crossed eyes, facial asymmetry, and aphasia. According to a study that stroke patients experience several things when having a stroke, namely numbness, tilted face, slurred speech, saliva coming out of the mouth and paralysis (Luan, Yang, Huang, & McDowell, 2021). Sudden speech difficulties and sudden weakness on one side are the most frequently identified symptoms (Krishnamurthi et al., 2019). Speech/language impairment was the only factor independently associated with patient first aid (Soto-Cámara et al., 2019).

This study also shows that the family's knowledge (cognitive) is knowing, doubtful/not sure, and not knowing. A study showed that the better the family's knowledge about pre-hospital stroke detection, the faster the time of arrival at the hospital (Ainiyah, Izzah, Zahroh, Bistara, & Faizah, 2021). There is a relationship between family knowledge

about risk factors and early symptoms of stroke and family behavior in the early treatment of stroke. The higher the value of family knowledge, the better the behavior of the family (Rosmary & Handayani, 2020). The patient's interpretation of symptoms is also important: when they think the situation cannot be self-managed, first aid is reduced to 253 minutes (Soto-Cámara et al., 2019).

Intervention by the family at home are to provide first aid and care. The first aid given included lifting the patient, bringing him to the puskesmas, bringing him to the hospital, slapping his face, measuring blood pressure, taking medicine, being given coconut water, not being taken to the hospital. Treatment given by feeding, providing comfort, telling rest/sleep. One study reported that they would call an ambulance, the most appropriate course of action, if they saw someone suffering from stroke symptoms (i.e., impaired vision, speech problems, numbness or one-sided weakness). The second most common course of action is to advise the person to see a doctor instead of consulting a doctor immediately. About 1/3 would recommend bed rest and 1/10 would suggest drinking water (Luan et al., 2021).

Participants who recognized more stroke symptoms performed each action more frequently, indicating a positive relationship between symptom recognition and action. With regard to calling an ambulance, any additional symptoms are recognized. It is likely that calling an ambulance is the most frequent course of action (Luan et al., 2021). However, this study shows that the average patient's family immediately takes stroke sufferers using their private vehicles.

Home care of the patient is the most common response to participate in regular or increased physical activity followed by eating more fruits and vegetables/having a healthier diet and quitting smoking, reducing salt intake, and a small percentage not knowing how to reduce the chance of having a stroke (Krishnamurthi et al., 2019). Knowledge of relatives that stroke is a disease that requires immediate treatment (Ningsih, Andarini, & Rachmawati, 2020). Misjudgment of symptom onset or poor awareness of stroke symptoms and emergency pathways (Pulvers & Watson, 2017). This includes family support when having a stroke, the support provided by the family can improve the patient's quality of life (Maryam, Resnayati, Riasmini, & Mambang Sari, 2018).

Medical treatment

The second theme is medical care, which consists of the distance from the health facility to the house and the time lag for receiving therapy in the hospital. The distance of health facilities is 300 m, 1 km, 4 km in the results of this study. A study revealed that there was no effect of location distance on the delay in arrival of patients after an acute ischemic stroke in the UGD (Ningsih et al., 2020). The results showed that the time lag at home to the hospital was 2 hours 30 minutes, 30 minutes, 1 hour, 2 hours,

1 month, while the time lag from referral was 30 minutes and 1 day. A review article revealed that the average time to admission and the percentage of stroke patients arriving before the logistically critical 3 hours have shown a slight increase in the last two decades. The main factors that affect prehospital time are related to emergency medical lines, stroke symptoms, patient and bystander behavior, patient health characteristics, and awareness of stroke treatment (Pulvers & Watson, 2017). Severe stroke is one of the reasons patients are quickly taken to the hospital. Other factors associated with early arrival were related to stroke symptoms, stroke subtype, comorbidities, behavior or perception of patients and/or observers at stroke onset, and stroke onset time (Pulvers & Watson, 2017). The top three factors associated with late arrival were the general practitioner or primary care facility was visited first, referral from another hospital, and living alone (Pulvers & Watson, 2017).

The results of this study indicate that family knowledge is one of the causes of patients being immediately taken to the hospital, but because of covid 19, there is a fear of patients going to the hospital. Another important supporting factor is the delay in referral from primary care to the hospital so that patients are late in getting help.

Conclusion

Family experience in carrying out treatment during prehospital stroke is very important, where knowledge about stroke needs to be considered in prehospital stroke management. The more family knowledge increases, the sooner stroke patients are brought to the hospital. So as to reduce patient treatment delays, primary care also needs attention. Specifically in terms of making referrals to hospitals, in this study, training for primary care workers needs to get attention so as not to delay bringing patients to the hospital. After this research was conducted, the recommendation from the researchers was increasing the knowledge of the families of patients who are at risk of stroke is very important as well as a good training for primary health workers in following up stroke patients.

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The Effect of Earmuff and Earplug Use on Preterm Infants Towards Oxygen Saturation and Pulse

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Abstract

Background: A bright circumstance, cold temperatures with loud noise and many activities around can influence oxygen saturation and pulse in preterm baby.

Purpose: This study aimed to identify the effect of using earmuffs and earplugs on the physiological response of preterm infants.

Methods: This crossover study involved 15 medically stable preterm infants treated in a closed incubator. It used the consecutive sampling technique where the babies' physiological response using Neonatal Pulse Oximetry was observed for 30 seconds every 15 minutes for two hours of using earmuffs and earplugs.

Results: The result of repeated ANOVA analysis showed that there is no significant difference of pulse repetition frequency before, during, and after using the earmuff and earplug to preterm infants. Meanwhile, statistically, there was a difference in the mean of oxygen saturation during and after using the earmuff with $p = 0.019$.

Conclusion: The use of ear protection (earmuff and earplug) could assist and support premature infants in maintaining physiological condition. Earplugs are considered better than earmuffs for maintaining a preterm infant's physiological condition.

Keywords: earmuffs; earplugs; premature; physiological responses.

Introduction

Preterm birth is one of the contributors of high neonatal mortality rate in Indonesia, making Indonesia as a country with the 5th leading preterm birth accounted for 675,700 people. While being nurtured, the physical conditions of the treatment room such as the light, the sound, the temperature, the activities nearby, and the room arrangement have a certain impact on the infant's development (Altimier et al., 2015). The NICU room is frequently illustrated as a noisy place due to unexpected noise from the alarm, ventilators, phone, and staff conversation which are truly susceptible to preterm infants (Beal, 2006).

American Academy of Pediatric recommends a noise level of <45 dB in the NICU room, yet the noise level often exceeds this standard. A sudden loud noise has proven to trigger immediate physiological effects such as increased heart rate, blood pressure, respiration and sleep cycle issue, and an increase on the intracranial pressure (ICP) as well as affecting the development of long-term neurodevelopment like language and hearing development (Wachman & Lahav, 2016). Noise contributes to sleep disorders, hearing damage, and decreased oxygen saturation that could have negative impacts on the development of the nervous system (Ranganna & Bustani, 2011). An attempt to reduce noise received by each infant can be accomplished by using earmuffs or earplugs that are designed to adjust the infants' head or using a tool to muffle noises on the incubator cover (Almadhoob & Ohlsson, 2020).

Based on the preliminary research, the noise level of the room ranged

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from 55 to 90 dB. While inside the incubator, its level ranged from 58 to 75 dB. The measurement was conducted using the 4-in-1 digital multifunction environment meter. This condition is unquestionably not in line with the American Academy of Pediatric recommendation that limits noises in NICU rooms to around 45 Db. Therefore, most of the preterm infants in the incubator are not protected from the noises around. This study aimed to identify the effect of using earmuffs and earplugs on the physiological response of preterm infants. Earmuffs and earplugs are individual interventions that reduce noise up to 22dB compared to general interventions by modifying the environment which only reduces noise by 6–8 dB.

Methods

Design

This study used a crossover study design where respondents received more than one intervention (Polit, D.F., Beck, 2016). With this research design, the research subjects had control over themselves. This study was carried out from September to November 2017. Each respondent with an odd number initially used earmuffs (treatment A), while each respondent received an even number used earplugs (treatment B). This treatment using earmuffs and earplugs was completed in two hours. There was a break (washout phase) between the first and the second treatment to avoid the effect of the first treatment on the next treatment. The treatment was stopped for 24 hours and hereafter, each respondent received a reverse treatment. Respondents with odd numbers received treatment B whereas treatment A was given to respondents with even numbers. The effect of the treatment was then compared.

Setting and Sample

This study was conducted in the Perinatology rooms of several hospitals in Riau province: Petala Bumi Hospital, Bangkinang Hospital, Selasih Kerinci

Hospital, Eria Bunda Mother and Child Hospital, and Mother and Child Hospital of Andini, Pekanbaru. Those hospitals were chosen because the noise intensity at each hospital is not yet consistent with the American Academy of Pediatric recommendation. This is known from noise level measurements carried out by researchers in the perinatology room in each hospital. The population of this study was premature infants who had been undergoing treatment at the neonatal care in 5 hospitals in Riau Province. Inclusion criteria for this research were: infant with gestational age between 28 to less than 37 weeks, infant had been treated in a Neonatal Intensive Care minimum in 2 days, infant did not use any mechanical ventilation and was under a tight control of blood gas analysis, infant was in level 2 that needed a higher level of care and infant was under a closed incubator treatment. Based on the inclusion criteria and preliminary research, the sample size was determined using the paired mean difference formula. 15 Preterm infants were taken as samples using a consecutive sampling technique and none of the samples was dropout.

Instruments

In this study, the researchers used the Anderson Behavioral State Scale (ABSS) with a kappa value of 0.85, which has been used by previous researchers (Syahreni, 2010). To ensure the instrument validity of oxygen saturation and pulse frequency, the researchers used the measuring tools utilized by the hospital in which they had been initially calibrated. Observation sheets A and B were also used. Observation sheet A encompassed data of respondents' characteristics including gender, gestational age, and chronological age. Whereas observation sheet B covered data on physiological function such as oxygen saturation and pulse frequency based on the measurement time. The tools utilized in the study were 1) Earmuffs from Em's 4 Bub that is designed to protect babies from noises. It was equipped with a headband to fit babies' head. 2) The earplugs used was child-sized soft moldable

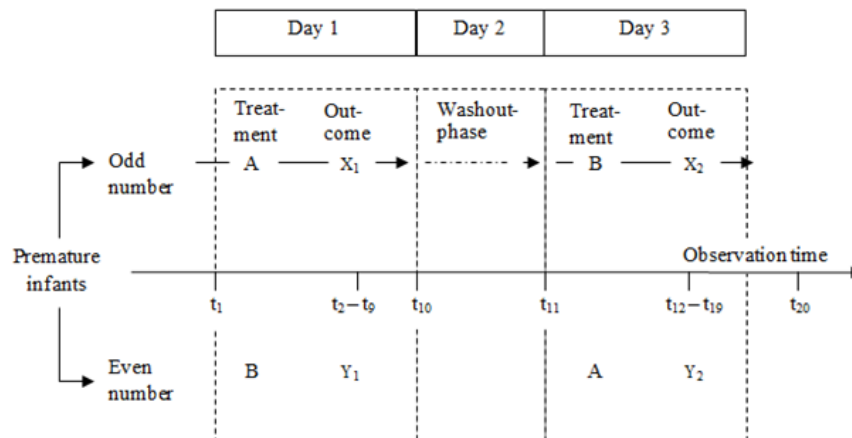


Figure 1. Cross-Over Design

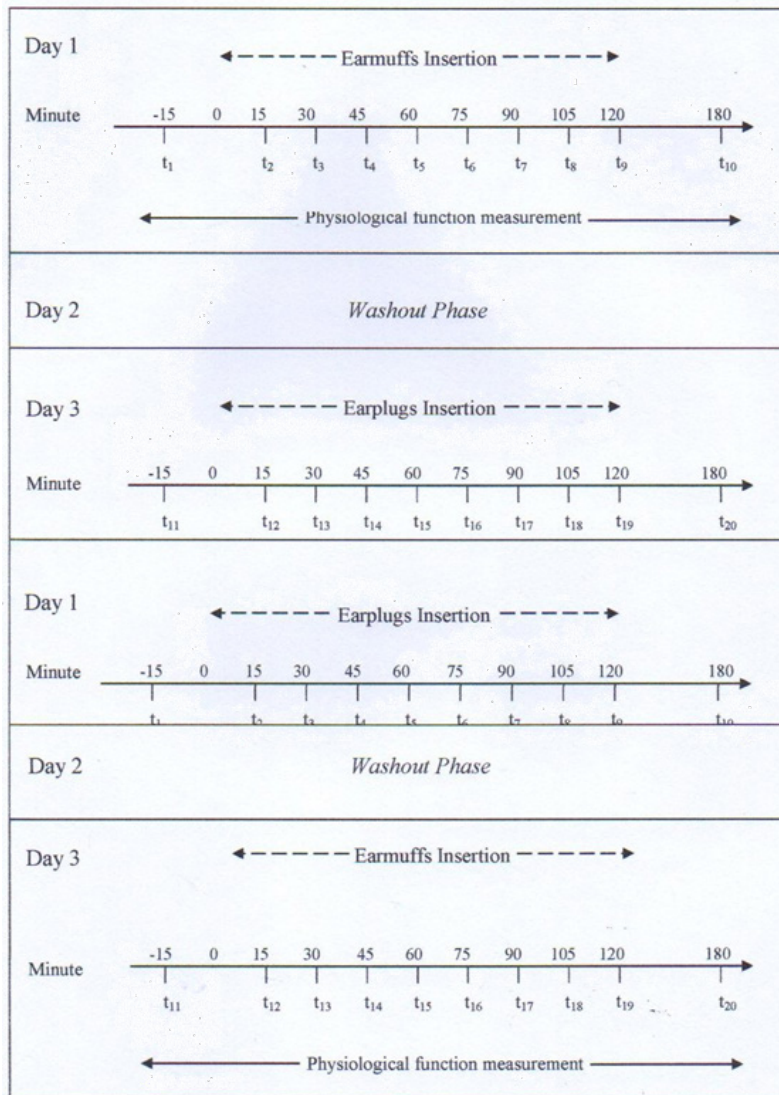


Figure 2. The Measurement on Physiological Function of Respondents with Even Number

silicone from Mack's Earplugs produced by McKeon Products, Inc. USA which has complied with the Environmental Protection Agency (EPA) standard with ANSI S.319 as hearing protection equipment. 3) Neonatal pulse oximeter used in the nursery 4) The 4 in 1 digital multi-function Environment Meter to measure noise level of a room. This tool is designed by combining the function of a sound level meter, light meter, humidity meter and thermometer.

Data Collection and Procedure

The following is the data collection process: 1) First, the infants were given an odd and even number. On the first day, babies with odd number used earmuffs while the ones with even number used earplugs. 2) Second, the physiological function was measured by recording the result of measurement of the oxygen saturation and pulse frequency from the monitoring screen on at (t₁), which was 15 minutes before inserting the earmuffs, every 15 minutes for 2 hours of wearing earmuffs (t₂-t₉), and after

60 minutes, the earmuffs were removed (t₁₀). 3) The second day was the washout period when the infants did not wear any earmuff or earplug. 4) On the third day, infants with odd number wore earplugs while the ones received even number wore earmuffs. 5) Physiological function measurement was accomplished on the third day. The oxygen saturation and pulse frequency were recorded from the monitoring screen at (t₁₁); that was 15 minutes before inserting the earmuffs, every 15 minutes for 2 hours of wearing earmuffs (t₁₂-t₁₉), and after 60 minutes, the earmuffs were removed (t₂₀).

Data Analysis

Univariate analysis was conducted to understand the frequency distribution as well as to check the percentage and proportion of each variable. The characteristics of variables analyzed in this study include gender, gestational age, chronological age, oxygen saturation, and pulse frequency. Gender was explicated by using frequency distribution and

Table 1. Respondent Distribution Based on Their Characteristics, Oxygen Saturation, and Pulse Frequency (n=15)

Variable	Mean ± SD	Median (min-max)	95% CI
Gestational age	32.33 ± 2.38	32 (28–36)	31.02–33.65
Chronological age	7.22 ± 5.60	6 (2–25)	4.16–10.36
Oxygen saturation Earmuffs			
Before	96.67 ± 1.50	97(94–99)	95.83–97.49
During	96.53 ± 2.64	97(90–100)	95.07–97.99
After	96.00 ± 2.33	96 (92–99)	94.71–97.29
Oxygen saturation Earplugs			
Before	96.67 ± 2.64	98 (91–100)	95.20–98.12
During	97.09 ± 1.67	97.5 (93–99)	96.16–98.01
After	95.80 ± 2.81	96 (90–100)	94.24–97.35
Pulse frequency Earmuffs			
Before	141.13 ± 19.56	135 (100–167)	130.30–151.96
During	140.45 ± 14.67	139.75 (121.13–161)	132.32–148.57
After	139.2 ± 15.03	135 (115–174)	130.87–147.52
Pulse frequency Earplugs			
Before	147.53 ± 16.94	146 (130–186)	138.15–156.91
During	142.38 ± 16.25	147.38 (112–162)	133.38–151.38
After	146.60 ± 17.45	147 (117–172)	136.93–156.26

Table 2. Respondent Distribution Based on Gender (n=15)

Variable	Frequency	Percentage (%)
Gender		
Male	8	53.3
Female	7	46.7

Table 3. The Comparison of the Mean of Oxygen Saturation Before, During, and After Using the Earmuffs and Earplugs (n=15)

Oxygen Saturation of Preterm Infants		Mean ± SD	95% CI	p value
Earmuffs	Before	96.67 ± 1.496	95.838-97.495	0.506
	during	96.53 ± 2.642	95.070-97.997	
	after	96.00 ± 2.329	94.710-97.290	
Earplugs	before	96.67 ± 2.636	95.206-98.127	0.017
	during	97.09 ± 1.674	96.165-98.019	
	after	95.80 ± 2.808	94.245-97.355	

Note: Repeated Anova Test

percentage which are considered as categorical data. Meanwhile, numerical variables such as gestational age, chronological age, oxygen saturation, and pulse frequency were analyzed using the mean, median, standard deviation (SD), as well as the minimum and maximum value at the 95% significance level ($\alpha = 0.05$). The statistical test in the bivariate analysis is determined based on the assumptions that must be met for each statistical test using repeated measures ANOVA and Pairwise comparison test. All variables were tested for their normality by using the Shapiro Wilk test.

Ethical Consideration

The study was approved by the Health Research Ethics Committee, Faculty of Nursing Indonesia University, Jakarta, Indonesia (approval no.191/UN2.F12.D/HKP.02.04/2017) and written informed consent was obtained from each participant before data collection was conducted.

Results

Respondent characteristics analyzed in this study

Table 4. The Comparison of the Mean of Oxygen Saturation Before, During, and After Using Ear-muffs (n=15)

Oxygen Saturation of Preterm Infants		Mean Difference (95%CI)	p value
Earmuffs	Before vs during	0.133(-1.603-1.870)	1.000
	Before vs after	0.667(-0.983-2.316)	0.871
	During vs after	0.5339(-0.964-2.031)	1.000
Earplugs	Before vs during	-0.425(-1.846-0.996)	1.000
	Before vs after	0.867(-1.080-2.813)	0.739
	During vs after	1.292(0.193-2.391)	0.019

Note: Pairwise Comparison Test

Table 5. The Comparison of the Mean of Pulse Frequency Before, During, and After Using the Ear-muffs and Earplugs (n=15)

Pulse Frequency of Preterm Infants		Mean	SD	95% CI	p value
Earmuffs	Before	141.133	19.555	130.304-151.963	0.893
	during	140.450	14.668	132.327-148.573	
	after	139.200	15.029	130.877-147.523	
Earplugs	before	147.53	(16.9)	138.154-156.912	0.116
	during	142.38	(16.2)	133.386-151.381	
	after	146.60	(17.4)	136.938-156.262	

Note: Repeated Anova Test

were described based on the type of data, numerical and categorical data. Numerical variables consisting of gestational age, chronological age, oxygen saturation, and pulse frequency were analyzed using the mean, median, standard deviation (SD), as well as the minimum and maximum value at the 95% significance level ($\alpha = 0.05$).

The number of male premature infants was almost the same as the females as illustrated in the following table.

The result of bivariate analysis on the comparison of the mean of oxygen saturation before, during, and after using the earmuffs and earplugs using repeated ANOVA test shows that the highest mean of oxygen saturation of premature infants using earmuffs was before the earmuffs used. The second highest mean was obtained during the use of earmuffs and lastly after its use. Further, the statistical test result done to compare oxygen saturation before, during, and after using the earmuffs designates that H_0 was rejected. This implies that there was no significant difference in the oxygen saturation of premature infants before, during, and after using the earmuffs ($p=0.506$). Moreover, the highest mean of oxygen saturation on premature infants with earplugs was gained while using the earplugs. The second highest mean was before using earplugs and the lowest was after using earplugs. The results can be seen in Table 3 below.

The result of the pairwise comparison test to compare the mean of oxygen saturation before, during, and after using the earplugs indicates that the mean of oxygen saturation statistically had at least two different means ($p=0.017$). The significance value of the comparison for the second and the third measurement was < 0.05 ($p=0.019$). There was a

different mean of oxygen saturation during and after using the earplugs. Further detailed result can be seen in Table 4 below.

The highest mean of pulse frequency on premature infants with earmuffs was gained before the earmuffs were used. The second highest mean was obtained during the use of earmuffs. After its use, the mean was lower. The result of the statistical test used to compare the mean of pulse frequency before, during, and after using the earmuffs shows no significant difference ($p=0.893$). Meanwhile, the mean of pulse frequency of preterm infants from the highest to the lowest was obtained consecutively before, after, and during the use of earplugs. The statistical test employed to contrast the mean of pulse frequency before, during, and after using the earplugs also results in no substantial difference with $p=0.116$. The result is further explicated in the following table below.

Discussion

Respondents in this study were premature infants who were nursed at several hospitals in Pekanbaru and its neighborhood such as Petala Bumi Hospital, Bangkinang Hospital, Selasih Kerinci Hospital, Eria Bunda Mother and Child Hospital, and Mother and Child Hospital of Andini, Pekanbaru. The samples in this study were infants who were born fewer than 37 weeks with an average gestational age of 32.33 weeks. Premature infants were born with organ immaturity so that the environment as well as the use of medical tools in the hospital room are excessive stimulus and can cause prolonged stress on the preterm infants (Tilly Reid, 2001). The

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noise intensity of the treatment rooms for infants in this study was high with an average noise level of 56,31 dB. According to [Hassanein et al. \(2013\)](#), cardio-respiratory equipment alarms could increase noise intensity to 73 dB, endotracheal suctioning to 68 dB, and the sound of telephone ringing to 83 dB. Reducing the noise received by infants is one of the ways that can be done to diminish sensory stimulation ([Pineda, 2015](#)).

Premature infants born before 28 weeks' gestation also have an immature auditory system. Premature infants are unable to coordinate autonomic response towards the environment and tactile stimulation until 32–34 weeks of gestation. They need more energy to optimize the immature organs. The infants do not have a strong ability to adapt, thus assistance and support by using earmuffs or earplugs could help reduce noise intensity received by the baby. Nurses play a role in diminishing noise intensity and create a healing environment which allows the infants to maintain energy for their growth and development.

The mean chronological age of respondents in this study was 7.26 days. The increase in the chronological age of premature infants is expected to enable them to respond to any stimuli received from the surroundings just as what occurs in the neonatal care. In this study, the preterm infants were at least 2 days old to be able to be involved in the study with an estimate that they had passed the transition period and had received minimum treatment or medical intervention as the first attempt to save life.

Gender is not a factor that influences premature infants. The research result shows that there were almost similar numbers of male and female infants. This is in accordance with a study conducted by [Joshi & Tada, \(2017\)](#) revealing that there is no significant effect of gender to pulse frequency, respiratory rate, or oxygen saturation.

