**ORIGINAL RESEARCH**

# ACUPRESSURE THERAPY TO DECREASE BLOOD PRESSURE FOR MRS. MT WITH CORONARY ARTERY DISEASE

**Qolbu Ainun Hanifah, Muhamad Nurmansyah, Alfonsius Ade Wirawan**
Universitas Sam Ratulangi
Corresponding Email: muhamad.nurmansyah@unsrat.ac.id