The average of oxygen saturation of premature infants in this research proves no significant difference before, during, and after using the earmuffs. It is consistent with a study by [Duran et al. \(2012\)](#) reporting no significant difference of oxygen saturation to 20 babies using earmuffs involved in the study with $p=0,55$. The measurement was carried out during babies' rest where they did not receive any treatment that could disturb the babies. That measurement agrees with [Abdeyazdan et al., study \(2014\)](#) disclosing a decrease on oxygen saturation that occurred to the control group (without earmuffs) was due to an increase on activities in the room such as medical visits (e.g. doctor check-ups and routine treatment given to babies) which eventually cause a higher noise level. This is where nurses have an important role to provide earplugs to premature babies so that they are not disturbed by environmental activities around them.

The use of earplugs, on the other hand, shows significant differences during and after its use. An increase in oxygen saturation during the use of

earplugs indicates that the earplugs do not interfere with the position of the premature infants. The use of earplugs consistent with the infants' age will not interfere the treatment routine nor cause any obstacle, resuscitation process, and not injure the infants ([Eman A, 2017](#)). In addition, adjusting sleeping position both in supine or quarter prone position affords comfort and increases the infants oxygen saturation ([Utario, 2017](#)).

The result of this study also designates that there is no significant difference of the mean of pulse frequency before, during or after using the earplugs or earmuffs. The mean of pulse frequency is 140.45 for earmuffs and 142.3 for earplugs. Grounded on the researchers' observation, the premature infants' pulse frequency is not too fluctuated as the study is conducted when the infants are taking a rest. This suggests that during the study, the infants do not receive any intervention, especially the ones that could stimulate pain disrupting physiological stability. The strength of this research is that the equipment used complies with the Environmental Protection Agency (EPA) standard, which has ANSI S.319 as hearing protection equipment. These earmuffs and earplugs can reduce sound entering the ear (Noise Reduction Rating – NRR) by 22 decibels. However, the limitation of this study lies in the difficulty of finding samples that match the established criteria. Nurses are expected to put earplugs on premature babies as an intervention to overcome the noise of the care environment.

Conclusion

The use of earplugs on preterm infants could significantly improve oxygen saturation. It explicates that the earplugs do not interfere with the infants' position. Additionally, the use of earplugs on preterm infants is better compared to earmuffs. The use of earplugs consistent with the infants' age will not interfere the treatment routine nor cause any obstacle, resuscitation, and not injure the infants. However, there is no significant difference in the mean of pulse frequency before, during or after using the earplugs or earmuffs.

Declaration of Conflicting Interests

The authors declare no conflict of interest in this study.

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Data availability statement

The datasets generated during and/or analyzed during the current study are available from the corresponding author on reasonable request.

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Analysis of the Satisfaction of Nursing Students towards E-learning of the Medical-Surgical Nursing (MSN) subject during Pandemic

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Abstract

Background: The whole world is dealing with the covid-19 pandemic. Therefore, the government has taken a policy to transform the education system from in-class to remote learning. Nursing students are adapting to this system, maintaining learning activities through unfamiliar online methods. One of the subjects they take during this pandemic is Medical-Surgical Nursing. This online learning system has created new challenges in the teaching-learning process on the Medical-Surgical Nursing subject. Students tend to feel disinterested, which leads to a sense of dissatisfaction during online learning.

Purpose: This study aimed to analyse the satisfaction of nursing students towards e-learning of the Medical-Surgical Nursing subject during the pandemic.

Methods: This research used descriptive analysis with a cross-sectional research design and used self-administered questionnaire. The samples of 300 respondents were nursing students at private and public universities in Denpasar. The research started from January to July 2021 from proposal making to data processing. This study used univariate and bivariate analysis involving the logistic regression test.

Results: There is a relationship between the variables of accessibility, understanding the material, interactivity, and method accuracy. The regression equation is $-5.336 + 0.011$ for Accessibility, $+ 0.474$ for Material, $+ 0.021$ for Interactivity, $+ 0.150$ for Utility, and $- 0.093$ for Self-Reliance.

Conclusion: The conclusion in this research is that the convenience of obtaining materials is the most significant relationship.

Keywords: accessibility; learning; nursing education; satisfaction.

Introduction

The coronavirus disease 2019 or better known as COVID-19, has become a pandemic for several months in 2020. Then, the World Health Organization (WHO) declared the COVID-19 a global emergency on March 11th, 2020 (Dilante, 2020). The transmission of this virus is relatively high. It has caused a high percentage of mortality and morbidity in almost all countries, including Indonesia. The Disaster Management Agency reported that as of October 14th, 2020, the COVID-19 cases in Indonesia reached 344,749 patients confirmed as positive, and 12,156 people died (Covid-19 Task Force, 2020). It showed that the virus has been spreading faster and has had a significant impact on human life.

The increasing number of positive confirmed cases of COVID-19 has prompted the Indonesian government to take decisive action to reduce the spread of this disease, such as the large-scale social restrictions and self-isolation. One of the large-scale social restrictions is distance learning methods or online systems in education (Purwanto, 2020). Many countries have implemented this remote learning method, but not yet in Indonesia (Bowers & Kumar, 2015; Porter, Graham, Spring, & Welch, 2014).

The outbreak of Covid-19 has had an impact on the world of education.

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It requires enormous changes in the teaching-learning process, including nursing education. It has encouraged the government and universities to make innovations in the teaching-learning process through online learning methods. As a result, students need to spend time studying from home. Several nursing students expressed difficulties in the teaching-learning process because medical surgical nursing subject areas required a good understanding to support their knowledge and skills. Due to changes in learning during the pandemic, it is not uncommon for students to experience depression, anxiety and stress ranging from mild to severe symptoms (Acob, Arifin & Dewi, 2021)

Based on the AIPNI (Asosiasi Institusi Pendidikan Ners Indonesia) curriculum, the semester credit system in medical-surgical nursing holds the most credits compared to other subjects (Core Curriculum for Indonesian Nurses Education, 2015). In the nursing profession curriculum, medical-surgical nursing is also the subject with the most credits in clinical practice. It requires students to learn more about the medical-surgical nursing subject both in theory and skills. In this current pandemic, it becomes a new challenge for lecturers and students. Based on researcher interviews, students' opinions reflected dissatisfaction towards the online process in this subject because of the subject complexity, limited learning time, and the absence of opportunities to meet directly with lecturers. .

The authors realize that the students' satisfaction level towards online learning in medical-surgical nursing subject is still relatively low. Therefore, it is necessary to conduct further study on the factors related to the students' satisfaction level towards e-learning in this subject, so that student satisfaction with the online learning process will have an impact on student learning outcomes which include knowledge and skills improvement. This study aimed to analyse the satisfaction of nursing students towards e-learning of the Medical-Surgical Nursing subject during the pandemic.

Methods

A Study Design

This quantitative research uses descriptive analysis with a cross-sectional research design. The independent variables in this study are accessibility, the convenience of understanding the materials, interactivity, method accuracy, and self-reliance. Then, the dependent variable is student satisfaction.

Setting

This research started from January to July 2021 for seven months long. Nursing students from private universities in Denpasar took part to be the respondents.

Research Subject

The population in this study were all students of grade 4 and 6 from public and private universities

in Denpasar which included ITEKES Bali, Stikes Wira Medika Denpasar, Udayana University, and Poltekkes Denpasar. The authors used a purposive sampling technique with the Slovin formula and obtained 300 respondents. Inclusion criteria were nursing students who had taken medical-surgical nursing subject online. Exclusion criteria were respondents who refused to be research subjects, did not complete the questionnaire, and students who were on leave were not included in the study.

Instruments

This study used several questionnaires developed by researchers according to the topic and quoted from several studies in Indonesian. The questionnaires included seven parts. First, the characteristic questionnaire consisted of initials, age, gender, university origin, learning media used, internet network conditions, study locations, and devices used during learning. Second, the accessibility of the e-learning questionnaire contained seven statements using a Likert scale with reliability alpha Cronbach 0.781. Then, the four statements of convenience of obtaining materials inquiry had alpha Cronbach score of 0.876. Interactivity questionnaire with nine statements had a Cronbach alpha of 0.887. Utility questionnaire with six statements had a Cronbach alpha of 0.928. The self-reliance questionnaire had 12 points with a Cronbach alpha of 0.911. Lastly, the satisfaction questionnaire with five statements had a Cronbach alpha of 0.864.

The independent variables including accessibility, convenience of obtaining materials, interactivity, utility, and self-reliance have three categories: good, sufficient, and poor. The values are categorized based on the quartile values. While the dependent variable of satisfaction has two classifications: satisfied and dissatisfied based on the median value. The researcher modifies the questionnaire according to the needs and then tested the reliability and validity. The authors developed the questionnaires from previous research with a Likert scale regarding factors related to students' satisfaction (Cigdem & Ozturk (2016), Kuo, et al. (2014), Liaw & Huang (2016).

Data Analysis

The univariate analysis is to identify each research variable, including demographic data, accessibility, the convenience of understanding the materials, interactivity, methods accuracy, self-reliance, and the students' satisfaction level towards e-learning. Then, the bivariate analysis aims to determine factors related to students' satisfaction towards e-learning in the medical-surgical nursing subject.

The statistical test used is the chi-square test if it meets the requirements. Then, by using the SPSS test for windows version 20, with a 95% confidence interval or p-value smaller than 5% alpha (<0.05), H_0 is rejected with a 95% CI value.

The multivariate analysis by logistic regression aimed to determine the variables that have a more

Table 1. Respondents Characteristics

Variables	Students' Satisfaction						P
			Dissatisfied		Satisfied		
	n	%	n	%	n	%	
Age							
19 years old	28	9.3					
20 years old	112	37.3					
21 years old	125	41.7					
22 years old	31	10.3					
23 years old	2	0.7					
24 years old	2	0.7					
Gender							
Male	36	12.0					
Female	264	88.0					
University Origin							
Utekes Bali	175	58.3					
Stikes Wira Medika	34	11.3					
PSSKPN Udayana	75	25.0					
Poltekkes Denpasar	16	5.3					
Network Conditions							
Poor	9	3.0					
Fair	225	75.0					
Good	66	22.0					
Study Locations							
Home	284	94.7					
Boarding house	16	5.3					
Electronic Devices							
Handphone	161	53.7					
Computer	139	46.3					
Accessibility							
Poor	110	36.7	52	47.30	58	30.50	0.000
Sufficient	98	32.7	39	35.50	59	31.10	
Good	92	30.7	19	17.30	73	38.40	
Materials Understanding							
Complex	46	15.3	37	33.60	9	4.70	0.000
Fair	164	54.7	63	57.30	101	53.20	
Easy	90	30.0	10	9.10	80	42.10	
Interactivity							
Passive	84	28.0	43	39.10	41	21.60	0.001
Sufficient	126	42.0	46	41.80	80	42.10	
Active	90	30.0	21	19.10	69	36.30	
Utility							
Poor	80	26.7	43	39.10	37	19.50	0.000
Sufficient	185	61.7	63	57.30	122	62.20	
Appropriate	35	11.7	4	3.60	31	16.30	

Variables	Students' Satisfaction						p
			Dissatisfied		Satisfied		
	n	%	n	%	n	%	
Self-Reliance							
Less	79	26.3	30	27.30	49	25.80	0.341
Fair	141	47.0	56	50.90	85	44.70	
Independent	80	26.7	24	21.80	56	29.50	
Satisfaction							
Dissatisfied	110	36.7					
Satisfied	190	63.3					

Table 2. The Logistic Regression Equation

Variable	Coefficient β	SE (B)	p-value	OR (Minimum-Maximum)
Accessibility	0.011	0.057	0.852	1.011 (0.904-1.130)
Materials understanding	0.474	0.091	0.000	1.6060 (1.343-1.919)
Interactivity	0.021	0.045	0.651	1.021 (0.934-1.116)
Utility	0.150	0.056	0.008	1.161 (1.040-1.297)
Self-reliance	-0.093	0.036	0.010	0.911 (0.849-0.978)
Constant	-5.336	1.600	0.001	

significant influence on other variables. Logistic regression analysis is a mathematical approach used to analyse the relationship between several independent variables and a dichotomous or binary dependent variable. The authors applied the analysis in this research, considering that the dependent variables are satisfied and dissatisfied.

Ethical Consideration

Prior to data collection, the Ethics Committee of Institute Technology and Health Bali approved this study on June 28th, 2021, with approval number: 04.0466/KEPITEKES-BALI/VI/2021. The authors confirmed that all respondents had obtained appropriate informed consent.

Results

Based on the table 1 above, demographic data is presented. Out of 300 respondents, 125 respondents were 21 years old, then 112 respondents were 20 years of age. Most of the respondents, namely 264 people were female, while 36 respondents were male. The data shows that 175 respondents came from ITEKES Bali, 75 students came from PSSKPN Udayana, 34 respondents came from Stikes Wira Medika, and 16 respondents came from Poltekkes Denpasar. On the network conditions aspect, 225 respondents considered it as fair. Then, 66 respondents revealed it as good, while nine others implied it as poor. Only 16 respondents studied at the boarding house while 284 students studied from home. Handphone was the most widely used device as 161 respondents chose it, although 139 students

used laptops.

The results showed that 110 respondents remarked poor on the accessibility aspect, 98 students considered it sufficient, and 92 people experienced the good ones. On the materials understanding variable, 46 students thought it was complex, 164 respondents answered it was fair, and 90 students revealed it was easy. For the interactivity variable, 126 people stated it as sufficient, as 90 students claimed they could actively interact, while 84 respondents chose the passive category. Considering the method used during the online learning process, 185 people marked it as sufficient, then 35 people stated it as appropriate, whereas 80 people responded to the poor category. For the self-reliance aspect, 141 people counted it as fair, 80 students answered they were independent in learning, yet 79 respondents claimed they were less. Concerning the satisfaction variable, 190 respondents conveyed they were satisfied, while 110 people were dissatisfied.

Based on chi-square cross tabulation, the results show that there is a significant relationship between satisfaction and most all of the variables: accessibility (p value = 0.000 and $X^2 = 15.902$), the convenience of obtaining materials (p value = 0.000 and $X^2 = 63.473$), interactivity (p value = 0.000 and $X^2 = 15.522$). The data shows there is a relationship between satisfaction with the method accuracy (p value = 0.000 and $X^2 = 20.198$). Meanwhile, the self-reliance variable has no significant relationship with the satisfaction variable (p value = 0.341 and $X^2 = 2.154$).

The logistic regression equation in the table can

be written with the model ($y = a \text{ (constant)} + b_1x_1 + b_2x_2$), which is $-5.336 + 0.011 \text{ Accessibility} + 0.474 \text{ Material} + 0.021 \text{ Interactivity} + 0.150 \text{ Utility} - 0.093 \text{ Self-Reliance}$. The table above shows that:

1. The odds ratio for the Accessibility variable is 1.011. The coefficient B is positive, and the data is quantitative, therefore if the Accessibility variable increases by 1 unit, the probability ratio of Satisfied compared to Dissatisfied will increase by a factor of 1.011, assuming the variables of Material, Interactivity, Utility, and Self-reliance are constant.

2. The odds ratio for Material is 1.606. The coefficient B is positive, and the data is quantitative, thus if the material increases by 1 unit, the probability ratio of Satisfied compared to Dissatisfied will increase by a factor of 1.606, assuming the variables Accessibility, Interactivity, Utility, and Self-Reliance are constant.

3. The odds ratio for Interactivity is 1.021. The coefficient B is positive, and the data is quantitative, thus if the interactivity increases by 1 unit, the probability ratio of Satisfied compared to Dissatisfied will increase by a factor of 1.021, assuming the variables of Accessibility, Material, Utility, and Self-Reliance are constant.

4. The odds ratio for the Utility variable is 1.161. The coefficient B is positive, and the data is quantitative, therefore if the utility variable increases by 1 unit, the probability ratio of Satisfied compared to Dissatisfied will increase by a factor of 1.161, assuming the variables of Accessibility, Material, Interactivity, and Self-reliance are constant.

5. The odds ratio for the Self-Reliance variable is 0.911. The coefficient B is negative, and the data is quantitative, therefore if the self-reliance increases by 1 unit, the probability ratio of Satisfied compared to Dissatisfied will decrease by a factor of 0.911, assuming the variables of Accessibility, Material, Interactivity, and Utility are constant.

Discussion

The COVID-19 pandemic has changed the pattern of life for the entire community from all aspects, including education. The droplet transmission of COVID-19 has urged society to keep their distance and avoid direct contact while interacting. It has affected the education system to transform the in-class into remote learning that utilises technology as a way of learning.

Online learning is uncommon in the education system in Indonesia, so adaptation is needed. Higher education settings can adapt more quickly to online learning since they are more familiar with the technology. The nursing education system has started to use technology as a tool in continuing online learning. The lecturers use various methods during the learning process to make effective and efficient lessons for the students. For this reason, it is necessary to support the facilities, infrastructure, activeness and creativity of the lecturers.

Students' perceptions influence their satisfaction towards e-learning, involving the activeness, the

convenience of accessing materials, internet connection, teaching methods, and motivation to study. Alquarshi (2019) stated that the factors related to satisfaction and perception in distance learning are self-efficacy, materials understanding, and the interaction between students and lecturers. Self-efficacy gives higher satisfaction because it encompasses the responses towards learning evaluation, a good comprehension of the materials, getting challenges in the learning process, and increasing involvement.

This study shows that the accessibility, the convenience of understanding the materials, interactivity, method accuracy variables have a significant relationship with students' satisfaction. However, the self-reliance variable does not. One of the necessary tools during online learning is accessibility, including the internet network to obtain the lessons. The respondents in this study stated they got sufficient internet connection, yet most experienced a poor network. Almost in all over Bali Island, including Denpasar, the internet connection is unstable due to the scattered learning locations. Few students returned to their home areas where internet access could be lacking. Moreover, some of them did not understand how to operate the computer, which hindered them in accessing materials or attending online lectures. Yilmaz (2017) states that when individuals are technology savvy, it will increase motivation during learning.

Another indicator that affects students' satisfaction during online learning is the convenience of understanding the materials. Medical-surgical nursing materials are very complex, so this subject requires students to discover more related literature. The respondents in this study are interested in learning about medical-surgical nursing materials. It motivates the students to brainstorm the concepts before the class begins. The lecturers provide easy access to the lessons for students. Although they might face difficulties understanding the subject, the students put individual efforts to figure out the medical-surgical nursing materials. Research by Rachmawati and Putri (2020) reveals that students find it hard to understand the lessons through online learning because they are accustomed to face-to-face learning. In-class lectures allow students to interact easily. When students experience difficulties, they can ask the lecturer immediately. However, the students can take advantage of online learning. The students can access the lessons anytime, anywhere that will trigger the preparations before online learning starts. Online learning that uses educational videos containing material explanations from lecturers is said to have a good effect in increasing student knowledge, also accompanied by assignments to hone their skills (Rahayu, Sulistiyawati, Purnamasari, Sawitri & Fikriah, 2021).

The interactivity between students and lecturers indicates the success of the learning process. In distance learning, students frequently feel detached

from the lecturers due to various obstacles. It might cause the students to feel uninterested in the learning process, which leads to confusion in understanding the materials (Rachman, 2012). Ineffective communication often occurs due to several obstacles, such as an unstable internet connection. Furthermore, the complex materials prompt the students to be focused. Eventually, it will lead to a reluctance for students to interact during the lesson. Demir (2015) states that online-based communication will be effective where individuals interact remotely with a language that is easy to understand, have a language culture and a supportive environment. Yilmaz's research (2017) found that interactions among students, other students, and teachers are effective during online learning. Good interaction also shows increased learning needs that will address satisfaction and motivation to learn (Yilmaz, 2014).

The effectiveness of the distance learning method influences students' satisfaction. The use of the appropriate approach can increase the knowledge and skills of students (Nurumal, Diyono & Che, 2020). It will affect the system, information, and services qualities received by students (Pawirosumarto, 2016). Liaw and Huang (2013) found that one of the interactive learning environments is determined by appropriate learning media. The videos in the LMS as learning media are accessible at any place and anytime (Karao_glan Yilmaz & Keser, 2016). The learning methods design will arouse curiosity and attract the attention to learn and understand the lessons. The high curiosity about the materials will encourage the students to interact with each other through online learning. It will also be one of the pedagogical learning for applying the technology method as an adult learning that improves the learning outcomes (Yilmaz & Kılıç-Çakmak, 2012).

This study shows that the self-reliance factor is not related to students' satisfaction. It is different from the research by Yilmaz (2017), which states that independence in the learning process is one of the factors that affect students' satisfaction. Distance learning makes students less independent because they are not familiar with online methods in the learning process. However, some students feel they are required to increase their independence in learning. Yilmaz (2017) shows that e-learning readiness is a crucial predictor of students' satisfaction and learning motivation. Therefore, to build learning satisfaction, determine the readiness of students. Lecturers can help them by providing learning materials and topics discussion the day before the online learning schedule. If there are students who have low readiness, it is the lecturer's responsibility to assist them in arranging the strategy during the online learning. Moreover, to improve online learning readiness, it is also necessary to update the curriculum or improve computer-based and technology-based learning. Lecturers must become role models for students in using e-learning

methods (Hao and Lee, 2016).

Conclusion

The conclusion of this research is that there are some variables which have relationship with student's satisfaction such as accessibility, convenience in understanding materials, interactivity, method accuracy. The most significant relationship is the convenience of obtaining materials with an OR value of 1.606.

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The Effect of Pelvic Rocking Exercise and Buteyko Exercise on Reducing Primary Dysmenorrhea Pain Levels

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Abstract

Background: Dysmenorrhea is cramping pain and is often followed by lower back pain, nausea and vomiting, headache and diarrhea. Dysmenorrhea refers to the overall pain symptoms that arise during menstruation, there are 2 types of dysmenorrhea, namely, primary and secondary dysmenorrhea. Primary dysmenorrhea is a cyclic menstrual pain without pathological abnormalities in the pelvis is called Primary dysmenorrhea. There are 2 types of Management primary dysmenorrhea which are pharmacological and non-pharmacological. The treatment for Non-pharmacological can be done with pelvic rocking exercise and Buteyko Exercise. The movements in pelvic rocking exercise and Buteyko Exercise can stimulate the body to release endorphins which function as natural sedative hormones, and can also facilitate blood flow to the uterus so that pain is reduced.

Purpose: The effect of pelvic rocking exercise and Buteyko Exercise on reducing pain in primary dysmenorrhea was The purpose of this research.

Methods: This research is a quantitative study with a quasi-experimental design, pre-test and post-test designs. Nonequivalent control group design. The amount of the sample are 58 people by using purposive sampling technique. The research instrument used a standard operating procedure sheet for pelvic rocking exercise and Buteyko Exercise, a monitoring sheet, a stop watch and a numeric rating scale pain measurement sheet. The hypothesis is tested by using the independent T Test.

Results: Before the intervention, the p-value was 0.063. The results of this research was p value 0.001.

Conclusion: This research can also be used as input for nurses to make new decisions in improving the quality of nursing care with non-pharmacological therapeutic approaches. There is an effect of pelvic rocking exercise and Buteyko Exercise on reducing pain in primary dysmenorrhea. The results of this research can be used as a contribution of thoughts and references as a more in-depth study of pain reduction in primary dysmenorrhea.

Keywords: buteyko exercise; dysmenorrhea; pain level; pelvic rocking exercise.

Introduction

A period of human growth and development after childhood and before adulthood in the age range of 10–19 years is called Adolescence. In the past century, adolescence encompasses elements which have changed of biological growth and major social role transitions. The onset of earlier puberty adolescence in nearly all populations has accelerated, while its continued growth has lifted its endpoint age well into the 20's (Sawyer et al., 2018). A milestone in a woman's life as it denotes the start of reproductive capacity called menarche (Karapanou & Papadimitriou, 2010). The expulsion of the endometrial lining of the uterus following a nearly month long preparation for embryo implantation and pregnancy called menstruation. A functional

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Table 1. Characteristics of Respondents by Age (n=58)

Age Category	Frequencies (n)	Percentage (%)
Intervention		
16 years	17	58.6
17 years	12	41.4
Control		
16 years	15	51.7
17 years	14	48.3

Table 2. Analysis of Pain Levels in Primary Dysmenorrhea (n=58)

Pain level	Pre Test		Post Test		SE	P Value
	Mean	SD	Mean	SD		
Intervention	4.05	1.504	1.65	1.309	0.294	0.001*
Control	4.15	1.309	3.25	1.860	0.512	

*paired T Test with $P < 0.05$ is significant

layer, the stratum functionalis, which faces the lumen, and a basal layer beneath it, the stratum basalis in endometrium has changes in response to the monthly endocrine cycle and is shed during menstruation (Yang et al., 2012).

Dysmenorrhea distinguished by Primary and Secondary. Menstrual pain that caused not by pelvic pathology called Primary Dysmenorrhea. Symptoms experienced cramps that are not pathological and this is experienced by 50% of women and can result in decreased quality of life and absenteeism (Dawood, 2006). While in secondary dysmenorrhea, gross pathology is present in the pelvic structures, frequently associated with dyspareunia, dysmenorrhea and chronic pelvic pain (Origoa et al., 2021). Dysmenorrhea is pain during menstruation that many young women feel (Abreu-Sánchez et al., 2020).

Prevalence of dysmenorrhea of Indian female students was 70.2% (Omidvar et al., 2016). Experienced dysmenorrhea pain for one or 1-2 days during menstruation. About 23.2% of the dysmenorrheic girls experienced pain for 2–3 days. Most of Dysmenorrheic and non dysmenorrheic girls during the menstrual periods was tiredness and back pain. Females experiencing of dysmenorrhea could be mild pain, moderate and severe forms of dysmenorrhea respectively. Majority girls 83.2% depended on non-pharmacological methods. Less than depended pharmacological management (25.5%) and 14.2% had sought medical advice (Omidvar et al., 2016).

A woman's quality of life and interfere with daily activities are negatively affect from Dysmenorrhea. Primary dysmenorrhea is increased prostanoids, particularly prostaglandins (PGs). Anaerobic metabolites will stimulate pain receptors, it will happened when The increased PGs, because uterine contractions that restrict blood flow (Ferries-Rowe, Corey, & Archer, 2020). Several non-pharmacological techniques can be used to reduce

pain and have a very low risk, including pelvic rocking exercise and Buteyko Exercise. Cramps and improves associated symptoms because of menstrual can reduce (Mohamed & Hafez, 2017). Pain intensity scores, pain duration, menstrual flow duration can be reducing by pelvic rocking exercise. It can used by adolescent girls who were suffering from moderate to severe primary dysmenorrhea. (Mohamed & Hafez, 2017). Therefore primary dysmenorrhea pain can reduce by using non-pharmacological methods such as pelvic rocking exercise (Mohamed & Hafez, 2017). It happens cause when doing sports, the body will feel relaxed and produce endorphins. Endorphins are hormones that reduce pain produced in the brain and spinal cord. This hormone can also have a natural sedative effect for comfort (Mohamed & Hafez, 2017). While the Buteyko Exercise is one of the breathing exercises in which oxygen is released from the blood more slowly, causing breathlessness, a slow and shallow breathing pattern, which is called "reduced breathing" so that it will help relax the respiratory muscles and make the body more relaxed (Hassan, Riad, & Ahmed, 2012). Management of primary dysmenorrhea can be done with pharmacological and non-pharmacological treatment. Non-pharmacological treatment can be done with pelvic rocking exercise and Buteyko Exercise. Movements in pelvic rocking exercise and Buteyko Exercise can stimulate the body to release endorphins which function as natural sedative hormones, and can also facilitate blood flow to the uterus so that pain is reduced (Hassan et al., 2012).

Methods

This research was conducted at SMK Tirtayasa, Jakarta, after receiving a letter of ethical review approval from Universitas Esa Unggul. This research applied four main principles in the ethics of nursing research, such as respect for human dignity,

respect for privacy and confidentiality, respect for justice, inclusiveness, and balanced harm and benefits. The research design applied was the Quasi-Experimental Design by using the design of pre-test and post-test Nonequivalent control group design. The design of this research used a control group and the first observation (pretest). Next, 58 people from the total sample met the inclusion criteria set by the researcher, such as being able to, and agreed to become respondents by signing a consent form including important information from participants. Chi square is used as sample, with p value 0.001.

The instruments used in this study were as follows: Numeric Rating Scale to measure pain level from 1-10, and a stopwatch to measure execution time. This research activity was carried out at the same time, namely on the 1st day of dysmenorrhea. A pre test was carried out and then intervention was implemented until the 2nd day, per activity session / day for 30 minutes. The post test was carried out on the 2nd day. The analysis used to test the significance of the difference in the mean of the research variables between before and after the intervention was an independent parametric t-test or paired t-test. For statistical tests, the level of significance (significant) used was p 0.05.

Results

The research was conducted at SMK Tirtayasa. There were 2 groups in the study, the intervention and the control.

Table 1 shows intervention group with 29 respondents, 17 people (58.6%) were 16 years old, and 12 people (41.4%) were 17 years old. Control group shows that of the 29 respondents, 15 (51.7%) were 16 years old, and 14 people (48.3%) were 17 years old.

Table 2 shows that before intervention, the average pain level was 4.05. While after intervention, the average was obtained and the pain level was 1.65, it means that the pain was reducing. The average pain level was 4.15 for control group. While after the intervention 3.25. The p value was 0.001, it means there is an effect of Pelvic Rocking Exercise and Buteyko Exercise in reducing the level of primary dysmenorrhea pain.

Discussion

Dysmenorrhea is a normal part of the menstrual cycle based on health professionals, pain researchers, and women themselves. Women with primary dysmenorrhea will reports the impact and consequences of recurrent menstrual pain such as pain sensitivity, mood, quality of life and sleep in (Iacovides, Avidon, & Baker, 2015).

One of the problem that prevalent among adolescent secondary-school girls is dysmenorrhea, it can make school absenteeism and limitations on social and academic activities (Abd El-Mawgod,

Alshaibany, & Al-Anazi, 2016). Health education can be delivered to their students as a topic to prevent dysmenorrhea. It can cooperate with school nurse and school physician (Abd El-Mawgod et al., 2016). Debilitating gynecological condition that affects between 45 and 95% of menstruating women that caused by Primary dysmenorrhea (Iacovides et al., 2015).

One of Various physiological signals is Pain which is subjective feeling, it is a sensation that every human being must have experienced all their life. (i.e., heart activity, brain activity, muscle activity, electrodermal activity, respiratory, blood volume pulse, skin temperature) and behavioral signals are organized for wearable sensors detection (Chen, Abbod, & Shieh, 2021).

Nociception is the neural phenomena of sensory transduction which is identify and the perceptual experience of pain (Moayedi & Davis, 2013). It is a gate that opened by a sensory cue, which will then open a gate between the tube and the brain (Moayedi & Davis, 2013). It will identification pain diagnostic of 3 steps: pain state, pain mechanism, and molecular target (Vardeh, Mannion, & Woolf, 2016).

Prostaglandins as The somatosensory nerves transmit pain signals in a way innervating the inflamed areas experience heightened excitability and generate (Jang, Kim, & Hwang, 2020). The roles of arachidonic acid-derived prostaglandins, particularly in terms afferent nociceptors focusing on prostaglandins and one thromboxane (Jang et al., 2020).

The central nervous system, activation nociceptive nerve endings or fibers implicates generation of action potentials which then travel to and may induce pain sensation (Bradykinin, Peth, & Reeh, 2012). Thermal, mechanical, or chemical stimuli that may be translated to corresponding hyperalgesias increased responsiveness because of sensitization of nociceptors (Bradykinin et al., 2012). Mechanisms sensitizing actions of inflammatory mediators including bradykinin, prostaglandins, thromboxanes, leukotrienes, platelet-activating factor, and nitric oxide on nociceptive primary afferent neurons which supporting data from molecular, cellular, and behavioral models are consistent with findings that reflect properties of peripheral nociceptive nerve endings (Bradykinin et al., 2012).

Pain can be measured using the Numeric Rating Scale method. The numeric rating scale (NRS 0–10; 0, no pain; 1-3 mild; 4-6 moderate; 7-8 severe; 9-10 worst pain imaginable) (Gerbershagen et al., 2011). The level of pain in the intervention group before and after being given pelvic rocking exercise and Buteyko Exercise can decrease because of the intervention that has been given in the form of pelvic rocking exercise and Buteyko Exercise. In addition, respondents also performed pelvic rocking exercise and Buteyko Exercise in accordance with standard operating procedures.

Pelvic rocking exercise and Buteyko Exercise

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are exercises that help in reducing primary dysmenorrhea pain, that make small movements in the pelvis. This exercise can alleviate the release of several neurotransmitters such as endorphins, catechol, production of secretory hormones, suppress prostaglandins, and increase the estrogen-estradiol ratio which acts to reduce endometrial proliferation and blood flow from the uterus (Mohamed & Hafez, 2017).

Pain intensity scores, pain duration, menstrual flow duration who were suffering from primary dysmenorrhea has reduced by Pelvic rocking exercise for adolescent girls. Therefore, one of the non-pharmacological methods to alleviate primary dysmenorrhea is pelvic rocking exercise. Based on the findings, health education program in school carried out non-pharmacological to reduce primary dysmenorrhea such as pelvic rocking exercise (Mohamed & Hafez, 2017). The combination of movements in pelvic rocking exercise and Buteyko Exercise can stimulate the body to release endorphins which function as natural sedative hormones, and can also facilitate blood flow to the uterus so that pain is reduced (Hassan et al., 2012).

Conclusion

The respondents characteristics of this research were that most of 16-17 years. Based on the results of the research, there was a significant correlation between pelvic rocking exercise and Buteyko Exercise in reducing pain in primary dysmenorrhea. The results showed p value 0.001 (p value < 0.05). This means it can reduce pain in primary dysmenorrhea. Most importantly, the results of the research may become the basis that can reduce pain level in primary dysmenorrhea. It can be used as an alternative nursing treatment in reducing pain. However, the procedures for the research should be improved.

This research can be considered in nursing services as a solution in overcoming primary dysmenorrhea. This research can also be used as input for nurses to make new decisions in improving the quality of nursing care with non-pharmacological therapeutic approaches. The results of the study can be used as a contribution of thoughts and references as a more in-depth study of pain reduction in primary dysmenorrhea before and after being given pelvic rocking exercise and Buteyko Exercise so that it can enrich the knowledge, especially in the field of nursing.

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Model of Spiritual Culture of Madurese People in Resilience and Adaptation of New Normal

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Abstract

Background: From the beginning of its initial appearance until mid-2021, Corona Virus Disease-19 (Covid-19) is a feared outbreak around the world, including in Indonesia and particularly in Madura. The negative perception of stress will further weaken self-strength both physically and mentally so that resilience and coping mechanisms tend to be maladaptive.

Purpose: This study aimed to analyze the spiritual culture of Madurese communities in resilience and physical health.

Methods: This analysis will later become the basis in the formulation of a model of spiritual cultural towards resilience, and physical health. In the design of explanatory observational research, the first stage is to explain the construct and its contributing indicators. The second stage is to conduct FGD with respondents as well as to consult with experts. The population is a community on the island of Madura with a sample consisting of 400 respondents using probability sampling, namely cluster random sampling based on a predetermined population area. The exogenous variable is the culture of spirituality. Endogenous variables are resilience and physical health. Data were collected using questionnaire research and analyzed using structural models with SmartPLS (Partial Least Square) software.

Results: The results showed that spirituality culture factors had a positive effect on resilience with a coefficient of 0.449. Spirituality culture factors had a positive effect on physical health with a coefficient of 0.161, and resilience factors had a positive effect on physical health with a coefficient of 0.172.

Conclusion: This indicates that the higher the spiritual culture of the Madurese community, the higher the resilience, psychological well-being, and physical health, especially during the COVID-19 pandemic.

Keywords: culture of spirituality; physical health; resilience.

Introduction

Severe acute respiratory syndrome coronavirus 2 (SarsCov-2) or Corona Virus Disease-19 (Covid-19) is a respiratory infectious disease declared a global pandemic by WHO on March 11, 2020. Covid-19 from the beginning of its appearance until mid-2021 is an outbreak that is tweeted around the world including in Indonesia and Madura. The number of cases on August 27, 2021, globally reached 214,468,601 with data on deaths of 4,470,969 people (WHO, 2021). Cases in Indonesia reached 4,056,354 with a death toll of 130,781 (Kemenkes, 2021). This will have an impact on various physical and mental distresses that affect the holistic dimensions of life. Preliminary studies on the Madurese community related to holistic health obtained data that 70% fully understood the meaning and purpose of life in the spiritual dimension. Meanwhile, regarding perseverance (persistence) in effort and struggles, 80% was very persistent and 20% was quite persistent. In terms of independency or self-reliance, 60% was very independent, 20% was independent and 20% was quite independent. Concerning equanimity when facing problems, 30% was calm, 30% was calm enough, and 40% was less calm. While existentially alone in facing challenges, 70% was good and 30% was enough. Madura, culture, and Islam are sociological facts that cannot

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be separated because all three form the distinctive values of the Madurese (Wiyata, 2013).

Covid-19 has caused various negative impacts since the March 2020 period and the impacts can still be felt. The negative impacts are not only physical but also psychological, social, cultural, economic, political and spiritual. Several studies have reported that Covid-19 causes distress (Bao et al., 2020), delirium, depression, anxiety, fatigue, insomnia, PTSD (Guo et al., 2020; Rogers et al., 2020) to mental disorders (Rajkumar, 2020). The social impacts that occur are distress due to restrictions on physical mobility (Kraemer et al., 2020), public fear, decreased socio-economic and cultural activities (Kim & Su, 2020; Uddin et al., 2020). Biological impacts are the occurrence of respiratory diseases such as pneumonia (Jin et al., 2020), damage to the cardiovascular system (Madjid et al., 2020), Acute Respiratory Distress Syndrome (ARDS) (Leijamartinez et al., 2020; Lin et al., 2020; Hashemian et al., 2021) until death (Barro et al., 2020). This condition is very risky and manifests in bio-psycho-social-spiritual distress which if it persists for a long time will cause a lot of chaos in various aspects of life.

Various prevention efforts have been carried out, especially in improving health status and preventing the transmission of COVID-19. This can be seen from implementing health protocols, minimizing anxiety, and improving psychological health to maintaining social distance. Moreover, what is important is self-awareness that all dimensions cannot be separated from the deep transcendental meaning of life that is related to God in the spiritual dimension. Spirituality will be meaningful in life because it is related to the belief in God as a reality greater than oneself (Ekşi & Kardaş, 2017). According to Gonzales et al (2014), spirituality activates adaptive coping mechanisms so that individuals can cope with the stress of an illness (Salman & Lee, 2019). Deep spirituality will bring psychological calm and move the neuro, hormonal and immunological systems. Spiritual application through remembrance is effective in improving the perception of stress and balancing cortisol which has an impact on metabolic stability (Amir et al., 2018), and significantly affects the working system of the immune system (Asiyah et al., 2021). Spirituality is a transcendental and integrative side that plays an integral role in shaping the quality of life, health, and well-being in a bio-psycho-socio-spiritual manner. Spirituality impacts on various aspects of life in a multidimensional manner and is very complex in influencing and dealing with various situations and conditions of life.

The spiritual strength of the Madurese community is reflected in a holistic harmony that includes bio-psycho-social-spiritual aspects which have implications for the range of health and illness during the pandemic and the era of new habits. The strong dimension of Islamic spirituality in Madura is able to form an individual who is strong-minded, patient, sincere, good at being grateful,

and taking wisdom. The implementation of all these characters will give birth to high resilience. Resilience will strengthen the Madurese community to have adaptive coping strategies. In the study of psychoneuroimmunology, it is perceived as eustress that balances the function of nerves, hormones, and the immune system so that it is more resistant to disease, including COVID-19 infection.

The purpose of this study was to analyze the spiritual culture of Madurese communities in resilience and adaptation. This analysis will later become the basis in the formulation of a model of spiritual cultural nursing towards resilience and adaptation.

Methods

Design

This research is an explanative observational study through structural model testing with SmartPLS (Partial Least Square) software. The first stage describes the test results based on the theory by looking at the constructs and indicators that contribute. The second stage then compiles a module on strategic issues that have been carried out by FGD with respondent representatives and conducted consultations with experts.

Setting and Sample

Respondents consisting of 400 people were selected using probability sampling, namely cluster random sampling based on a predetermined population area. The sample is people in four districts on the island of Madura, namely Sumenep, Pamekasan, Sampang, Bangkalan without regard to the existing strata in the population, namely random sampling from the population. The determination of the number of samples was carried out based on the statement of Hair et al., (2017) that the minimum sample for SEM-PLS analysis is at least 10 times the number of indicators and 10 times the number of arrows in the model structure. The data collection process was carried out online in July-September 2021 with inclusion criteria of a minimum age of 17 years.

Variables

The variables are spirituality culture, resilience, and physical health. Exogenous variables are spirituality culture and endogenous variables are resilience and physical health.

Instruments

The questionnaires in this study were the questionnaire which was adopted and adapted from various sources. The researcher developed the resilience questionnaire based on the Resilience Assessment Scale (FRAS) questionnaire by Walsh (2016). The spiritual culture questionnaire was developed based on the Spiritual questionnaire by Yusuf (2016), and the physical health questionnaire was developed based on the Signs of Physical

Table 1. Frequency Distribution of Respondents Demographic Data (District, Gender, Age, Education, and Occupation) in Madura

Variable	Items	n	%
District	Bangkalan	216	54
	Sampang	69	17.25
	Pamekasan	87	21.75
	Sumenep	28	7
Gender	Man	164	41
	Woman	236	59
Age	17-25 years (Late Adolescence)	139	34.7
	26-35 years (Early Adulthood)	78	19.5
	36-45 years (Late Adulthood)	68	17
	46-55 years (Early Old Age)	78	7.75
	56-65 years (Late Old Age)	31	19.5
	>65 years (Elderly)	6	1.5
Education	No School	11	2.75
	Primary School	48	12
	Junior High School	18	4.5
	Senior High School	52	13
	Diploma 1-Diploma 3	41	10.25
	Bachelor	201	50.25
	Master	28	7
	Doctor	1	0.25
Occupation	Student	132	33
	Government employees	73	18.25
	Private employees	60	15
	Honorary employee	24	6
	Trader	30	7.5
	Farmer	32	8
	Farm workers	3	0.75
	Unemployed	46	11.5

Health Symptoms during the Covid19 Pandemic from the Indonesian Ministry of Health. (2021). The researcher asked permission to develop a questionnaire and then tested the validity and reliability of 32 respondents based on the same characteristics as the research sample, namely the areas of Jember, Bondowoso, Situbondo, and Probolinggo where most of the people are Madurese. The questionnaire uses an ordinal scale with good, fair, and poor categories. The compositions are Culture of Spirituality, Resilience, and Physical Health. Culture of Spirituality consists of mystery, love, suffering, hope, and grace, while Resilience consists of meaningful life/purpose, perseverance, self-reliance, equanimity, and existential aloneness, and Physical Health consists of symptoms of fever and flu, painful, minor respiratory disorders, moderate respiratory disorders, and severe respiratory disorders.

Intervention

The data were collected by giving questionnaires to 400 respondents and testing the structural model with SmartPLS (Partial Least Square) software.

Data Collection

The sample is people in four districts, namely Sumenep, Pamekasan, Sampang, Bangkalan. The participants were recruited based on ethical principles. Participants who were involved in previous research had received a written explanation regarding the research objectives, procedures, rights and obligations, benefits, and disadvantages during the research. Only participants who had provided informed consent were included in the study. The data collection process was carried out online with research assistants for each district. There were 404 people who responded. Three people refused or were not willing to be respondents and 401 people were willing to be respondents, but there

Table 2. Frequency Distribution of Respondents Characteristics (Ever Diagnosed with Covid19 or Ever Performed PCR with Positive Results, Symptoms Experienced in the Last 3 Months, and Diagnosis of Comorbidities) in Madura

Variable	Items	n	%
Ever Diagnosed with Covid19 or Ever Doing PCR with Positive Results	yes	54	13.5
	no	346	86.5
Symptoms felt in the last 3 months	Fatigue	20	5
	Sore throat	4	1
	Loss of Ability to Sense of Smell	4	1
	Headache	25	6.25
	Digestive Disorders or Problems (Such As: Diarrhoea, Vomiting, etc.)	0	0
	Cough	10	2.5
	Breathlessness	1	0.25
	High Body Temperature	3	0.75
	Flu or Cold	16	4
	Feeling More Than One Symptom	159	39.75
Never Feel the Symptoms Above	158	39.5	
Diagnosis of Comorbidities (Comorbid)	Diabetes mellitus	9	2.25
	Hypertension	39	9.75
	Coronary heart disease	2	0.5
	Heart Decompensation	1	0.25
	Heart disease	2	0.5
	Lung Disease	4	1
	Kidney disease	5	1.25
	Having co-morbidities other than the above	30	7.5
	Do not have co-morbidities	308	77

was 1 person who did not meet the inclusion criteria so the total respondents were 400 people. Before starting data collection, the researcher conducted a trial on 32 participants with the same characteristics. The pilot was conducted to the community in four districts namely Jember, Bondowoso, Situbondo, and Probolinggo to validate the questionnaire.

Data Analysis

The construct factors studied included cultural spirituality (X1), resilience (Y1), and physical health (Y2). The data scale used for statistical testing is the absolute value of each variable, but to facilitate the presentation of data in the table, a Likert scale is used. The stages of structural model analysis are testing the effect of exogenous factors on endogenous factors. Path diagram analysis of SEM Partial Least Square structural equations on indicators of all latent variables are done in the Development Model of Spiritual Culture of the Madurese People in Resilience and Adaptation in the New Normal. Evaluation of construct validity is done by calculating convergent validity. Convergent validity is known through the value of factor loading and Average Variance Extracted (AVE). All

instruments meet the convergent validity test with a loading factor and Average Variance Extracted (AVE) above 0.5.

The strategic issues obtained from the results of the Structural Equation Modelling-Partial Least Square (SEMPLS) analysis were used as a reference for conducting Focus Group Discussions (FGD) with respondent representatives and conducted consultations with experts. The results of strategic issues, FGDs, expert consultations, and the results of the development of a cultural model of Madurese spirituality in resilience and adaptation to new habits are used as a reference for module development. The modules resulting from the development of the models serve as a reference for the manufacture of comprehensive modules, so that they can be used as guidelines by health workers or researchers in conducting interventions.

Ethical Consideration

This research has received approval from the Ngudia Husada Madura School of Health research ethics committee with Ethics Approval Letter Number: 1076/KEPK/STIKES-NHM/EC/VII/2021.

Table 3. Frequency Distribution of Spirituality Culture, Resilience, Physical Health in Madura

Indicator	Category						Total	
	Good		Enough		Less		Σ	%
	n	%	n	%	n	%		
Mystery	364	91	35	8.75	1	0.25	400	100
Love	348	87	44	11	8	2	400	100
Suffering	364	91	33	8.25	3	0.75	400	100
Hope	345	86.25	51	12.75	4	1	400	100
Grace	361	90.25	28	7	11	2.75	400	100
Meaningful life/purpose	373	93.25	24	6	3	0.75	400	100
Perseverance	366	91.5	33	8.25	1	0.25	400	100
Self-reliance	379	94.75	19	4.75	2	0.5	400	100
Equanimity	388	97	12	3	0	0	400	100
Existential Aloneness	364	91	33	8.25	3	0.75	400	100
Symptoms of Fever and Flu	376	94	21	5.25	3	0.75	400	100
Pain	373	93.25	22	5.5	5	1.25	400	100
Minor Respiratory Disorders	390	97.5	5	1.25	5	1.25	400	100
Moderate Respiratory Disorders	391	97.75	4	1	5	1.25	400	100
Severe Respiratory Disorders	390	97.5	5	1.25	5	1.25	400	100

Results

This research is explanative observational study through testing the structural model with SmartPLS (Partial Least Square) software. This research was conducted to determine the development of a cultural model of Madurese spirituality in resilience and adaptation to new normal by looking at the contributing constructs and indicators, then compiling a module on the strategic issues that have been carried out by the FGD with respondent representatives then consulting with experts. Description of study variables is shown to explain constructs research data according to measurable indicators for each construct research factors. The construct factors studied including Culture of Spirituality (X1); Resilience (Y1); and Physical Health (Y2). The data scale used for statistical tests is the absolute value of each variable, but Likert scale is used to facilitate the presentation of the data in the table.

The results of the study in table 1 show that from 400 respondents, it is known that based on the district with the largest number of respondents (54%) is Bangkalan Regency. Based on gender, the majority of respondents (59%) were women. Based on age, as many as 139 respondents (34.7%) were at the stage of late adolescence (age 17-25 years). Based on the education level of the respondents, the most respondents were Bachelor with 201 respondents (50.25%), and based on the occupation, the students occupied the highest

positions with 132 people (33%).

The results of the study illustrate that as many as 54 respondents (13.5%) had been diagnosed with COVID-19 or had done PCR with positive results. Based on the symptom variables felt in the last 3 months, the majority felt more than one symptom of being infected with Covid-19, namely 159 people (39.75%). Based on the variable diagnosis of comorbidities (comorbid) there were 1 person (0.25%) with cardiac decompensation, 2 people with coronary heart disease (0.5%), 2 people with heart disease (0.5%), 4 people with lung disease (1%), 5 people with kidney disease (1.25%), 9 people with diabetes mellitus (2.25%), 39 people with hypertension (9.75%), 30 people with other comorbidities (7.5%), and 308 people with no comorbidities (77%).

The results of the study in spirituality culture illustrate that in the Mystery variable (Belief in the Afterlife), 364 people (91%) in Madura had high confidence. Based on the Love variable, the majority of Madurese people had a high value on love which was the key or domain of a person's spirituality, with 348 people (87%). Suffering response of the Madurese community had a high response in a positive direction with 364 people (91%). Then the hope of the Madurese community in the majority of Spirituality Culture had a high value, with 345 people (86.25%). Meanwhile, Grace (Gratitude for What God Has Given) in the Madurese community also had a high score, with 361 people (90.25%).

The results of the study in resilience show that the meaning of life/purpose (meaningful life/

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purpose) of the Madurese community was high, with 373 people (93.25%). The Madurese also had a decision to continue to survive despite the difficulties, disappointments, and perseverance are high with 366 people (91.5%). Based on the self-reliance variable, only 1 person (0.25%) had a low level of independence, while the equanimity variable the majority had a high level of patience/calmness as many as 388 people (97%) and none had a low level of patience/calm (0%). In the Existential Aloneness variable, the majority of Madurese people had a high awareness that they had to face the challenges in life, with 364 people (91%).

The results of the study illustrate that the physical health of the Madurese community in adapting to the new habits of the Covid-19 pandemic mostly had high fever and flu symptoms, namely 376 respondents (94%). In the pain variable, 373 respondents (93.25%) were in the high category. While the majority of respondents (> 97%) were in the high category in mild, moderate, and severe respiratory disorders.

Discussion

Madura is a district in East Java that is known for its cultural acculturation and spirituality. The culture of visiting each other, helping, family, friendship, and togetherness in worship activities cannot be separated in the daily life of Madurese people. Various studies of social anthropology explain that Madura is scientifically proven to have a distinctive and unique character in exploring the balance of inner dimensions and social structures (Mulyadi, 2018). The role of religion as a means of spirituality is very influential on the life of the people of Madura. Even in daily behavior, it is not uncommon for religious leaders to be involved in various things such as matchmaking, sustenance, internal conflict, social conflict, and also the treatment of diseases (Ramin, 2018). It is also implemented in the attitude of the people of Madura in responding to the Covid-19 pandemic. The people of Madura have a high belief that health and salvation can be achieved by approaching God. If this is not managed properly, it will give birth to a combination of social and spiritual support for the Madurese community as a potential to achieve holistic health.

Spirituality is interpreted in a deep sense as an exploration of the highest truth and not just a routine of religious rituals (Maraj et al., 2020). Spirituality is the connection between the personal, social, environmental, and transcendental dimensions of God which is believed to affect physical and mental health (Ghaderi et al., 2018). Every individual has a side of spirituality to achieve closeness and connectedness between himself and the highest Existence that is the God of the Universe (Joseph et al., 2017). A deep sense of connectedness encourages the mental resilience of individuals to be able to survive in the face of distress and rise from stressful circumstances. This is in accordance

with the Qur'an Surah Al-Baqarah verse 277 and many similar statements explain that believers (good spirituality) do not feel worried and do not grieve. This can be translated that spirituality will give birth to resilience and the ability to respond positively to distress in life. Chen and Bonanno (2020) explained that resilience is the ability of individuals to be positive about various problems and uncertain situations including mental attitudes during the Covid-19 pandemic. Resilience gives birth to an effective coping mechanism when facing threatening situations and conditions. It is in accordance with Syukrowardi et al. (2017) that spirituality is suspected as one of the main factors for the formation of high resilience in individuals so that adaptive in responding to stress. Many studies have also reported a significant association between spirituality and resilience (Mizuno et al., 2016 ; Jones et al., 2016; Khan et al., 2016; Cherry et al., 2018; Maraj et al., 2020).

Spirituality does not only affect the psychosocial dimension but also greatly affects the biological stress response. Researchers argue that all factors and consequences of distress are inseparable from the meaning of deep life that is transcendental in the spiritual dimension. In the time of the covid-19 pandemic, stress must be watched out for as a promoter of the risk of respiratory infections and decreased health range with all clinical sweetness (Peters et al., 2021). One of the trans-objective implementations of social spirituality in Madura is the reading of Burdah as a magical and economical treatment when there are sick relatives (Faidi, 2016). Burdah is also believed to be a spiritual-based method of treatment to cure the sick and avoid society from ta'on disease (Ramin, 2018), including in the spiritual response to Covid-19 which is also perceived as a kind of ta'on disease version of the latest. In addition to Burdah, there is remembrance and prayer together as well as carrying out certain practices by the Madurese community to reject bala (misfortune), illness, disease, and avoid disaster. In line with Sohail (2020) the application of spirituality is reflected in many rituals such as congregational prayer, giving alms, listening to lectures, and applying the Prophet's methods of treatment.

Spiritual influence on improving physical and mental health status can be studied scientifically, one of which is through the concept of psychoneuroimmunology. Psychoneuroimmunology describes the close relationship between the psychological dimensions of stress mechanisms, the nervous, endocrine, and immune systems in modulating the immune response to infection (Kim & Su, 2020). Spirituality in this case should be translated as a stimulus that can turn distressed (negative stress) into eustress (positive stress). This will have an impact on the perception of positive stress so that the stress response is also positive. According to DhabbarMcEwen, the perception of stress is more psychological in internal mental events and stress responses are more biological

(Amir et al., 2018). In this study, it has been explained that spirituality is significantly related to resilience so that the perception of stress in this study is positive. This is in accordance with studies that spirituality improves health (Firda & Haksama, 2020), resilience (Fradelos et al., 2020), reduces anxiety, increases the meaning of life and hope (Reis & Menezes, 2017), and subjective happiness (Satıcı, 2016). Spirituality in principle must be able to lower psychological pressure so that individuals do not fall into a state of illness. This is because stressors affect the immune system through several pathways, namely the Hypothalamus-Pituitary-Adrenal (HPA Axis), the Sympathy-Adrenal-Medullary (SAM Axis) axis, the CRH-Mast Cell axis, Neuropeptide with the Immune System, psychological stress pathways, and oxidative stress (Campeau, 2016). If one of these systems is disrupted, then what happens is a decrease in immunity that has an impact on the susceptibility of covid-19 infection. If the body is already infected with covid-19, it will be very risky for cytokine storms (Coperchini et al., 2020) such as the uncontrolled release of pro-inflammatory cytokines interleukin (IL)-1b and IL-6 (Conti et al., 2020). This will have a negative impact on the occurrence of immunopathology (Bhaskar et al., 2020) which is often accompanied by coagulopathy (Willim et al., 2020). The three pathogenesis phenomena on the course of covid-19 inflammation are the cause of the severity of the disease until the occurrence of ARDS and multiorgan damage to death. Therefore, according to researchers, modulating the spiritual system has a good impact on psychological health and will eventually look more concrete on physical health and avoid covid-19 infection. This can be found in many Madurese and people outside Madura who have spiritual awareness to be free from serious stress. Therefore, there will also be balanced regulation of various body systems so that they adapt and survive to various forms with stress and covid-19 infection.

Conclusion

The cultural model of the Madurese spirituality in resilience and adaptation to the new normal which consists of: Culture of Spirituality, Resilience, and Physical Health. Culture of Spirituality composed of mystery, love, suffering, hope, and grace, while Resilience consists of a meaningful life/purpose, perseverance, self-reliance, equanimity, and existential aloneness, and Physical Health consists of symptoms of fever and flu, pain, minor respiratory disorders, moderate respiratory disorders, and severe respiratory disorders. High resilience is influenced by spiritual culture directly so that it affects the physical health of the Madurese community in the new normal.

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Data Availability Statement

The datasets generated during and/or analysed during the current study are not publicly available due to in a series research projects but are available from the corresponding author on reasonable request.

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Impact of Resilience on Psychological Well-Being In Breast Cancer Patients Undergoing Chemotherapy

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Abstract

Background: The most commonly used therapy for breast cancer is chemotherapy. Chemotherapy has physical and psychological side effects that affect the psychological well-being of the patient. Resilience plays an important role in changing psychological well-being. Cancer patients who have low levels of resilience will show negative psychological well-being and vice versa. However, the condition of cancer patients undergoing chemotherapy is not yet known whether resilience can change psychological well-being so that they can adapt to the stressors of chemotherapy.

Purpose: This study aims to analyze the relationship between resilience and psychological well-being of breast cancer patients undergoing chemotherapy.

Methods: This study was conducted using an observational analytic method with a cross-sectional approach. The population in this study were breast cancer patients who underwent chemotherapy sessions 2-6 at one of the hospitals in Malang, Indonesia. A sample of 62 people was obtained by using a stratified random sampling technique based on the chemotherapy sessions the patient underwent. Data Collection used the Connor-Davidson Resilience Scale questionnaire. Data analysis procedures were carried out in univariate and bivariate ways (lambda correlation test).

Results: The Univariate analysis showed that the lowest resilience was experienced by respondents who underwent the second chemotherapy session and the bivariate analysis showed that there was a positive correlation between resilience and psychological well-being with $p=0.039$ and $r=0.267$. This means that the higher a person's resilience, the greater the chance of having positive psychological well-being.

Conclusion: This study shows that the higher the resilience, the greater the probability of experiencing positive psychological well-being. While the higher the resilience, the more likely it is to experience positive psychological well-being. It is recommended that patients who will undergo chemotherapy are given education related to therapy so that low resilience is not experienced at the beginning of chemotherapy.

Keywords: breast cancer; chemotherapy; psychological well-being; resilience.

Introduction

Breast cancer cases in the world are ranked second after cervical cancer and become one of the leading causes of mortality for women in the world. The North American Association of Central Cancer Registries in 2017 mentioned that in Asia, the incidence of breast cancer is about 907 occurrences per 100,000 people (De Santis et al, 2017). Breast cancer caused 8.8 million deaths in 2015, while in the period 2011-2015 it was 11.3% of deaths and increased to 14% of deaths in 2016 (De Santis et al., 2017; Torre et al., 2016). Breast cancer is a type of cancer that is commonly found in Indonesia. The estimated incidence of cancer cases in women in Indonesia is 12/100,000, about 80% of cases are at an advanced stage, based on the identification of the average cancer patient already in a very concerning condition (Ministry

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of Health of the Republic of Indonesia, 2017). The data above shows that the morbidity and mortality of breast cancer has increased every year.

Most symptomatic patients who do not undergo immediate medical treatment are generally diagnosed with cancer at an advanced stage. This is due to the delay of patients coming to health services after the appearance of early symptoms of breast cancer (Fathania, Rahayuwati, & Yani, 2019). Advanced breast cancer will affect the quality of life and prognosis of the sufferer can be disturbed. (Moatter, T., Aban, M., Iqbal, W., & Pervez, S., 2015). Breast cancer patients lead a life of forming patterns that become reference throughout their lives. This pattern is an effort to learn, understand and apply a treatment and treatment behavior to support their quality of life, one of the efforts made is to undergo therapy (Witdiawati, Rahayuwati, & Sari, 2017).

Breast cancer therapy is given based on the stage. Therapy given in stages I and II is a combination of breast surgery and radiotherapy, a combination of breast surgery, radiotherapy and chemotherapy. The combination of mastectomy and chemotherapy is mostly done at this stage. While in stage IV, the most widely chosen treatment is a combination of radiotherapy and chemotherapy or one of them. Of the above therapies, chemotherapy is the most effective and most widely used therapy. The choice of therapy also depends largely on socio-demographic factors and the patient's knowledge. The more they know, the better decisions they make to treat the disease. Although in the end in general breast cancer patients decide to undergo chemotherapy (Rahayuwati, Ibrahim, Nurhidayah, & Hendrawati, 2020).

In stage I, patients have a 70% chance of recovery so that the quality of life is not too disturbed. In stage II, the possibility of recovery by 30-40% which causes the quality of life at this stage begins to be disrupted (Moatter, T., Aban, M., Iqbal, W., & Pervez, S., 2015). Many physical and psychological conditions undergo changes due to the side effects of chemotherapy. The impact that chemotherapy has on the physical is very diverse. Most patients experience gastrointestinal disorders such as diarrhea, constipation, nausea, vomiting, (Escalante et al., 2017) hair loss (Chon et al., 2012), decreased weight, malnutrition, general weakness (Bicakli et al., 2018), and sensory neuropathy (Kuchuk et al., 2013).

Psychic impacts caused by chemotherapy such as anxiety and depression due to physical changes (Baati et al., 2010) fear if the disease recurs, anger and feel guilty (Costa et al., 2016), self-esteem, impaired body image due to the occurrence of alopecia (Baati et al., 2010; Chon et al., 2012) The impact of chemotherapy above will have an effect on the psychological well-being of patients (Costa et al., 2016).

Psychological well-being is an overview of an individual's psychological health based on the

fulfillment of individual positive psychological function criteria (Karyono, Dewi and Lela, 2008). Breast cancer patients who have positive psychological well-being will show self-acceptance, self-reliance, ability to interact with the environment, a purpose in life, ability to show personal development and ability to build positive relationships with others. Negative psychological well-being will have an impact on an individual's self-acceptance of his or her physical changes, feeling lost, changing roles, difficulty achieving life goals, as well as awareness of family suffering (Zimmermann, Burrell and Jordan, 2018). In addition, individuals with negative psychological well-being will feel burdensome to others or families because of reduced independence. This is what makes breast cancer patients who have negative psychological well-being find it difficult to undergo chemotherapy (Lai et al., 2018).

Negative psychological well-being causes individuals to not have good stress management strategies (Mawarpury, 2013). Stress management strategies play a role in maintaining the stability of the psychological condition of breast cancer patients undergoing therapy. The balance of the patient's psychological condition plays an important role in the treatment process. Breast cancer patients who have a good stress management strategy will have improved health, high enthusiasm for life, good social function, decreased anxiety about the therapeutic process (Karyono, Dewi and Lela, 2008) For breast cancer patients undergoing chemotherapy, it is very important to reduce the occurrence of negative psychological effects due to chemotherapy.

Number of visits to breast cancer chemotherapy at the RST chemotherapy unit. TK II dr. Soepraoen Malang is \pm 95 people every month and 20 of them are new patients. A preliminary study using a questionnaire with guided questions on 10 patients undergoing chemotherapy showed 8 patients (80%) had negative psychological well-being, including patients who said that during chemotherapy they experienced limited activity, the patients also said that they were no longer able to do what they wanted because they felt limited and dependent on others. Five patients (50%) said they could not accept their current condition and had limitations in building relationships. 9 patients (90%) stated that they had a desire to discontinue chemotherapy because of the difficulties experienced during chemotherapy.

Resilience is a factor related to psychological well-being. Patients who have low levels of resilience will show negative psychological well-being. High resilience will make patients able to adapt to stressors (De Couto et al, 2011). Souri & Hasanirad (2011) research on medical students as a sample, shows that individuals who have high resilience can adapt to change so those individuals have positive psychological well-being. This is influenced by the characteristics of individuals who consider religious values to play an important role so that a person is optimistic. However, Wang and Tian (2010) research

Table 1. Respondent Demographic Data

Characteristics of respondents	n	%
Recent education		
Elementary school or equivalent	29	46.8
Junior high school or equivalent	18	29.0
High school or equivalent	10	16.1
College	5	8.1
Marital status		
Married	55	88.7
Unmarried	2	3.2
Ever married	5	8.1
Domicile		
Malang City	26	41.9
Out of Malang	36	58.1
Have you ever received information about breast cancer from health workers?		
Yes	44	71.0
No	16	29.0
Have you ever received information about chemotherapy from health workers?		
Yes	51	82.3
No	11	17.7
Have had breast removal surgery		
Yes	40	64.5
No	22	35.5

Table 2. Distribution of Respondents by Age and Length of Illness

Characteristics of respondents	n	Mean±SD	Min- Max
Age	62	48.90±8.11	30-62
Duration of illness	62	12.29±8.67	2-37

Table 3. Distribution of Respondents by Level of Resilience and Distribution of Respondents Based on The Level of Psychological Well-Being

Resilience	Session 2		Session 3		Session 4		Session 5		Session 6		Total	
	n	%	n	%	n	%	n	%	n	%	n	%
Low (22-29)	7	41.2	3	23.1	3	25.0	3	27.3	1	11.1	17	27.4
Medium (20-36)	6	35.3	6	46.2	6	50.0	5	45.5	6	66.7	29	46.8
High (37-42)	4	23.5	4	30.8	3	25.0	3	27.3	2	22.2	16	25.8
Psychological well-being												
Negative < cut off point	6	35.3	8	61.5	7	58.3	7	63.6	4	44.4	32	51.6
Positive > cut off point	11	64.7	5	38.5	5	41.7	4	36.4	5	55.6	30	48.4

Table 4. The Results of The Analysis of The Relationship between Resilience and Psychological Well-Being

		psychological well-being		Total	r	P
		Positive	Negative			
Resilience	Low	5	12	17	0.267	0.039
	Medium	13	16	29		
	High	12	4	16		

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conducted on gastrointestinal cancer patients who did not undergo chemotherapy, explained that resilience is not directly related to psychological well-being, this is because the study depends on the individual's quality of life. Meanwhile, in this study, the researcher wanted to analyze the relationship between resilience and psychological well-being of breast cancer patients undergoing chemotherapy at a hospital unit in Malang, Indonesia. Resilience research is needed to provide nursing care that focuses on the psyche of patients undergoing chemotherapy treatment.

Methods

Study design

This study used an observational analytic survey design with a cross sectional approach.

Setting and sample

The population in this study were breast cancer patients who underwent chemotherapy in one of the units of Malang Hospital, Indonesia. The total population of 74 people consisted of 20 people in session 2, 16 people in session 3, 15 people in session 4, 13 people in session 5, and 11 people in session 6. The number of samples was determined using Issacs Michael formula with an error rate of 5% so that the number of samples obtained is 62 people. The sample was selected using a stratified random sampling technique based on the chemotherapy sessions carried out, namely sessions 2-6. The sample size for each session is determined based on the stratum size by using the formula for the number of samples multiplied by the total population for each session divided by the total population, so that the minimum sample size for each session is as follows; session 2 with 17 people, session 3 with 13 people, session 4 with 12 people, session 5 with 11 people, and session 6 with 9 people. Respondents have different levels of resilience, meaning that for each chemotherapy session, there are respondents with high to low resilience. The inclusion criteria in this study were breast cancer patients who had undergone the first session of chemotherapy, aged 18-65 years, were willing to become respondents by signing an informed consent form, and were able to read and write. Exclusion criteria in this study were patients undergoing radiotherapy, taking antihistamines, anti-anxiety and antidepressants.

Variable

There are two variables in the study, namely the independent and dependent variables. The independent variable is the factor that affects psychological well-being, namely resilience, and the dependent variable is psychological well-being.

Instruments

Collecting data using the Connor-Davidson

Resilience Scale (CD-RISC) questionnaire is developed by Kathryn M. Connor and Jonathan R.T Davidson in 2003. Before the instrument is used, it must first be translated into Indonesian using the services of a professional translator. The questionnaire contains 22 statements, the independent variables (resilience) are measured using the Guttman scale, namely yes and no choices. For the favorable statement, the choice of 'yes' is given a value of 2 and the choice of 'not' is given a value of 1. While the statement that is not favored, the choice is given a value of 1 and the choice is not given a value of 2. The score obtained is in the form of an interval scale, to interpret in 3 categories, namely high, medium and low. Psychological well-being was measured using a Ryff's Psychological well-being scale (PWB) questionnaire. The Guttman scale, namely "yes" and "no", is used to measure the psychological well-being of respondents with a total of 38 statement items. Favorable statements with the "yes" option are given a value of 2 and the "no" choice is given a value of 1, while statements that are unfavorable with the choice of "yes" are given a value of 1 and the choice of "no" is given a value of 2. Determination of the category in the dependent variable uses with a cut off value. mean. Data were analyzed by univariate analysis and bivariate analysis (lambda correlation test).

Validity testing is carried out to determine whether or not the statement on each variable is valid. The instrument is valid if the calculated r value $> r$ table. The value of r table in this study is 0.576. The reliability test was carried out on statements that had a value of $r > 0.576$ (valid). Reliability testing is done only once by testing the instrument. After that, the analysis was carried out using KR-20. The results of the reliability of the questionnaire are based on Kuder Richardson-20, the questionnaire is declared reliable if the KR-20 value is > 0.90 . The validity test for the resilience variable was carried out on 25 statements. From these 25 statements, 22 valid statements and 3 invalid statements were obtained. Valid statements are statements numbered 1, 2, 3,4, 5, 6, 8, 10,11, 12, 13, 14, 15, 16, 17, 19, 21, 22, 23, 24, 25 while the invalid is statement number 7,9,20. All invalid statements are removed (drop). Because based on the reliability test using the Kuder Richardson-20, a value above 0.90 means that the deleted statements are not reliable. Even if the statement is deleted, it will not affect the results because each resilience indicator still has a representative statement.

Data analysis

Data is processed using SPSS 16 for windows. The data analysis procedure was carried out with univariate and bivariate analysis. Univariate analysis is used to describe the characteristics of respondents. Bivariate analysis is done by connecting the independent variable with the

dependent variable that is thought to have a correlation. The two variables connected are categorical data (ordinal and nominal).

Ethical clearance

This research has obtained ethical permission number 352/EC/KEPK-S2/12/2018 from the Ethics Committee of the Faculty of Medicine, Universitas Brawijaya. The ethical aspect of research in this study is to respect the dignity of the respondent, namely the respondent is given the freedom to follow or refuse to be a respondent, patients agree to participate in the research, respect the privacy of the respondents by not disclosing personal information about the respondents, and ensure that the research does not harm the respondents. In this study, the possibility of the ethical principle being violated is related to the respondent's autonomy in the form of the length of the respondent's involvement in the study. To overcome this problem, respondents were given explanation again regarding involvement without negative consequences even though the research could not be completed to the end.

Results

Univariate Analysis Results

The results of the univariate analysis for the characteristics of the respondents, namely recent education, marital status, domicile, information about breast cancer and chemotherapy are displayed in the form of frequency and percentage distributions because these data are categorical data, while the respondent's age and length of illness are displayed in the form of mean, standard deviation, value minimum and maximum because the data is in the form of numeric data. The results of the univariate analysis of research variables, namely resilience and psychological well-being are shown in the form of frequency and percentage distributions because the data are categorical data.

The table above shows that the average respondent is 49 years old with an average length of illness of 12 months.

The table above shows the lowest percentage of resilience experienced by respondents who underwent the 2nd chemotherapy session and increased in the next session. However, the percentage of low resilience increased in sessions 4 and 5. This table shows low resilience because it is difficult for the patient to get out of the problem at hand, moderate resilience shows that it is difficult for the patient to rise from the problem but still tries to find a solution to the problem, and high resilience shows that the patient is able to control the situation that occurs from all possible adversities. The table also shows the percentage of respondents with the least negative psychological well-being experienced by respondents in session 2 and fluctuated in the

next session.

Table 4 shows that the value of $p = 0.039$, if $p < 0.05$. It can be concluded that H_0 is rejected, meaning that there is a relationship between resilience and psychological well-being. The value of $r = 0.267$ indicates a positive correlation with weak strength, meaning that the higher the resilience of patients undergoing chemotherapy, the more positive the psychological well-being of patients.

Discussion

Resilience is a process of adaptation when facing problems, pressures, threats, or more severe stressors. Resilience is needed in dealing with anxiety and depression to be able to adapt positively and be able to improve abilities in bad situations and conditions (Yang & Smith, 2016). Resilience is a process of self-defense from stressful situations against life experiences that have implications for psychological well-being. Humans are basically able to adapt to the environment and psychological changes. However, there are some conditions where individuals are unable to control their life situations, this is when resilience is needed so that individuals can control their life situations (Ifeagwazi et al., 2015).

Resilience is needed to withstand stressors. Resilience will result in good personal growth, and this will respond to the patient's readiness to face challenges or stressors. Good personal growth makes patients ready to face challenges so that patients have positive psychological well-being (Ivtzan et al., 2013). The whole process above can be assessed through the psychological well-being of the patient.

The results of this study indicate that many respondents experienced low resilience in the initial session of chemotherapy, but the percentage of resilience decreased or increased in the next session. The percentage of low resilience experienced by many respondents who underwent chemotherapy session 2 and increased in session 3. However, in sessions 4 and 5 the percentage of low resilience increased again and decreased again in session 6. This condition occurs because of the patient's resistance to undergoing chemotherapy changes and can increase if the individual is able to get through the stressor well. Patients who are able to adapt to the changes they experience during chemotherapy will show increased resilience. This is in line with the opinion of Moser et al. (2012) which states that resilience is dynamic, depending on a person's physical condition. K. E. Lee & Lim (2019) explained that an increase in resilience occurs if a person can adapt to a stressor by going through the changes caused by the stressor. This is in accordance with Wu et al., (2016) who explained that breast cancer patients undergoing chemotherapy patients will experience side effects

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such as hair loss, nausea, vomiting, and fatigue. This will make the patient experience psychological stress, therefore high resilience is needed so that the patient is able to adapt to the stressor.

Another factor that can affect resilience is the level of education. The results of this study indicate that most of the respondents were at elementary school education level, but their resilience can show an increase because respondents have received information from health workers and have access to telephones that can help patients obtain information related to their complaints. This is supported by Yurtsever (2010) which states that the information provided will make individuals aware of information about the disease they are experiencing, therapy, taboos, and directions so that individuals can prepare themselves for the situation to be faced.

The results of this study also show that there is a significant relationship between resilience and psychological well-being. The higher the patient's level of resilience, the higher the probability that the patient will have positive psychological well-being. High resilience can make psychological well-being positive. This is because patients undergoing chemotherapy believe that God will provide healing so that they feel optimistic. Optimism has a great capacity to influence individuals in adapting to changes or stressors. The respondent's ability to adapt to changes that occur increases self-acceptance, independence, and personal development during chemotherapy. This is in line with the research of Sourı & Hasanirad (2011) which explains that resilience plays a role in psychological well-being. According to him, resilience comes from religious values that direct a person towards optimism. Values in society explain the context of religion and faith is a key element in optimism. This is supported by Ivtzan et al. (2013) which explains that personal development which is one of the domains in psychological well-being is strongly influenced by religious factors and one's spirituality. Individuals with higher personal development will take the initiative to explore, seek, mingle and create meaning in their lives.

According to another research on resilience and psychological well-being, namely Yang & Smith (2016), individuals who are able to accept change will have good personal development so as to increase their readiness to adapt and deal with stressors. Research by K. E. Lee & Lim (2019) also explained that patients who are able to adapt to stressors are individuals who show improvement in physical and psychological aspects.

The respondent's low resilience is due to changes in physical condition due to chemotherapy. The increased resilience of respondents indicates that respondents are able to adapt to the changes they experience so that they can accept their conditions and can develop personally. Thus, the respondent will show positive psychological well-being.

Conclusion

Many patients experienced low resilience at the beginning of chemotherapy, increasing in the next session but decreasing in the last session. There is a significant relationship between resilience and psychological well-being. The higher the level of resilience, the more positive the welfare of patients undergoing chemotherapy. Future researchers are expected to analyze the relationship between family resilience and the resilience of patients undergoing chemotherapy.

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The Effect of Religion, Self-Care, and Coping Mechanisms on Quality of Life in Diabetes Mellitus Patients

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Abstract

Background: Uncontrolled diabetes is at a high risk for complications. This chronic complication can cause a decrease in the quality of life of DM patients. There are several factors that affect the quality of life of people with diabetes. Religiosity, self-care, and coping mechanisms together affect the quality of life. Religiosity is very important for patients to have as a foundation for maintaining quality of life. Self-care is a basic effort to control and prevent complications arising from DM. Coping mechanisms are problem-solving efforts and defense mechanisms used to protect themselves from DM problems.

Purpose: This study aims to determine the effect of religiosity, self-care, and coping mechanisms on the quality of life of DM sufferers.

Methods: This study uses a quantitative research design and a cross-sectional approach involving 130 respondents, using a total sampling technique. Data was collected using various questionnaires, including a Centrality Religiosity Scale (CRS) questionnaire, Summary of Diabetes Self-Care Activity (SDSCA), Coping Orientation to Problem Experienced (COPE), and Diabetes Quality of Life (DQOL). Inclusion criteria were patients with type 2 diabetes mellitus with blood glucose levels \leq 200 mg/dl and patients with type 2 diabetes who had diabetes $>$ 1 year or more. Path Analysis is used to analyze data.

Results: The religiosity of patients with type 2 diabetes has a mean of 49.47, a mean of 42.59 for self-care, a mean of 85.29 for coping mechanisms, and a mean of 42.56 for quality of life. There is an effect of religiosity ($p = 0.000$), coping mechanisms ($p = 0.001$), and self-care ($p = 0.000$) on the quality of life.

Conclusion: Religiosity, coping mechanisms, and self-care affect the quality of life of people with Type 2 DM. Efforts that can be made by the hospital to increase health promotion related to improving the quality of life of people with diabetes mellitus.

Keywords: coping mechanisms; diabetes mellitus; quality of life; religiosity; self-care.

Introduction

Diabetes Mellitus (DM) is one of the health problems that has caught the world's attention, especially in modern society (Teli, 2017). Approximately 537 million adults (20–79 years) are living with diabetes. The total number of people living with diabetes is projected to rise to 643 million by 2030 and 783 million by 2045 (International Diabetes Federation (IDF), 2021). The prevalence of DM in Indonesia based on doctor's diagnosis in the population aged 15 years from the 2018 Riskesdas increased to 2%. In West Java Province, Sukabumi City ranks the 7th highest with the prevalence of DM based on doctor's diagnosis in the population of all ages by regency or city, which is 1.54% (Riskesdas, 2018). The American Diabetes Association

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(ADA) states that DM is a group of metabolic diseases characterized by hyperglycemia resulting from defects in insulin secretion, insulin action or both (Setiyorini & Wulandari, 2017). The risk of complications increases with the duration of hyperglycemia. This chronic complication can cause high morbidity and mortality in DM patients. The risk of complications of DM that continue in the end will have an impact on the quality of life of DM patients (Teli, 2017).

Quality of life is defined as a state of health, physical function, perceived health status, subjective health, perception of health, symptoms, satisfaction of needs, individual cognition, functional disability, psychiatric disorders, significant well-being (Resmiya & Misbach, 2019). Several factors that affect the quality of life of people with diabetes. Among these factors, religiosity, self-care, and coping mechanisms are closely related to the quality of life of DM patients (Hartati et al., 2019; Megawaty, 2016; Siahaan et al., 2020).

According to Glock and Stark, religiosity is a religious activity that is identified into five dimensions of religiosity, namely: having a religious belief or ideology, practicing religion/worship (religious practice), having a religious experience, knowing one's religion (religious experience), religious knowledge), and being able to practice their worship practices (religious consequential) (Megawaty, 2016). Religion plays an important role in human health and well-being. Religiosity can be a coping mechanism and an important contributing factor to the patient's recovery process. The meaning of life and religiosity are very important for patients because they play a very important role as a foundation in maintaining their quality of life (Najjini & Sudyasih, 2017). This is evidenced by Megawaty's research (2016) and supported by Zakiyah's research (2017), which states that there is a relationship between religiosity and quality of life (Megawaty, 2016; Najjini & Sudyasih, 2017; Zakiyah, 2017).

Another factor that affects the quality of life of people with diabetes is self-care. Self-care, according to Dorothea Orem, is a human need for self-care and conditions whose management is carried out continuously to maintain health and life, as well as heal from disease and overcome complications caused by it (Hartati et al., 2019). Good self-care activities will achieve accurate monitoring of glucose levels so that the risk of complications can be minimized (Bachri, 2016). Self-care is one of the important factors that can affect the quality of life of people with DM. This is in line with research conducted by Hartati et al. (2019) and Wani et al. (2019), which states that self-care can affect the improvement of quality of life (Hartati et al., 2019; Wani et al., 2019).

Coping mechanisms are efforts directed at managing stress, including problem solving and defense mechanisms used to protect oneself (Wulansari, 2017). Healthy coping strategies such as improved coping, impulse control exercises, and

decision-making support are needed by DM clients so that the client's health status and quality of life are in good condition (Rochmah et al., 2019). This is in accordance with the results of research by Asafitri et al. (2019) and Siahaan et al. (2020), which state that there is a relationship between coping mechanisms and quality of life (Asafitri et al., 2019; Siahaan et al., 2020).

The three variables in previous research studies were only associated with quality of life separately or partially. Whereas the three variables are interrelated and mutually supportive in influencing the quality of life of DM patients, Religiosity can affect the way of self-care and make the individual's coping mechanisms better, so that it will improve the quality of life. At the same time, a good coping mechanism will lead to a better way of self-care, which will ultimately change the quality of life. The interaction of these three variables is very decisive in an effort to improve the quality of life of DM patients.

Sukabumi City is one of the level II regions in West Java Province that has 15 health centers. The top 3 health centers with the highest visits by DM patients were the Selabatu Health Center with 5,796 people, the Benteng Health Center with 4,618 people, and the Sukabumi Health Center with 1,585 people as of 2019. The working area of the Selabatu Public Health Center was in the first position for the largest number of DM case visits in 2019 (Dinkes Kota Sukabumi, 2019).

One of the programs to reduce the incidence of DM carried out at the Selabatu Health Center is homecare services by visiting healthy families for blood sugar measurements as well as cleaning gangrene wounds in DM patients and health education. Measuring the quality of life of DM patients is very important to monitor the progress of their condition. Likewise, the quality of life of DM patients in the study area has not been carried out. So far, research considering that the variables of religiosity, self-care, and coping mechanisms have a direct and indirect influence on the quality of life of people with diabetes is rarely done. The purpose of this research is to find out "The Effect of Religiosity, Self-care, and Coping Mechanisms on Quality of Life in Diabetes Mellitus Patients in Selabatu Village, Selabatu Health Center Work Area, Sukabumi City".

Materials and Methods

Design

This study uses correlational research through a cross-sectional approach.

Sample and setting

The study was conducted in Selabatu Village, the Working Area of the Selabatu Health Center, Sukabumi City from January 2021 to August 2021. The research sample was 130 people with type 2 diabetes. This study used a total sampling technique. Inclusion criteria were typed 2 DM patients with current blood glucose levels 200 mg/dl and suffering

Table 1. Characteristics of Respondents

Characteristics	n	%
Age		
17-25 Years	2	1.5
26-35 Years	10	7.7
36-45 Years	12	9.2
46-55 Years	47	36.2
56-65 Years	55	42.3
>65 Years	4	3.1
Gender		
Male	48	36.9
Female	82	63.1
Last education		
No school	1	0.8
Primary school	10	7.7
Junior high school	41	31.5
Senior High School	72	55.4
College	6	4.6
Marital status		
Married	115	88.5
Not married yet	9	6.9
Divorce/ Divorce Dead	6	4.6
Work		
Does not work	61	46.9
Work	69	53.1
Long Suffering DM		
<1 Years	0	0
>1 Years	130	100

Table 2. Univariate Analysis

Variable	Mean	Standard Deviation (SD)	Max	Min
Religiosity	49.47	9.053	69	28
Coping Mechanism	42.59	11.168	69	20
Self-care	85.29	9.528	106	70
Quality of Life	42.56	6.925	55	27

Table 3. Direct Effect, Indirect Effect and Total Effect of Independent Variables on Quality of Life of DM Patients

Variable	Direct Effect	P-Value	Indirect Effect	Total Effect
Religiosity	0.342	0.000	$(0.571 \times 0.255) + (0.251 \times 0.350) + (0.571 \times 0.302 \times 0.350) = 0.292$	0.634
Coping Mechanism	0.255	0.001	$(0.302 \times 0.350) = 0.105$	0.361
Self-care	0.350	0.000		0.350

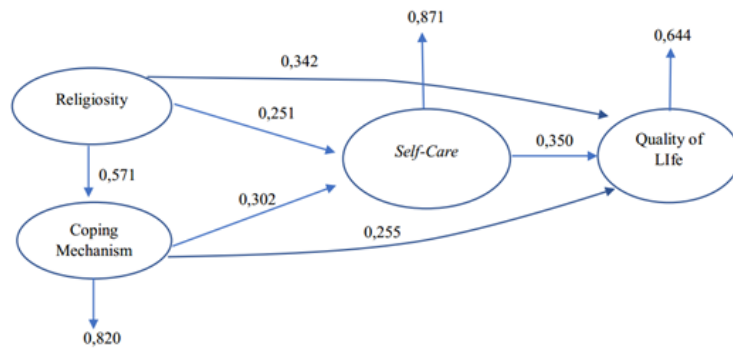


Figure 1. Model Path Analysis of Quality of Life for DM Patients

from DM > 1 year or more.

Instruments

The instrument for measuring the independent variables, which include religiosity, is the Centrality Religiosity Scale (CRS) instrument with construct validity with a value of 0.83 (Huber & Huber, 2012). The Self-care Questionnaire refers to the Summary of Diabetes Self-Care Activity (SDSCA) instrument conducted by Hanif, 2012 with an r-value of 0.534-0.607 (valid if r count > r table 0.444). The coping mechanism instrument refers to the Coping Orientation to Problem Experienced (COPE) instrument, with a validity test result of 0.694 (Fijianto et al., 2021). As well as the dependent variable, namely the quality of life in DM patients using the Diabetes Quality of Life (DQOL) instrument, which has been tested for the validity of the instrument by Burroughs et al., 2004, in the domains predicting behavioral self-care and satisfaction with diabetes control with a value of $r = 0.254-0.360$ and $r = 0.562-0.580$ (valid if r count > r table).

Data collection

Respondents filled out the questionnaire voluntarily, not through coercion and anonymity. All respondents have given informed consent. Respondents who are willing are allowed to continue filling out the questionnaire, and for respondents who do not want to continue, there is no element of coercion. The online questionnaire consists of questionnaires on respondent characteristics, religiosity, self-care, coping mechanisms, and quality of life. SPSS 16 software was used to analyze all of the data.

Data analysis

Data analysis was performed using univariate calculations, including frequency distribution, bivariate analysis, and multivariate analysis, using a path analysis test with a 95% confidence level.

Ethical consideration

This research has obtained the appropriate ethical license, received by the Health Research Ethics Committee with the number III/0356/KEPK/STIKEP/PPNI/JABAR/II/2022. The management of research

ethics is carried out by evaluating research proposals and designs that have been made in accordance with the ethical principles of health research. The ethical study was conducted at the PPNI West Java College of Nursing and analyzed by reviewers who already have expertise in the field of research.

Results

The number of patients involved as many as 130 people, showing the characteristics of the respondents (Table 1) that, in general, respondents aged 56-65 years are 55 people (42.3%), 82 people are female (82%), 72 people have a high school education (55.4%), 115 people are married (88.5%), 69 people work (53.1%), and 130 people have diabetes > 1 year (100%).

Based on the results of univariate analysis (Table 2), the mean value for the religiosity variable is 49.47, the mean value for the coping mechanism variable is 42.59, the mean value for the self-care variable is 85.29, and the mean value for the quality of life variable is 42.56.

Figure 1 shows that religiosity has a direct effect on quality of life ($b = 0.342$, $p = 0.000$) and has an indirect effect on quality of life through coping mechanisms ($b = 0.571$, $p = 0.000$) and self-care ($b = 0.251$, $p = 0.000$). The coping mechanism has a direct effect on quality of life ($b = 0.255$, $p = 0.000$) and an indirect effect on quality of life through self-care ($b = 0.302$, $p = 0.000$). Self-care has a direct effect on quality of life ($b = 0.350$, $p = 0.000$).

The results of multivariate analysis show (Table 3) that religiosity has an indirect effect on the quality of life through coping and self-care mechanisms ($b = 0.292$). Through self-care, coping mechanisms have an indirect effect on the quality of life ($b = 0.105$).

Discussion

Religiosity, coping mechanisms, and self-care are variables that directly affect the quality of life. Quality of life is defined as a state of health, physical function, perceived health status, subjective health, perception of health, symptoms, satisfaction of needs, individual cognition, functional

disability, psychiatric disorders, significant well-being (Resmiya et al., 2019). Religiosity, coping mechanisms, and self-care affect the quality of life, especially on perceived health status, subjective health, and perception of health.

Good religiosity allows individuals to find a better life orientation, find answers to important existential questions, strengthen beliefs about the meaning of life, increase one's quality of existence (life satisfaction), and increase self-esteem and/or self-efficacy (Baral et al., 2019; Bradshaw & Kent, 2018; Zarzycka & Puchalska-Wasył, 2020; Zarzycka & Zietek, 2019). Religiosity gives a sense of happiness to the individual. A good level of religiosity can take positive religious re-evaluation actions, seek spiritual support, attend religious meetings, and carry out religious practices well. In this way, individuals spend their free time positively, namely by getting closer to God and interacting with the surrounding environment. The effect of these actions is a greater sense of security, gaining peace of mind, and finding meaning in experiencing difficulties (Thomas & Barbato, 2020). Participation in religious activities can provide benefits in life, such as being healthier and happier (Aulia & Adriani, 2020). The religiosity factor has a positive influence on the quality of life (Rahmah, 2018; Megawaty, 2016; Khikmah, 2019).

Coping mechanisms are factors that directly affect the quality of life because coping strategies help people with DM control their emotions or thoughts to reduce the stressors they face both physically and psychologically, socially and spiritually (Dewi et al., 2019; Krisdayanti & Hutasoit, 2019). This results in a good quality of life. Coping mechanisms overcome the problems experienced and psychosocial functions, and the patient feels confident that he can treat various DM diseases. The patient can determine or take positive attitudes and actions to support the treatment process (Chow et al., 2021; Dewi et al., 2021; Nauck et al., 2019).

DM sufferers will experience physical and psychological changes. The psychological changes experienced will usually cause stress due to the situation, so that it has an impact on the quality of life they have (Apriyan & Kridawati, 2019; Dewi et al., 2021). Whereas a good quality of life needs to be maintained so as not to cause metabolic disorders, both from hormonal stress and resulting in complications. Quality of life is one of the main goals in the treatment of DM patients. Good coping strategies are essential to produce a good quality of life and also so that individuals take positive action (Asafitri et al., 2019; Nomiko, 2020). In research Nurhikmah, et al., 2018, Patricia et al., 2021 and Asafitri et al., 2019 there is a significant relationship between coping mechanisms and quality of life.

Self-care is one of the factors that directly affect the quality of life. For DM sufferers themselves, self-care has become a program that needs to be done and is their own responsibility. With controlled self-care, it will minimize the occurrence of complications that can arise and DM sufferers can carry out daily

activities properly (Hartati et al., 2019). The ability of individuals to carry out self-care effectively has been shown to be able to significantly minimize mortality and morbidity and has been shown to affect the quality of life of patients and affect their productivity (Prasetyani et al., 2018).

Self-care is an action taken by individuals who are in a threatening condition that is useful in controlling, maintaining, and even improving their health and welfare status. Self-care affects the clinical status, health status, and quality of life of individuals with DM. The clinical status includes glucose, blood pressure, and cholesterol levels, and the health status includes minimizing the occurrence of complications. The more effective the individual's self-care is, the lower the HbA1c and fasting blood glucose levels. In addition, when HbA1c is on target, it tends to shorten the length of stay of individuals in hospitals and improve the quality of life of diabetics (Ramadhani, 2019; Rissanti, 2021). Self-care is proven to have a significant effect on the quality of life (Chaidir et al., 2017; Hartati et al., 2019; Rissanti, 2021).

The findings indicate that religiosity has an indirect effect on life quality via the variables of coping mechanisms and self-care. On the one hand, religiosity expression (establishing transcendent personal relationships, demonstrating belief in God, sensing assistance from a Higher Power, and continuing development in the spiritual realm) is associated with human well-being (a high sense of life's quality and health), because religiosity acts as a protective factor against destructive behavior, encouraging individuals to exercise self-control, optimism, and confidence (Niewiadomska et al., 2021; Santos et al., 2017; Zarzycka et al., 2020). Religiosity can affect coping mechanisms in the form of changes in individual behavior in dealing with stress or in a state of decline (Kirnawati et al., 2021). Spirituality is a multidimensional aspect that includes cognition, feelings, and behavior in the relationship between the individual and the Creator. A high level of understanding of aspects of religion and spirituality will benefit the individual in adapting to stressors so that they have better coping skills (Koerniawan et al., 2018).

The results showed that coping mechanisms affect the quality of life through self-care variables. Components of self-care management behavior, one of which is managing stress. One of the components of self-care management behavior can be shown by the adaptive coping mechanism shown by the individual (Salami et al., 2021). Several types of adaptive coping mechanisms can be in the form of problem-focused coping or emotion-focused coping.

Self-care is certainly related to the behavior of the individual. One of the behaviors that arise can be influenced by the strategies and coping mechanisms that they use in dealing with existing stressors. Li & Show in their research explain that individuals who use one type of effective coping mechanism, such as problem-focused coping, will

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change people's relationships and the environment by modifying or eliminating them through behavior when facing stressors (Yuliana et al., 2019).

The development of coping mechanisms can enable individuals to have a positive outlook and be able to decide on various choices of action. One of them is the choice of taking action to improve self-care abilities. Individuals tend to realize that self-care is a positive action that needs to be taken to get a good quality of life. In addition, effective coping mechanisms carried out by individuals can provide strength to individuals to always be patient, steadfast, take lessons from the problems faced, and be optimistic in achieving the targeted goals (Kurniati & Alfaqih, 2020).

Conclusion

This study shows that there are direct and indirect effects of religiosity on the quality of life. There are direct and indirect effects of coping mechanisms on the quality of life, and there is a direct influence of self-care on the quality of life.

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Adaptation of Validity and Reliability of Indonesian Instruments of Attitudes Toward Suicide with The Rasch Model Approach

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Abstract

Background: Indonesia has a suicide rate that continues to increase so suicide attempts need to be made. One of the early prevention steps is to find suicidal ideation. ATTS is a multi-dimensional measuring tool by measuring Cognitive, Affective and Behavioral aspects that is easy to fill, fast and precise in measuring attitudes towards suicide in the general population through large surveys than other instruments and ATTS is also not yet developed in Indonesia. Therefore, with the Rasch Model that can perform analysis at the item and respondent level, it is expected to produce a psychometric tool in preventing suicide in Indonesia.

Purpose: The purpose of this study is to test the validity and reliability of the adaptation of the Attitudes Toward Suicide (ATTS) instrument into Indonesian using the RASCH model approach.

Methods: The method used is non-experimental with an analytical observational approach which is carried out cross-sectionally using the RASCH model with winstep software. The number of samples used was 243 residents with inclusion criteria of being adults (20-40 years) and knowing about suicide cases in Plered District, one of the sub-districts in Purwakarta Regency which had several suicide cases in 2020. This instrument consists of 73 questions.

Results: The results showed a value of scale-level (S-CVI) = 0.89 and content validity ratio (S-CVR/UA) = 0.72. This value indicates a good quality of content validity. Analysis based on RASCH shows very good item reliability with a value of 0.98 but the result of person reliability is 0.27 which is caused by the lack of variation in respondents' answers in filling out the questionnaire. This also has an impact on Cronbach's alpha value = 0.32. The analysis is elaborated into four factors consisting of summary statistics, unidimensionality, item size, and Differential Item Functioning (DIF). The results show ideal results, but the pattern of person responses that are not diverse from the respondents causes a logit distribution that is not too far away and the variance is not large.

Conclusion: it can be concluded that the consistency of respondents' answers is weak but the quality of the instrument questions in terms of reliability is good and can still be used to measure ATTS.

Keywords: Attitudes Toward Suicide (ATTS); Indonesian; rasch model; reliability; validity.

Introduction

Suicidal behavior is widely known to be a problem that occurs in society (Cwik et al., 2017). Suicide is a behavior carried out by someone where he considers suicide as the best solution to solve the problem at hand. More than that, suicide is death due to an act committed against oneself with the purpose of life and specifically this death is caused by injury, poisoning, or death in a helpless state committed by a person. (Nock et al., 2008).

Data from the World Health Organization (WHO) in 2017 states that every year, as many as 800,000 people die from suicide, or every 40 seconds, there is one person who dies by suicide. Indonesia as a middle-

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income country has a suicide rate that tends to increase. The suicide rate in Indonesia was around 4.3% of the 100,000 population, while in 2015 it increased to 4.5% of the 100,000 population. So, the data shows that there are around 9105 suicides every year (WHO Region, 2014). A preliminary study conducted by researchers with members of the Criminal Investigation Unit of the Plered Police stated that in 2020, there were 4 cases of suicide in the Plered Police area.

Suicide cases recorded in Indonesia to date represent only a small fraction of the actual suicide cases and if there are no concerted prevention efforts, this number could increase from year to year. It is necessary to prevent suicide attempts. Suicidal ideation, threats and attempts at suicide require a high priority and are serious things to do (Townsend, 2011). One of the early prevention steps that can be done is to find suicidal ideation. A person should be asked directly about suicidal thoughts, where the question makes them feel cared for and gives them the opportunity to express their problems (Stuart, 2016).

Based on the literature conducted by researchers, various instruments have been developed and validated to measure attitudes towards suicide including the Beck Scale for Suicide Ideation, Suicide Attitude Questionnaire (SUIATT), Suicide Opinion Questionnaire (SOQ) and Attitudes Toward Suicide (ATTS) (Renberg et al., 2008) When compared with the three measuring tools that the authors describe, only the ATTS and SOQ measuring tools can be used in the general population, because the SUIATT and BSSI can only be used by professional clinical settings so that it requires the development of a measuring scale in the form of a simpler scale if used in the general population and on a large scale. Like the ATTS, although the SOQ can be used in the general population, the SOQ has 100 question items and 7 additional question items so it is considered too much if used in large survey studies, so that only ATTS, as a multi-dimensional measuring tool that can measure Cognitive, Affective aspects, and Behavior, is suitable for measuring attitudes toward suicide in the general population through a large questionnaire survey (Stecz, 2021).

Attitudes Toward Suicide (ATTS) is the newest instrument in 2003 which was developed in Sweden by Renberg & Jacobsson to the Swedish community. In addition, ATTS is a measure of attitudes towards suicide that has never been developed in Indonesia. So based on the explanation above, researchers are interested in conducting research on the validity and reliability of Attitudes Toward Suicide (ATTS) in the Indonesian version of the adult community.

Methods

Study Design

This research is quantitative research with a non-experimental method. The approach used was observational analytic, carried out cross-sectionally

using the RASCH model approach in the data analysis to test the validity and reliability of the Indonesian version of Attitudes Toward Suicide (ATTS).

Setting and sample

The population in this study was 77,357 residents with 243 samples selected using the cluster random sampling method. The samples were residents of Plered sub-district with inclusion criteria of adult (age 20-40 years) and knowing about suicide cases in Plered sub-district.

Instrument

The research instrument used was Attitudes Toward Suicide (ATTS). This instrument is a questionnaire used to measure attitudes towards suicide.

Procedure

The first step in this research was to request permission and approval from the copyright owner of the Attitudes Toward Suicide (ATTS) instrument, namely Prof. Ellinor Salander Renberg. Then, researcher submitted ethical clearance to the Research Ethics Committee of the Faculty of Medicine, Padjadjaran University.

The researcher also applied for a research permit to the UPTD of the Plered Health Center. After the letter of ethics was received, the researcher carried out the translation stage. At the expert panel stage, three people were present. The expert panel consisted of psychologists and psychiatrists with experience in instrument development and translation. The research process was carried out by researcher and assisted by a nurse who held a mental health program at the Plered Health Center and 16 mental health cadres taken from each village in the Plered sub-district.

The data collection process began with providing an explanation to the respondent before giving informed consent, regarding the research objectives via telephone/whatsapp. Respondents who were willing to participate in this study would fill out a willingness to become a respondent form and filled it out without coercion from other parties using the Google form.

In the initial translation stage, the English version of the Attitudes Toward Suicide (ATTS) instrument would be translated into Indonesian. Furthermore, at the expert panel stage, three experts attended. The expert panel consisted of psychology and psychiatric experts with experience in instrument development and translation, namely dr. Selly Iskandar, Sp.AKP., Sp.KJ., M.Si., Ph.D; Aat Sriati, S.Kp., M.Si; Dr. Ahmad Gimmy Prathama Siswadi, M.Sc. This expert panel discussed the original version of the instrument. Based on the results of the expert assessment, there were 9 questions that were omitted because these questions were related to euthanasia, while the concept of suicide was different from euthanasia.

Several questions were omitted based on expert advice, namely questions that had a CVI value > 0.8 and a CVR value that had a range of values from +1 to -1. The CVI value for each statement item was determined based on expert judgment with a range of 1 (irrelevant) – 2 (somewhat relevant) – 3 (relevant) – 4 (very relevant). While the CVR assessment was determined based on an assessment with a range of items 1 (not essential), 2 (important but not essential), and 3 (essential). CVR was calculated by counting the number of experts who gave a score of "3" (essential) minus $(N/2)$ divided $(N/2)$. From the results of the assessment above, the results of the expert panel that had been carried out in this study showed the value of S-CVI = 0.89 and S-62 CVR/UA 0.72. This value indicated a good quality of content validity.

Data Analysis

The data analysis stage in this study was carried out using computer software, with a RASCH model analysis approach to see the interaction between people and statement items. Researchers measured 4 things, namely summary statistics to measure the overall quality of the respondents and the quality of the instruments used, as well as the interaction between the person and the question items. Unidimensionality is the most important measure to evaluate whether an instrument should be developed or measure what should be measured. Measured items to determine the level of suitability of the initial item and Differential Item Functioning (DIF) Instruments could be identified based on the probability value of the item being below 5% (0.05).

Ethical Clearance

This research had received ethical approval from the Research Ethics Committee of the Faculty of Medicine, Padjadjaran University and received research permission on April 2, 2021 with letter number 253/UN6.KEP/EC/2021.

Results

The analysis in this study is elaborated into four, consisting of summary statistics, unidimensionality, item measure, and Differential Item Functioning

(DIF). The summary statistics are used to measure the overall quality of respondents and the quality of the instruments, as well as interactions between people and items. Unidimensionality is the most important measure to evaluate whether the developed instrument is able to measure what it is supposed to measure. Items are measured to determine the level of suitability of the initial items. Meanwhile, Differential Item Functioning (DIF) can be used to detect bias on items in certain respondent categories or no.

Summary Statistic

Summary statistic is used for measuring Cronbach's alpha values, person reliability and item reliability, separation, infit and outfit.

Based on the [table 1](#) above, the results of the RASCH analysis in the statistical summary of person measure = -0.32 logit show the average number of respondents' answers in answering the questions given. This result means that the value is smaller than the logit item (0.0) which shows the tendency of the respondent's ability to be smaller than the level of difficulty of the question instrument. The standard deviation of person = 0.24 shows that the distribution of the respondent's logit is not that far away because the variation in answers does not vary, this has an impact on the reliability value of the person 0.27 (minimum 0.6) and the separation value 0.62 (minimum 2).

However, the logit item measure = 0.0 with SD = 2.68 shows that the logit item variance is very ideal. Rhus, the implication is that the item reliability value is very good = 0.98 and separation = 7.88. This shows that the instrument has a good measurement quality from the aspect of the distribution of logit items. The value of person reliability is 0.27 and item reliability is 0.98. It can be concluded that the consistency of respondents' answers is weak, but the quality of the instrument questions in terms of reliability is good.

The MNSQ Infit and Outfit values or the suitability of the data with the model, both for persons and items are within the ideal value, namely = 1.00 (accepted range = 0.5 – 1.5), as well as for the ZSTD Infit and Outfit value which is very close to the

Table 1. Summary Statistic

	SD	α	Mea- sure	Separa- tion	Reli- ability	Infit		Outfit	
						MNSQ	ZSTD	MNSQ	ZSTD
Person	0.24	0.32	-0.32	0.62	0.27	1.00	0.00	1.00	0.00
Item	2.68		0.00	7.88	0.98	1.00	-0.20	1.01	-0.12

Table 2. Unidimensionality

	Emperical
Raw variance explained by measure	69.8%
The raw first unexplained variance contrast	1.9%

ideal value 0 (range which is accepted is -2 to +2). This shows that the overall person and item data can be analyzed using the RASCH model, because the accuracy of the data and the index model shows that it is close to the ideal value. Cronbach's alpha value = 0.32 (minimum value of 0.6) indicates a lack of reliability.

The variation in the pattern of person responses in this study came from the respondents, while the instrument was not problematic. The diversity of person response patterns, among others, is caused by the type of questions given that do not cause various answers or because the rating choices are limited.

Unidimensionality

Unidimensionality is the most important measure to evaluate whether the developed instrument is able to measure what is supposed to be measured.

The table 2 above shows that the Raw variance explained by measure (unidimensional) has a value of 69.8% where the minimum value = 20%, above 40% is considered better, and above 60% is very good. This shows that the value above has a good construct validity value, the items can measure the level of difficulty from low to high levels. The value of unexplained variance = 1.9% where the value should be less than 15%. This shows that noise or measurement interference can be reduced to a minimum so that it does not interfere with the quality of the measurement.

Item Measure

The measure column indicates how many respondents (243) and items (73) were evaluated. The higher the measure value (logit value = 0.0) then the question item is more difficult to approve and vice versa, the smaller the measure value of 0.0 logit, the easier the item is approved.

Based on the results of the analysis, items numbered 1 and 8 are the most difficult items to be approved by the respondents and items no. 25, 21, 20, 19, 13 are items that are difficult to agree on. Items 1 and 8 contain "Has your family ever attempted suicide" and "Many suicide attempts were made because of revenge or to punish others" because none of the respondents had a father or sister who had ever attempted suicide. While items no. 25, 21, 20, 19, 13 which are easily agreed upon items contain "Suicide is never justified", "most people avoid talking about suicide", "I can say that I don't really want to kill myself", "I am ready to help someone who is in a suicide crisis by contacting them", "suicide is preventable". Easy-to-approve items, meaning the items with the lowest logit values, where most of the respondents answered agree and strongly agree. While the items that are difficult to agree on are items with a large logit value, meaning that more respondents answered disagree and strongly disagree.

Differential Item Functioning (DIF)

Items and measurement instruments can be biased, when items favor one individual with certain characteristic (Sumintono & Widhiarso, 2014). DIF in RASCH is used to detect measurement bias. The DIF threshold is 0.05. on the results of data management, the probability value of items above 0.05 indicates that there is no measurement bias. The use of the RASCH model properly can help to avoid ambiguous instruments or are not well understood by respondents (Mokshein et al., 2019). In this study, the community, both males and females, did not have a significant difference in attitude because the probability value of all items was > 0.05. This shows that the ATTS instrument that measures attitudes towards suicide can measure well in both men and women in society without any measurement bias.

Discussion

Reliability is used to assess the consistency of the instrument in assessing respondents. The results of personal reliability data analysis are almost the same as the results of data analysis from classical theory (eg, KR 20 and Cronbach's alpha). If the person reliability is close to 1, the instrument has better consistency in measurement (Klein et al., 2011). In RASCH, it is necessary to understand separation (person and item), person separation is used to classify people and item separation is used to verify the hierarchy of items.

A low person means that the instrument is not sensitive enough to distinguish people who have good and low performance, the solution given is to add items to the instrument while a low item separation indicates that the sample of people used is not sufficient to confirm the hierarchy of difficulty items (construct validity). Separation value is 0 to infinity, the higher the value of separation, the better the measurement (Boone et al., 2014).

Attitudes are considered as an important part of a person's personality and can often predict a person's behavior (Poreddi et al., 2016). Thus, measuring individual attitudes toward suicide is the first step in preventing suicide (Renberg et al., 2008). Based on the results of the RASCH analysis in the statistical summary, person measure = -0.32 logit shows the average number of respondents' answers in answering the questions given. This result means that the value is smaller than the logit item (0.0) which shows the tendency of the respondent's ability to be smaller than the level of difficulty of the question instrument. The standard deviation of person = 0.24 indicates that the distribution of the respondent's logit is not that far where the variance is not large. This has an impact on the reliability value of the person 0.27 (preferably above 0.6) and the separation value of 0.62 (at least 2).

However, the mean logit item = 0.0 with SD = 2.68 where the ideal logit mean = 0.0 and the ideal SD > 1 which indicates that the logit item

variance is very ideal. This has implications for a very good item reliability value = 0.98 and a good separation of 7.88. This shows that the instrument has a good measurement quality from the aspect of the distribution of logit items. So, from the value of person reliability 0.27 and item reliability 0.98, it can be concluded that the consistency of the respondents' answers is weak but the quality of the instrument questions in the reliability aspect is good. The MNSQ Infit and Outfit values or in terms of the suitability of the data with the model, both for persons and items are within the ideal value, namely = 1.00 (accepted range 0.5 – 1.5), as well as for the ZSTD Infit and Outfit value which is very close to the ideal value of 0, (and the accepted range is -2 to +2). This shows that the overall person and item data can be analyzed using the RASCH model, because the accuracy of the data and the index model shows that it is close to the ideal value. Cronbach's alpha value = 0.32 (minimum value of 0.6) indicates a lack of reliability.

The variation in the pattern of person responses in this study came from the respondents, while the instrument was not problematic. The diversity of person response patterns, among others, is caused by the type of questions given that do not cause various answers or because the rating choices are limited. Unidimensionality plays an important role explicitly and implicitly during the item construct process. Unidimensionality is the basis and critical assumption of measurement theory. The measurement of unidimensionality is a prerequisite for reliability analysis (Mokshein et al., 2019)

Unidimensionality is an important measure to evaluate whether the instrument is able to measure what it is supposed to measure, in this case the ATTS construct. The analysis of the RASCH model uses principal component analysis of the residuals, which is to measure the extent to which the variance of the instrument measures what it is supposed to measure. Identification of measurement dimensionality is useful for optimizing the measurements made so that the information provided is more focused on the attributes being measured (Sumintono & Widhiarso, 2014).

The value of raw variance explained by measure should not be less than 40% and the percentage of empirical value should be almost the same as the modeled. The raw first unexplained variance contrast should not exceed 15%, the second unexplained variance contrast should not exceed the first unexplained contrast. Based on the results of the RASCH analysis on the ATTS instrument, the value of Raw variance explained by measure (unidimensional) has a value of 69.8% where the minimum value = 20%, above 40% is considered better, and above 60% is very good. This shows that the value above has a good construct validity value, the items can measure the level of difficulty from low to high levels.

The value of unexplained variance = 1.9% where

the value should be less than 15%. This shows that noise or measurement interference can be reduced to a minimum so that it does not interfere with the quality of the measurement. The measurement evaluation process in the instrument is repeated to get the right composition. Instruments can be said to be good if they have various levels of difficulty. The diversity of item difficulty levels aims to measure the various abilities of people who come from different levels of the spectrum (Sumintono & Widhiarso, 2014).

The measure column indicates how many respondents (243) and items (73) were evaluated. The higher the measure, the more difficult the statement items to approve. Based on the results of the analysis, items numbered 1 and 8 are the most difficult items to be approved by the respondents and items no. 25, 21, 20, 19, 13 are items that are difficult to agree on. Items 1 and 8 contain "Has your family ever attempted suicide" and "Many suicide attempts were made because of revenge or to punish others" because none of the respondents had a father or sister who had ever attempted suicide.

While items no. 25, 21, 20, 19, 13 which are easily agreed upon items contain "Suicide is never justified", "most people avoid talking about suicide", "I can say that I don't really want to kill myself", "I am ready to help someone who is in a suicide crisis by contacting them", "suicide is preventable". Easy-to-approve items, meaning the items with the lowest logit values, where most of the respondents answered agree and strongly agree. While the items that are difficult to agree on are items with a large logit value, meaning that more respondents answered disagree and strongly disagree.

The views of the Indonesian people towards suicide with 101 research subjects consisted of 44 men and 57 women who are adherents of 6 religions in Indonesia who have in-depth knowledge about their religion. The study showed as many as 98 respondents answered that suicide was a sinful act and the other 3 respondents answered that they did not know or hesitated. This is in line with the results of the study which showed that all respondents did not condone suicide. Indonesia has a collectivism culture which means showing the state of society where each member is integrated into strong and integrated group ties throughout their life span to protect each other. In countries with a high level of collectivism, individuals have concern for other individuals in the group and expect others to care for themselves in a reciprocal manner (Pratiwi, 2020).

Items and measurement instruments can be biased, when items favor one individual with certain characteristics (Sumintono & Widhiarso, 2014). DIF in RASCH is used to detect measurement bias. The DIF threshold is 0.05. On the results of data management, the probability value of items above 0.05 indicates that there is no measurement bias. The use of the RASCH model properly can help to avoid ambiguous instruments or are not

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well understood by respondents (Mokshein et al., 2019). In this study, the community, both males and females, did not have a significant difference in attitude because the probability value of all items was >0.05 . This shows that the ATTS instrument that measures attitudes towards suicide can measure well in both men and women in society without any measurement bias.

Conclusion

The ATTS instrument adapted from Indonesian has tested the validity and reliability of the (ATTS) instrument into Indonesian using the RASCH model approach. The research design uses quantitative with non-experimental method showing the results of an S-CVI = 0.89 and an S-CVR/UA 0.72. This value indicates a good quality of content validity. The analysis in this study is divided into four factors consisting of summary statistics, unidimensionality, grain size, and Differential Item Functioning (DIF). The results of the four psychometric attributes of the instrument show ideal results, but the response pattern of people who are not diverse from the respondents causes the logit distribution that is not too far and the variance is not large.

Analysis based on RASCH shows the reliability of the item is very good with a value of 0.98 but the result of the reliability of the person is 0.27. This also has an impact on Cronbach's alpha value = 0.32 so that it can guarantee that the respondents' answers are weak but the quality of the instrument in terms of reliability is good and can still be used to measure attitudes towards suicide. The weak results of Cronbach's alpha and person reliability in this study were caused by the lack of variation in respondents' answers to the questionnaire items.

The ATTS exploratory factor analysis conducted in Renberg and Jacobsson's (2003) research also showed that the preparedness to prevent factor showed the lowest Cronbach's alpha value of 0.38, resulting in an overall Cronbach's alpha value accumulation of 0.60. Renberg and Jacobson (2003) in their research on instrument testing assume that the value of some items of ATTS reliability is low because this instrument measures a broad attitude that can lead to ambiguity, and is given to a heterogeneous group of people, thus requiring additional studies including repeatability measurements. In addition, the attitude change factor is not completely stable from time to time so that it can affect the instrument's reliability value (Inagaki & Yamada, n.d.).

The ATTS instrument does not cover Indonesian local culture and does not cover the typical signs and symptoms of suicide such as ambivalence, sadness, hopelessness, and self-harm.

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The Experience of Nurse Managers Implementing A Nursing Management System in COVID-19 Wards: A Descriptive Phenomenology Study

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Abstract

Background: The nurse manager is one of the nurses who has authority to implement a nursing management system in a nursing organization to achieve goals based on the input, process and output stages, whether the Covid-19 pandemic has positive and negative impacts on the implementation of the nursing management system. Nursing management is a form of coordination and integration in achieving nursing care and nursing services.

Purpose: The purpose of this study is to explore the experience of nurse managers in implementing nursing management system in the COVID-19 wards.

Methods: This study used a phenomenological descriptive design and in-depth interview data collection methods. Furthermore, the implementation of this research was carried out in 10 hospitals in North Sumatera, especially Medan City, Deli Serdang Regency and Serdang Bedagai Regency. The participants involved in this study were 20 participants and used the Collaizzi data analysis method.

Results: This study revealed 7 themes related to the experience of nurse managers running a nursing management system in the COVID-19 treatment room ; (1) Requires extra high discipline to carry out nursing management functions, (2) There is a psychological disorder for nurse manager to carry out nursing management, (3) Requires moral and material support in carrying out their duties, (4) Performs various efforts to disseminate information on nursing care management systems, (5) Experiences more benefits in implementing nursing management in the COVID-19 ward, (6) Faces complicated obstacles in carrying out nursing management, and (7) Has high expectations in carrying out increasingly complex management functions.

Conclusion: From the themes above, the researcher concludes that the nursing management system in the COVID-19 treatment room involves psychological feelings, requires extra self-preparation, requires support from all parties in providing nursing care, improving nursing services to the fullest and can develop the concept of nursing management system during a pandemic.

Keywords: covid-19; management; nurse manager.

Introduction

COVID-19 is spread from person to person through droplets released when an infected person coughs, sneezes, or talks. The most common signs and symptoms of COVID-10 are fever, cough and trouble breathing. The transmission system is by direct contact such as touching, coughing and mobilization in the affected area (Balkhair, 2020). Nurses are one of the most important professions in handling COVID-19 (Kirkland, 2020). Nurses provide quality and credible nursing care during a pandemic. Then Nir (2020) stated that nurses are at the forefront of fighting the COVID-19 pandemic.

Due to the COVID-19 pandemic, one of the professions affected is nursing. According to Daly et al., (2020) the role of nurse managers is very much

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Table 1. Demographic Characteristics and Length of Works of The Participants (n=20)

Characteristic	n	%
Age		
26-35 Year	5	20
36-45 Year	15	80
Education		
Diploma III	7	35
Bachelor	12	60
Master	1	5
Working Agencies		
Government Hospital	11	55
Private Hospital	9	45
Length to work In Covid wards		
Under 3 Month	0	0
More than 3 month	20	100

needed during the current pandemic, which is to be able to lead wisely, be strong, provide motivation, courage, and enthusiasm for work to nurses, so that nurse managers and staff will be more effective in achieving a successful nursing service, both in improving health and in using technology (Baykal et al., 2020).

Furthermore, important steps can be taken in improving nursing performance with the competence of nurse managers and influencing the nursing management system (Moghaddam et al., 2019). The implementation of nursing management by nurse managers in hospitals has shown positive results, where this statement was conveyed by Coleen Arlette Cox (2019) in her research, stating that nurse managers and staff show a close relationship in carrying out clinical and non-clinical care. The statement was also conveyed by Turkmen et al., (2020) that in nursing management, there are three important elements that nurse managers must do in planning for the COVID-19 pandemic, such as expanding care capacity, number of beds, providing competent nursing staff in sufficient numbers and ensure the completeness of materials and equipment for the needs of patients and staff. Nurse managers need to do all the management of the nursing system.

Nurse managers must play their role in accordance with COVID-19 conditions, apply and implement nursing practice skills (training on isolation wards, patient care isolation and operational standard procedure in covid-19 wards) during the pandemic (Hoffmann et al., 2020). Based on the explanation above, the researcher wants to know how to implement the nursing management system during the COVID-19 pandemic, and explore further and deeper about the experience of nurse managers in implementing a nursing management system in the COVID-19 treatment room at the North Sumatra Hospital.

Materials and Methods

Study design

This study used qualitative research methods with descriptive phenomenological designs. Descriptive phenomenological studies were to interpret the life experiences experienced by a person and a powerful way to understand subjective experience or gain insights into people's actions, motivations, bypass long held or challenging assumptions (Polit & Beck, 2018).

Sample/participants

The study was conducted in 10 hospitals in North Sumatra, with 20 participants in the implementation of this study. The criteria for research participants were as follows; participants were nurse managers who served in the COVID-19 wards at a hospital in the North Sumatra region, served in isolation wards for more than 3 months and willing to be participants. In this study, the participant taking technique used was purposive sampling.

Data collection

The study was conducted from March to July 2021. Qualitative data collection was conducted using data collection with in-depth interviews. Before interview, researcher made a contract with participants, providing informed consent and explaining the research objective, asking questions according to valid guidelines. Interviews were conducted with a time span of 50 to 60 minutes using a voice recording medium. This was done in one session, but if data had not reached saturation, the interview would be conducted again in the hope of achieving saturation. The interview was stopped if bored or off the research topic and the results of the interview were clarified with the participants. The interview was conducted to 20 people using two techniques, namely face to face interview and online using the

Table 2. The results of the theme of the experience of nurse managers in running a nursing management system in the COVID-19 ward

Themes	Sub-theme	Category
Carry out extra nursing management functions and high discipline	Planning	Planning PPE needs
		Application of PPE
		Apply staff
	Briefing	Ask staff
		Delegate tasks
		Give responsibility
		Coordination with the COVID-19 team
		Provide new policy information
		Provide psychological support
		Provide support with working conditions
	Staff Setting	Socialization of use and release of PPE
		Socialization of standard operating procedures
Convey discipline in the use of PPE		
Have a nurse registration certificate		
Supervision	Recruiting staff from the regular wards	
	Doing staff mutation	
	Setting shift	
	Monitoring via CCTV	
Expression of psychological feelings in caring out nursing operation an COVID-19 wards	Feel the ups and downs of being the nurse manager running nursing management	Staff performance appraisal
		Feel the ups and downs of being the head of COVID-19 room
	Feel afraid of being exposes to COVID-19 wards	Feel the ups and downs of implementation a nursing management system.
		Feel afraid of being exposed to COVID-19
	Provide challenges while on duty in COVID-19 wards	Feel scared in the COVID-19 room
Feel the weight of being the nurse manager in COVID-19 wards	Give a challenge to be the head of the COVID-19 room	
	Provide a challenge to carry out the task	
Feel stressed with a lot of work in COVID-19 wards	Feel it's getting harder to be the head of the COVID-19 room	
	Feeling stressed with a lot of work	
	Feel the stress in the COVID-19 room	
Get moral and material support while on duty	Receive training support and awards	Feel the stress of running a nursing management system
		Get training on COVID-19 wards for use and release PPE
	Standard availability	Reward to nurse
Obtain nutrition support and incentive	Standard operation procedure is the same as the regular treatment room	
	Get nutritional needs	
Make various efforts to disseminate information on COVID-19 care	Limited to explained information	Get incentive from hospitals and government.
		Doing discussion and share
		Using social media
		Access information with Google

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Cont. Table 2. The results of the theme of the experience of nurse managers in running a nursing management system in the COVID-19 ward

Themes	Sub-theme	Category	
Feel more benefits in implementing nursing management	Get a bonus from the ministry of health	Manage more effectively	
		More focused	
	Caring out tasks easily	Works well	
		Maximize service	
		Easy care service	
		Provide satisfaction to patients	
		Nurse is satisfied	
		Implementation according to standard	
		Achieve nursing care	
		Patient go home healthy	
Face complicated obstacles in carrying out nursing management	Limitations of standard operating nursing procedures applied in isolation wards	Shortage of PPE in COVID-19 wards	
		Inadequate PPE needs	
	Get response from patient and patient's family	The patient's family complains	
		Uncooperative patient's family	
		Complaints from patients	
	Limitations of staff	Refusal of the patient's diagnosis	
		Experiencing a staff shortage	
		Lack of human resources	
		Demand needs are not expected	
	Difference of characteristics	Staff doing disobedience	
		Have a different character from staff	
	Limited of standard operational procedure	No availability of standard operational procedure	
		Standard no yet available	
	Limited facilities and medical equipment funds	Incomplete facilities and infrastructure	
		Inadequate medical equipment	
	Activity limitations	Broken medical equipment needs	Broken medical equipment needs
			Experiencing fatigue
Have limited movement with the use of PPE		Have limited movement with the use of PPE	
		Feel heavy doing activities	
Feel the heat		Feel the heat	
		Communication limitation in COVID-19 wards	
Limitations of supervision		Limitations of supervision	
		Limitations of mobility	
Carrying out a doctor's visit in COVID-19 wards		Carrying out a doctor's visit in COVID-19 wards	
Incentives have not been disbursed		Incentives have not been disbursed	
Have high hopes in carrying out management functions	Nurses working in covid wards must be doing managements functions	Doing according to standard operational procedure	
		Minimize complaints	
		Improve service	
		Give healing	

telephone. During face-to-face interview, researcher used KN95 masks, kept distance, brought hand sanitizer and interview was conducted in a special room, such as in meeting rooms or in the head office. The tools used, including: (1) voice recorder and note book, (2) in-depth interview guideline, (3) Questions about the nurse manager's system management nursing the guideline.

Data analysis

The data analysis used is qualitative with content analysis. Using the Colaizzi's 1978 method as follows: (1) reading and rereading descriptions, (2) extracting significant statements, (3) formulating meanings, (4) categorizing into clusters of themes and validating with original text, (5) describing, (6) returning to participants, (7) incorporating any changes based on the informant's feedback. The analysis process was carried out as follows: the researcher conducted interviews with participants, then the results of the interviews were changed in the form of interview transcripts. Next, the researcher read the entire transcript and then returned it to the participants to correct whether the data provided was correct. In the next stage, the researcher extracted from the interview transcripts to obtain the meanings of the transcripts, then the researcher grouped each category obtained from that meaning so as to obtain a theme that was in accordance with the specified topic. After the theme was obtained, the researcher conducted crosschecks and feedback from the informants or participants. The results of the themes from the informants were then formulated into research results.

Trustworthiness/rigor

The principle of trustworthiness was applied to ensure accuracy in qualitative research. The principle in the data validity test were credibility, dependability, transferability and confirmability. In particular, credibility was maintained through prolong engagement techniques, observation, comprehensive field notes, triangulation, and member checking, which was performed with reference to the truth of data and its interpretation. The concept of transferability depended on the researcher's knowledge of the sender's and the recipient's context – attained through detailed descriptions. Meanwhile, dependability was conducted by checking the interview and field notes in order to produce themes for participants and to maintain data stability. Furthermore, confirmability was carried out by examination results, which involved the input of three nurse experts in the aspect of system management nursing.

Ethical considerations

This study was approved by the Research Ethics Commission of the University of North Sumatra. No. 101/Kep/USU/2021. Informed consent was obtained for this study with hardcopy. The participants dropped out if rejected or refused and had not worked in the

covid-19 wards for 3 months.

Results

This study recruited 20 participants from 10 hospitals in North Sumatra province, around 55% government hospitals and 45% private hospitals, consisting of head nurses' room COVID-19 and most of them were aged 36-45 years. Most of the participants held bachelor's degrees in nursing (60%), while the other participants held diploma and master degrees (Table 1).

The implementation of the nursing management system in the COVID-19 treatment room during the pandemic COVID-19 was as follows ; (1) Carry out extra nursing management functions and high discipline, (2) There is a psychological disorder for nurse manager to carry out nursing management, (3) Requires moral and material support in carrying out their duties, (4) Performs various efforts to disseminate information on nursing care management systems, (5) Experiences more benefits in implementing nursing management in the COVID-19 ward, (6) Faces complicated obstacles in carrying out nursing management, and (7) Has high expectations in carrying out increasingly complex management functions.

Discussion

Carry out extra nursing management functions and in high discipline

When carrying out the nursing management function in the COVID-19 treatment room, nurses must be extra and have high discipline. They have to do massive planning, organizing, directing and monitoring. This is also stated by Tsay et al., (2020) who said that in combating the COVID-19 pandemic like this, nurse managers in Taiwan recruited staff to compensate for the labour shortage. This is in line with the results of research from Astuti & Suyanto, (2020) which states that the management of staff and nursing facilities such as power capacity with a balanced number of shifts and with adequate personal protective equipment will provide convenience in the services provided.

The nursing management process in the COVID-19 treatment room has differences, such as coordinating with the COVID-19 task force team, providing massive support to staff for the need for psychological support and the use or removal of PPE as well as staff psychological guidance or guidance. Based on the qualitative research conducted by Liu et al., (2020) the staff in the room needed great support to reduce the stress felt by the staff.

Furthermore, staff arrangements in the COVID-19 room consist of determining the criteria for staff in the room, recruiting staff, transferring, rolling and assigning shifts. This is also in line with the results of research by Poortaghi et al., (2021) which stated that the implementation of labour recruitment, managing labour arrangements and

manage workforce retention.

Then in carrying out shift arrangements by paying attention to conditions in the field, where staff always use PPE and get high demands for the tasks they do, the staff will not be comfortable to work and provide obstacles in the service process that is carried out. Based on the results of research conducted by Zhang et al., (2021) staff are more comfortable working with shift arrangements for 4 hours per shift. This is due to the use of PPE. If it is more than that, the staff will experience difficulty breathing, headaches and fatigue.

Another finding from this study was that in the implementation of supervision carried out in the treatment room using CCTV, the supervision was carried out to assess the performance of the staff in the treatment room. Besides that, the participants carried out intensive supervision of the patient's condition through CCTV.

Expression of psychological feelings in carrying out daily nursing operations

In the COVID-19 treatment room, it was found that the psychological feelings of managers and staff experienced changed. Nurse managers experience feelings of joy and sorrow, fear, anxiety, stress, getting challenges and the workload getting heavier. In the results of the research by Ornell et al., (2020) mental health workers who work in the COVID-19 room have levels of stress, anxiety, and depression because working at the forefront will provide many other dimensions as a trigger for the stress. This was also conveyed by Xiang et al., (2020) who stated that during the pandemic, it gave a lot of psychological pressure for those carrying out duties in the COVID-19 treatment room.

Furthermore, there is an extra workload to manage inside and outside the COVID-19 treatment room, such as how to manage an unfamiliar room, having to coordinate with the cluster team, dealing with patients, families, and staff. This was also conveyed by Wahyuningsih et al., (2020) stating that an increase in workload or extras during this pandemic will have an impact on psychological conditions. (Xiang et al., 2020). The psychological feelings felt by the participants found in this study were the increasingly difficult task of being the head of the room, so that the burden faced by the participants is getting heavier. The research of Wahyuningsih et al., (2020) said that with a high workload due to additional hours of service and unexpected work.

Then the participants also revealed the challenges of being the head of the COVID-19 room and running the management system, while the challenges faced by the participants were that the participants had to be mentally prepared, prepared themselves and increased their adrenaline in this task. So, with the perceived challenges, participants had to prepare themselves to face pandemic conditions. The nursing management process in the COVID-19 treatment room would continue to

be carried out according to the common goal to be achieved, namely the achievement of nursing services to patients. Therefore, participants with psychological stress conditions would continue to provide the best nursing care and feel happy when the patients being treated feel healed (Karimi et al., 2021).

Get moral and material support in carrying out tasks

In this study, the results obtained are getting moral and material support in carrying out the task. Moral support, such as getting education and training and awards, while material support is in the form of rewards and nutrition.

Education and training are given to staff to provide understanding and knowledge regarding COVID-19 rooms and treatments. The training carried out has an influence on staff performance, this will provide an increase in staff skills and knowledge. Getting training is one of the added values of room staff in providing nursing services (Astuti & Suyanto, 2020).

Furthermore, there are awards from professional organizations such as the Indonesian National Nurses Association (PPNI) in the form of certificates. Then there is material support in the form of giving rewards from the hospital and the government to participants in the COVID-19 treatment room. Rewards have a significant effect on the performance of nurses, and provide the view that rewards have an impact on performance (Isnainy & Nugraha, 2018). Support from policy makers is needed in providing financial and spiritual support so that it will provide protection and attention (Wahyuningsih et al., 2020). Furthermore, support is provided in the form of food, fruits, milk, supplements, vitamins and a place to rest. The provision of nutritional support is useful to provide increased stamina, immunity and health of officers in the room.

Make various efforts to disseminate care information

Various efforts are made to disseminate treatment information by conducting discussions, sharing, using mass media and accessing information with Google. Information is obtained from several sources such as printed media, electronic media and through training (Notoadmodjo, 2003; Aisyah, 2021).

Several participants held discussions and shared to obtain the latest information related to COVID-19 treatment. They conduct discussions or share about the reciprocity of the information provided and provide each other with corrections or additions to the information submitted. This is done more effectively because it is obtained from a competent source, so that information about COVID-19 treatment is easily understood and applied by the staff in the room.

Therefore, social media and Google are an alternative reference for participants to access and obtain information related to treatment in the COVID-19 room as well as efforts to prevent the

COVID-19. This is in line with Aisyah's (2020) statement who said that social media had an influence on increasing knowledge related to efforts to prevent the COVID-19.

Experience more benefits in implementing nursing management

Running a nursing management system in the COVID-19 room results in more effective management, achieved patient satisfaction, nurse satisfaction and implementation of care according to standards. In qualitative research, it is stated that effective nursing management is an important step to remove obstacles in providing care, motivation, and changing the management system will improve the quality of care (Rezaee et al., 2020).

The standard nursing care will provide achievements in accordance with the purpose of providing care, as well as having a positive impact on patients with patients feeling healthy. Work carried out according to standards will make the service process at the hospital runs smoothly and facilitates the achievement of nurse service goals for patients (Potter & Perry, 2005).

Facing complicated obstacles in carrying out management

The implementation of nursing management in the COVID-19 room experienced various obstacles such as limited PPE, rejection from patients and patient families, staff shortages, staff cultural background, operational standards not fully available, limited infrastructure and medical equipment, exercise control and limitations to mobilization.

The shortage of personal protective equipment occurred at the beginning of the pandemic, such as hazmat, was anticipated by using raincoats as an alternative. Stocks for personal protective equipment are hard to find and if there are personal protective equipment, the prices are very expensive. Based on the results of Xie et al., (2020) research said that in China there was a shortage of nurses, little logistics, lack of personal protective equipment and disposable instruments.

Then, the patient and the patient's family refused when the service process was provided in the treatment room, the patient also complained and was not cooperative in the nursing care process that was carried out. In addition, the patient's family often refuses, complains and hinders work. The patient's family does not accept the condition of his family member who is tested positive for COVID-19, does not accept the reality that is happening and is difficult to coordinate.

Furthermore, the COVID-19 treatment room experienced limited staff. where the need for staff in the room still experienced imbalances with the conditions that occurred. This is due to the increasing number of patients being treated, the staff resigning and the increasing workload or overload in the treatment room. Officers who treat COVID-19

patients feel the addition of extra personnel and experience discomfort caused by the outbreak, intense work, large number of patients and lack of protective materials in the COVID-19 treatment room (Kim, 2018). Therefore, with sufficient resources, it can overcome staff performance problems and improve the quality of nursing services (Ahmadi, F et al., 2011; Rezaee et al., 2020).

According to the study, it was found that the increasing workload and labour shortage have become factors, where the limited workforce and the increasing number of patients will significantly increase the workload in the COVID-19 crisis and this is detrimental to physical and mental health (Lam et al., 2019).

Then what caused the shortage of staff in the COVID-19 treatment room, namely the staff restrictions carried out by the hospital to overcome the spread of infection that occurred. This means that more and more people on duty in COVID-19 rooms will increase mobilization and create crowds in COVID-19 treatment rooms (Stone, PW et al., 2004; Poortaghi et al., 2021).

The staffs in the COVID-19 treatment room had different ethnic, religious, cultural and experience backgrounds. The staff in the room had not known each other yet, had never worked in a team, so there were differences in nature, they were rebellious, and it was still difficult to work together. Based on the results of the study, the differences obtained had an influence on the implementation of the management of the COVID-19 treatment room, so that whatever the participants said to the staff was not easily accepted properly. So whatever was said would be ineffective for the staff to hear. In the study of Farajzadeh & Karimi (2020) it is said that communication between nurse managers and staff will have an influence in improving the quality of nursing care.

Then, another obstacle in implementing nursing management in the COVID-19 room that participants felt was the limited infrastructure and medical equipment. The constraints on facilities and infrastructure such as the condition of damaged room air conditioners, power failures, dead water faucets, damaged communication tools and damaged CCTV. Where the ward structure and facilities can have an influence on the quality of services provided, the availability of adequate equipment and facilities and effective communication will provide high-quality care services (Nobahar et al., 2014; Rezaee et al., 2020).

Furthermore, what participants felt in managing the COVID-19 treatment room were limited activities, which could be seen from feeling tired, having limited use of PPE, experiencing difficulty in carrying out activities, heat, difficulty in carrying out control and limited mobilization. For communication, it is felt that communication is less effective between patients and other officers, due to the use of strict personal protective equipment, so that the intensity of the sound emitted is neither appropriate nor valid.

The limitations in the implementation of supervision are caused by restrictions on entering the room and the duration of supervision is also small.

Furthermore, the delay in providing incentives from the government, where participants stated that the incentives they received had not yet been issued. The incentives that had not been issued yet were in November to March 2021, where this is due to the administrative process of patient input, the method of proposal to the centre and the current system. In the study, it was stated that the obstacles in carrying out managerial in the form of lack of human resources, lack of financial resources and inadequate equipment (Babaeipour et al., 2011; Rezaee et al., 2020).

Have high hopes in carrying out increasingly complex management functions

Running a nursing management system in the COVID-19 treatment room has expectations in the form of running according to standards or SOPs, minimizing complaints, improving services and providing healing. The COVID-19 treatment room is one of the red zones in the spread or contamination of high COVID-19 transmission, therefore all forms of services and activities must be in accordance with the stages that have been set. Implementing standards will provide increased accountability for the performance of the staff in the room, so that the entire performance of the staff will be achieved in accordance with the expectations of the room, as well as providing clarity on the performance of each staff during carrying out nursing services. It was also explained that by carrying out all activities and activities running with SOPs, it became a performance appraisal tool oriented to internal institutional performance appraisal, especially in terms of clarity of work processes within the organization (Taufiq, 2019).

Then, to minimize complaints by carrying out nursing management that will have a positive impact on the room in the form of healing, maximizing room management and improving the quality of services provided. This is one of the things that participants have as a strong foundation in managing the COVID-19 treatment room. Indirectly, managing the COVID-19 treatment room is not as easy as an ordinary room, but participants must be able to manage it well as much as possible. This was conveyed by Karimi et al., (2021) who said that even in the psychological pressure, they felt they would still provide the best nursing care and feel happy if the patient who felt cared for felt healed.

Conclusion

The nursing management system in the COVID-19 wards involves psychological feelings, requires extra self-preparation, requires support from all parties in providing nursing care and improving nursing services to the maximum. The nursing management system in the COVID-19 room is a

form of coordination, integration, management for nurse managers and the preparation of guidelines for the implementation of the nursing management system in the isolation ward.

Declaration of conflict of interest

The authors have no conflict of interests to disclose

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The Effect of Different Modalities of Mindfulness-Based Interventions on Blood Pressure

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Abstract

Background: Hypertension is one of the major killers around the world resulting in 7.6 million deaths and 92 million disability-adjusted life years (DALYs) per year. Mindfulness-based interventions (MBIs) have been studied as nonpharmacological modalities of lowering blood pressure. However, the evidence about the different modalities of MBIs is still unclear.

Purpose: The aim of this review is to identify the evidence about the effect of different MBIs on lowering blood pressure among different populations including hypertensive patients and healthy individuals.

Methods: Pubmed, Cochrane Central Register of Controlled Trials (Ovid) and EBSCO databases were systematically used to search by using the keywords "(mindfulness) AND (blood pressure)". All trials published from 1989 to July 2021 that reported the effect of MBIs on blood pressure as primary or secondary outcomes were included. Trials that did not report their results in English were excluded. Titles and abstracts were first screened for eligibility. Eligible studies were then fully reviewed and summarized.

Results: A total of 53 research articles were included in this review with 3947 participants. They include patients with hypertension, cardiovascular diseases, obesity, cancer, stress, diabetes, pregnancy and healthy individuals. Articles were classified and sorted according to the modality of MBI used for better comparison.

Conclusion: MBI modalities that are instructor guided and include breathing and/or physical exercises might result in a significant reduction of BP, especially among patients with HTN and/or anxiety. This effect could be complemented by other pharmacological and non-pharmacological interventions.

Keywords: alternative medicine.symi; blood pressure; hypertension; mindfulness; non-pharmacological.

Introduction

Hypertension is one of the major killers around the world resulting in 7.6 million deaths and 92 million disability-adjusted life years (DALYs) per year (Lawes et al., 2001). Many pharmacological and nonpharmacological management modalities have been developed over the years to control blood pressure (BP). Although often good control cannot be achieved without medications, most practitioners and patients prefer to start with non-pharmacological modalities; including -but not limited to- Dietary Approaches to Stop Hypertension (DASH), exercise ...etc.

Mindfulness can be defined as one's ability to focus their own attention on the current moment. Mindfulness-based interventions (MBIs) have been increasingly gaining attention in the last few decades. Although mindfulness meditation is an ancient practice, several MBIs protocols have been developed in the last 40 years; including Mindfulness-Based Stress Reduction (MBSR) which was developed by Kabat-Zinn (1990), and Mindfulness-Based Cognitive Therapy (MBCT) by Segal, Williams and Teasdale (2002). These modalities are originally developed to manage stress and depression.

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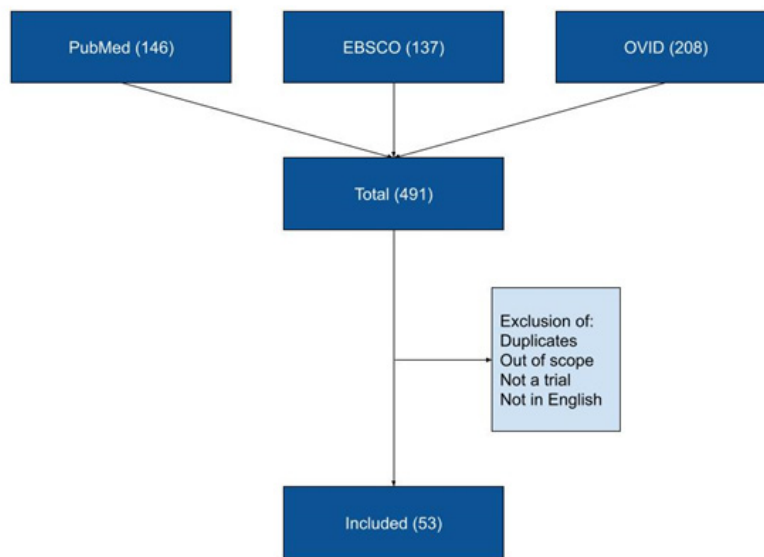


Figure 1. Eligible Studies

However, recently many researchers have been interested in the effect of MBIs on lowering blood pressure among hypertensive patients and healthy individuals. Several review articles showed that MBIs might result in a significant reduction of blood pressure among patients with hypertension and cardiovascular diseases (Marino et al., 2021; Conversano et al., 2021; Verma et al., 2021; Zou et al., 2021). On the other hand, other review articles reported no significant effect among similar populations (Ahmadpanah et al., 2016).

The aim of this review is to identify the evidence about the effect of different MBIs on lowering blood pressure among different populations including hypertensive patients and healthy individuals.

Methods

Design

This study was conducted as a narrative review.

Search methods

A systematic search was conducted using PubMed, Cochrane Central Register of Controlled Trials (Ovid) and EBSCO databases. The keywords were "(mindfulness) AND (blood pressure)". Titles and abstracts were first screened for eligibility. Eligible studies were then fully reviewed and summarized (Figure 1).

Inclusion and exclusion criteria

All trials published from 1989 to July 2021 that reported the effect of MBIs on blood pressure as primary or secondary outcomes were included. Trials that did not report their results in English were excluded.

Results

A total of 53 research articles were included in this review with 3947 participants. These participants were mostly adults with a variation in their ages. They include patients with hypertension, cardiovascular diseases, obesity, cancer, stress, diabetes, pregnancy and healthy individuals. Articles were classified and sorted according to the modality of MBI used for better comparison (Table 1).

MBSR

Two studies including 157 participants with unmedicated prehypertension and stage 1 hypertension were conducted for 8 weeks. Among prehypertensive patients, MBSR resulted in a significant reduction of SBP and DBP when compared to progressive muscle relaxation training (Hughes et al., 2013). On the other hand, MBSR did not result in a significant reduction of SBP and DBP among unmedicated stage 1 hypertension when compared with a wait-list control group. However, "in the secondary analysis, there was a small significant within-group reduction in BP for the entire cohort pre- to postintervention. This effect was largely confined to female subjects" (Blom et al., 2014). Additionally, a study of 42 participants with high-normal BP and stage 1 hypertension resulted in a significant reduction of SBP and DBP when compared to the control group (Ponte et al., 2018). Furthermore, MBSR significantly reduced both SBP and DBP even after 8 weeks of intervention cessation in adults with HTN (Nejati et al., 2015).

Four trials were conducted including 249 patients with CHD, cardiac events, and cardiac diseases. Three of these trials stated that MBSR resulted in a significant reduction in SBP when compared to control (Parswani et al., 2013; Momeni et al., 2016; Gu & Zhu, 2018). However, the fourth trial showed no significant effect of MBSR on SBP when compared with control at 3 and 9 months (Nijjar et al., 2019).

Two studies among 280 adults with obesity

Table 1. Articles Summary

Reference	Year	Population	Sample Size	Modality	Inter-vention duration	Main Relevant Results
Hughes et al.	2013	Adults with unmedicated prehypertensive BP	56	MBSR	8 weeks	MBSR resulted in a significant reduction of SBP and DBP when compared to progressive muscle relaxation training.
Blom et al.	2014	Unmedicated stage 1 hypertension patients	101	MBSR	8 weeks	MBSR did not result in a significant reduction of SBP or DBP when compared with a wait-list control group. However "in the secondary analysis, a small but significant within-group decrease in BP was observed for the entire cohort from pre- to postintervention. This effect was largely confined to female subjects."
Ponte Márquez et al.	2018	Adults with high-normal BP or grade 1 hypertension	42	MBSR	8 weeks	MBSR resulted in a significant reduction of SBP and DBP compared to control.
Nejati et al.	2015	Adults with HTN	30	MBSR	8 weeks	MBSR resulted in significant reductions in both SBP and DBP. This reduction was maintained after 8 weeks of intervention cessation.
Parswani et al.	2013	male patients with CHD	30	MBSR	8 weeks	MBSR resulted in a significant reduction of SBP compared to control.
Momeni et al.	2016	Cardiac patients	60	MBSR	8 weeks	MBSR resulted in a significant reduction of SBP compared to control.
Gu & Zhu	2018	Patients with stable coronary heart disease	112	MBSR	12 weeks	MBSR resulted in significantly larger reductions in SBP when compared to control.
Nijjar et al.	2019	Adults with with a cardiac event or procedure	47	MBSR	8 weeks	This pilot study showed no significant difference in BP between MBSR and control at 3 and 9 months
Daubenmier et al.	2016	Adults with obesity	194	MBSR	5.5 months	There was no significant difference between MBSR + diet-exercise guidelines, and diet-exercise guidelines only in their effect on BP.
Raja- Khan et al.	2017	women with overweight or obesity	86	MBSR	8 weeks	MBSR did not result in a statistically significant reduction of SBP or DBP after 8 weeks
Kopf et al.	2014	Type 2 Diabetes Patients with Early Kidney Disease	110	MBSR	8 weeks	MBSR resulted in a significant reduction of SBP and MAP for up to one year. However, this effect was not significant after 2 or 3 years.
Palta et al.	2012	Low-income African-American older adults	20	MBSR	8 weeks	MBSR resulted in a significant reduction of SBP and DBP when compared to control.
Manigault et al.	2018	Adults with moderate to high perceived stress	72	MBSR	6 weeks	The MBSR group showed a significantly greater reductions in MAP compared to CBT and waitlist control groups.

Cont. Table 1. Articles Summary

Reference	Year	Population	Sample Size	Modality	Inter-vention duration	Main Relevant Results
Nyklíček et al.	2013	adults with stress-related complaints	85	MBSR	8 weeks	MBSR group reported significantly lower SBP and DBP than the control at rest, during exposure to stress and after recovery.
Manigault et al.	2021	healthy adults reporting moderate/high stress	86	MBSR	6 weeks	There was no significant difference between MBSR, CBT and control groups in blood pressure habituation after stress.
Matchim et al.	2010	Breast cancer survivors	36	MBSR	8 weeks	There was a significant difference between MBSR and control in reducing both SBP and DBP.
Oswald et al.	2021	Young adult cancer survivors	126	MBSR	8 weeks	MBSR resulted in a significant reduction of SBP and DBP over time.
Campbell et al.	2012	Women with cancer	76	MBSR	8 weeks	There was no significant difference between MBSR and waitlist control groups.
Amutio et al.	2015	physicians	42	MBSR	8 weeks (weekly sessions) + 10 months (monthly sessions)	MBSR resulted in significant reductions in both SBP and DBP. This reduction was maintained after 12 months of intervention and was positively correlated to the total number of hours of home practice.
Kalinowski et al.	2021	women with pre-hypertension	37	telephone-delivered mindfulness-based cognitive therapy (MBCT-T)	8 weeks	There was no significant difference between reductions of BP among MBCT-T and control groups.
Alamout et al.	2020	women with overweight	45	Energy-restricted diet therapy with MBCT	8 weeks	MBCT with diet therapy resulted in significantly greater reductions in SBP compared to diet therapy alone. However, this effect was not significant on DBP.
Shay et al.	2018	Pregnant women	61	MBCT	8 weeks	There was no significant difference between MBCT and treatment as usual groups.
Bostock et al.	2018	employees at two U.K. companies	238	Headspace (smartphone meditation application)	45 days	There was no significant effect of mobile-based mindfulness training on BP compared to control
Aitè et al.	2019	Adult patients diagnosed with Somatoform Autonomic Dysfunction of cardiological	29	Online Mindfulness-based meditation exercise. (based on MBSR and MBCT)	3 weeks	There was no significant difference between Online Mindfulness-based meditation exercises and control in their effect on BP.
system	29	system	29	Online Mindfulness-based meditation exercise. (based on MBSR and MBCT)	3 weeks	There was no significant difference between Online Mindfulness-based meditation exercises and control in their effect on BP.
Younge, Wery, et al.	2015	Adults with heart disease	324	Online mindfulness meditation program	12 weeks	There was no significant difference between the online mindfulness meditation program and usual care in reducing BP after 3 months

Cont. Table 1. Articles Summary

Reference	Year	Population	Sample Size	Modality	Inter-vention duration	Main Relevant Results
Lindsay et al.	2018	Adults with stress symptoms	144	monitoring and acceptance (smartphone application)	3 weeks	Monitoring and acceptance resulted in a significant reduction of SBP during stress and in recovery compared to monitoring only and control groups. However, there was no significant effect on DBP.
Rajendran et al.	2020	Patients with uncontrolled hypertension	76	MINDING-GOALS program	16 weeks	Reductions in SBP and DBP in the MINDING-GOALS group were not significantly different from those in the GOALS group.
Creswell et al.	2014	college students	66	Brief mindfulness meditation training (recorded)	3 days (25-min per day)	There was no significant effect of the brief mindfulness meditation training on SBP or DBP during response and recovery from stress.
Miller et al.	2021	Adolescents at-risk for adult obesity	29	Mindfulness-induction	once (10 min)	There was no significant effect of mindfulness induction on SBP or DBP.
Grant et al.	2011	college students with a family history of HTN	97	Mindfulness-Analog (recorded)	one session (20 min)	Participants in the mindfulness group had slower and reduced rates of BP recovery after stress than participants in the control group
Coelho et al.	2018	women undergoing breast biopsies	82	Mindfulness-based body scan (recorded)	1 week	MBBS group reported significantly lower mean SBP and DBP compared to control; measured at one instance only
Park et al.	2014	African-American male veterans with HTN and CKD Stage III	15	Prerecorded guided mindfulness meditation (MM)	Once (14 min)	Mindfulness meditation resulted in a significant acute reduction of SBP and DBP compared to control. These reductions were sustained for at least several minutes post-MM.
Gainey et al.	2016	Adults with type 2 diabetes	27	Buddhist walking meditation	12 weeks	There was a significant difference in reducing SBP and DBP among diabetic patients using Buddhist walking meditation exercises when compared to traditional walking exercises.
Roche et al.	2017	older adults with HTN	55	Himalayan Yoga Tradition Meditation	8 weeks	Himalayan Yoga Tradition Meditation resulted in a significant reduction of SBP when compared to other forms of Yoga and control.
Hilcove et al.	2020	Healthcare practitioners	80	Mindfulness-Based Yoga	6 weeks	There was no significant change in SBP or DBP over time in Mindfulness-Based Yoga and control groups.
Ng et al.	2016	Cancer patients under palliative care	60	mindful breathing	one session (5 min)	Mindful breathing resulted in a significant reduction of both SBP and DBP compared to control.
Mitsunagnern et al.	2021	Patient with hypertensive urgency	110	Pursed-lip breathing with number counting	3 hours (15 minutes per hour)	Pursed-lip breathing with number counting resulted in a significant reduction of both SBP and DBP compared to control.

Cont. Table 1. Articles Summary

Reference	Year	Population	Sample Size	Modality	Intervention duration	Main Relevant Results
Chesney et al.	2016	pre-hypertensive, post-menopausal women	95	Mindful breathing (MB)	8 weeks	MB resulted in a large significant reduction of SBP when compared to control. However, no significant difference was noticed in DBP.
Ahmadpanah et al.	2014	women with HTN	45	(Metacognitive detached mindfulness therapy) and (Stress management training)	8 weeks	Both metacognitive detached mindfulness therapy and stress management training resulted in significant reductions of both SBP and DBP when compared to control. However there was no significant difference between the two intervention groups.
Wright et al.	2020	Hypertensive African Americans	38	Mindfulness in Motion and Dietary Approaches to Stop Hypertension DASH (MIM DASH)	8 weeks	There was a significant reduction in SBP in the MIM DASH group when compared to the attention only group
Mohammadi et al.	2021	Adults with type 2 diabetes	30	Mindful Breath Awareness and Muscle Relaxation (MBMR), transcranial electrical stimulation (tCES)	2 weeks	"MBMR treatment was more effective than the tCES with more than 95% confidence to decrease the systolic blood pressure in the post-intervention. However, the MBMR intervention and the MBMR+tCES treatment had the same effects on decreasing the systolic blood pressure in the post-intervention. Furthermore, the tCES intervention and the MBMR+tCES treatment also had the same effects on decreasing the systolic blood pressure in the post-intervention."
Chen et al.	2012	first-year nursing students	60	Mindfulness meditation training	7 consecutive days	Mindfulness meditation training resulted in a significant reduction of SBP compared to control. However, there was no significant effect on DBP.
Alexander et al.	1989	elderly	73	Transcendental Meditation (TM) program, mindfulness training (MF), relaxation program.	3 months	TM and MF groups showed lower posttest mean SBP after 3 months when compared with relaxation and control groups.
Crosswell et al.	2017	breast cancer survivors	71	Mindful Awareness Practices (MAPs)	6 weeks	MAPs resulted in a significantly lower DBP at the recovery stage from stress. However, no significant difference was reported between MAPs and control groups in SBP.
Muthukrishnan et al.	2016	Pregnant women of 12 weeks gestation	74	Mindfulness meditation program	5 weeks	The mindfulness meditation program resulted in significantly lower SBP and DBP responses to cold pressure when compared to control.

Cont. Table 1. Articles Summary

Reference	Year	Population	Sample Size	Modality	Inter-vention duration	Main Relevant Results
Ditto et al.	2006	healthy young adults	32	Body scan meditation	4 weeks	There was no significant difference between body scan meditation and progressive muscular relaxation in their effect on BP.
Wolever et al.	2012	Employees of an insurance carrier	239	Mindfulness at Work program	12 weeks	There was no significant difference between the Mindfulness at Work program, Yoga and control in their effect on BP.
Kingston et al.	2007	University students	42	Mindfulness meditation program	3 weeks	There was no significant difference between the Mindfulness meditation program and Guided Visual Imagery in their effect on BP.
Eisenberg et al.	2019	Employees of culinary school	40	Teaching Kitchen (TK) self-care intervention (offers the combination of culinary, nutrition, exercise, and mindfulness instruction with health coaching)	14 or 16 weeks	TK resulted in a significant reduction of SBP and DBP comparing baseline and post intervention levels.
Johnson et al.	2019	college students	75	5 minutes of mindfulness meditation (MM)	once	MM group showed significantly lower BP reactivity to speech and anger recall than the control group.
Ee et al.	2020	Patients with type 2 diabetes	18	Shared medical appointments with mindfulness training	12 weeks	Adding mindfulness training to shared medical appointments did not result in significantly different reductions of SBP or DBP compared to usual care which included recommending using a free mindfulness app.
Shilling et al.	2017	Women with breast cancer	29	Self-guided mindfulness	8 weeks	Self-guided mindfulness resulted in a significant reduction of SBP compared to baseline measures of the same group.

BP: Blood pressure.

MBSR: Mindfulness-based stress reduction.

SBP: Systolic blood pressure.

DBP: Diastolic blood pressure.

HTN: Hypertension.

CHD: Coronary heart disease.

MAP: Mean arterial pressure.

MBCT: Mindfulness-based cognitive therapy.

CKD: Chronic kidney disease.

showed that MBSR has not significantly reduced SBP when compared to control (Daubenmier et al., 2016; Raja-Khan et al., 2017).

A trial was conducted on 110 participants with type 2 diabetes and early kidney disease showed that MBSR resulted in a significant reduction in SBP and mean arterial pressure (MAP), and this reduction continued for up to one year. However, there were no significant results after that (Kopf et al., 2014).

Four studies were conducted among adults with stress-related complaints. The first two studies reported that MBSR significantly reduced BP compared with control (Palta et al., 2012; Manigault et al., 2018).

The third study showed that the MBSR group had significantly lower SBP and DBP compared to the control one when they were exposed to stress and at rest (Nyklíček et al., 2013). On the other hand, the fourth study showed that there was no significant difference between

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MBSR, CBT and control groups in blood pressure habituation after stress (Manigault et al., 2021).

Two out of three studies including 238 cancer patients and survivors showed significant reductions in BP after MBSR (Matchim et al., 2010; Oswald et al., 2021) while the third one showed no significant difference between MBSR and waitlist control groups (Campbell et al., 2012).

Authors of one trial including 42 physicians reported that MBSR resulted in a significant reduction of both SBP and DBP after 12 months of the intervention. These results were positively correlated with the home practice hours (Amutio et al., 2015).

MBCT

MBCT was investigated in three studies involving 143 participants. Two of these studies showed no significant difference between MBCT and control groups of women with prehypertension or pregnancy (Kalinowski et al., 2021; Shay et al., 2018). On the contrary, the third study showed that MBCT with diet therapy resulted in significantly greater reductions of SBP compared to diet therapy alone among overweight women. However, this effect was not significant on DBP (Alamout et al., 2020).

Online/smartphone application mindfulness training

Five studies including 811 participants were conducted using websites or smartphone applications to deliver mindfulness training. Three studies carried out for 3, 6 and 12 weeks showed no significant effect of mindfulness training on BP over control. The participants in these studies were healthy or had cardiovascular diseases (Bostock et al., 2019; Younge et al., 2015; Gotink et al., 2017). Furthermore, a study of the effect of adding a mindfulness component to an online self-help program designed for hypertensive patients showed no significant difference between the two groups of intervention; with and without the mindfulness component (Rajendran et al., 2020). However, one study conducted with adults who experience stress symptoms reported a significant reduction in SBP only; following 3 weeks of mindfulness training in the form of monitoring one's own experience and accepting it (Lindsay et al., 2018).

Recorded mindfulness meditation

Authors of five trials involving 289 participants used prerecorded audio or video clips to guide the participants through sessions of mindfulness meditation. These sessions varied in duration and frequency. They lasted from 10–25 minutes and were conducted once, for three consecutive days or for a week. Two studies involving healthy college students and adolescents at risk of obesity showed no significant effect of listening to a prerecorded mindfulness meditation on BP (Creswell et al., 2014; Miller et al., 2021).

Furthermore, one trial showed that college students with family history of HTN who were exposed to 20 minutes of Mindfulness-Analog audiotape had

slower and reduced rates of BP recovery after stress when compared with participants in the control group (Grant et al., 2013).

However, one study reported that women undergoing breast biopsies had lower baseline SBP and DBP after listening to mindfulness-based body scan audio tapes for a week when compared to controls (Coelho et al., 2018). Moreover, one trial showed that mindfulness meditation for 14 minutes resulted in a significant acute reduction of SBP and DBP when compared to control among African-American male veterans with HTN and CKD Stage III. These reductions were sustained for at least several minutes post-MM (Park et al., 2014).

Active mindfulness meditation

Three studies were conducted with 162 participants using different forms of active mindfulness exercises. Two studies reported a significant reduction of BP among adults with type 2 diabetes and HTN after using Buddhist walking meditation for 12 weeks and Himalayan Yoga Tradition Meditation for 8 weeks respectively when compared to control (Gainey et al., 2016; Tolbaños Roche et al., 2017).

However, practicing Mindfulness-Based Yoga for 6 weeks did not result in a significant change in BP among healthcare practitioners (Hilcove et al., 2021)

Brief mindful breathing

Most mindfulness meditation exercises include focusing on breathing as an anchor for one's attention. However, in two studies, the authors implemented brief mindful breathing (MB) exercises only with 60 cancer patients under palliative care and 110 patients suffering from hypertensive urgency. Both studies reported a significant reduction of BP immediately after interventions when compared to control (Ng et al., 2016; Mitsungrern et al., 2021). Furthermore, one study of 95 pre-hypertensive, post-menopausal women showed that MB resulted in significantly larger reductions of SBP when compared to the control group. However, no significant difference was noticed in DBP (Chesney et al., 2016).

Other modalities

The authors of the remaining 14 studies conducted different modalities of MBIs involving 866 participants. Two studies reported that MBIs resulted in a significant reduction of BP among women and African-American men with HTN (Ahmadpanah et al., 2016; Wright et al., 2021).

In the first study, there was no significant difference between metacognitive detached mindfulness therapy and stress management training in their effect on BP (Ahmadpanah et al., 2016). Furthermore, in the second study Mindfulness in Motion was complemented by Dietary Approaches to Stop Hypertension (Wright et al., 2021).

When compared to baseline, one study showed that Teaching Kitchen (TK) self-care intervention (offers the combination of culinary, nutrition,

exercise, and mindfulness instruction with health coaching) resulted in a significant reduction of SBP and DBP (Eisenberg et al., 2019).

Four studies showed that MBIs resulted in a significant reduction of SBP only but had no significant effect on DBP among adults with type 2 diabetes, nursing students, elderly people and women with breast cancer (Mohammadi et al., 2021; Chen et al., 2013; Alexander et al., 1989; Shilling et al., 2017).

On the contrary, one study reported a significant reduction of DBP only among breast cancer survivors (Crosswell et al., 2017).

Two studies showed that mindfulness meditation resulted in significantly lower SBP and DBP reactivity to induced stress when compared to control among pregnant women and college students (Muthukrishnan et al., 2016; Johnson et al., 2019).

Finally, three studies reported that there was no significant difference between MBIs and controls in their effect on BP among healthy adults and diabetic patients (Ditto et al., 2006; Wolever et al., 2012; Kingston et al., 2007; Ee et al., 2020).

Discussion

The majority of studies, 13 out of 19, that examined the effect of MBSR on blood pressure showed significantly greater reductions when compared to control. These results are consistent with the result of other reviews (Verma et al., 2021; Intarakamhang et al., 2020; Conversano et al., 2021; Priya & Kalra, 2018; Solano López, 2018; Abbott et al., 2014; Younge, Gotink, et al., 2015). However, this effect was not as salient with the studies that addressed MBCT, online/smartphone application mindfulness training or recorded mindfulness meditation, since the ratios of studies with significant reduction of BP to studies with no significant reduction of BP were 1:2, 1:4 and 2:3, respectively.

On the other hand, mindfulness modalities that focus on breathing (3 out of 4 studies) or add physically active (2 out of 3) components were shown to result in more reductions in BP when compared to control.

Overall, the use of an MBI of any modality for individuals with HTN or anxiety showed significantly greater reductions in BP in a ratio of 3:1.

Since this is a narrative review, it has some strengths and limitations. One strength would be the relatively wide scope which resulted in more studies being included in the review. However, the results showed be considered with caution because of the heterogeneity of the studies and the lack of quality assessment.

Conclusion

This review suggests that the effect of MBIs on BP varies greatly based on the modality used. Overall, MBI modalities that are instructor guided and include breathing and/or physical exercises might result

in a significant reduction of BP especially among patients with HTN and/or anxiety. This effect could be complemented by other pharmacological and non-pharmacological interventions. More research is needed to study the long-term effects of MBIs.

Declaration of Interest

The authors have no conflicts of interest to declare.

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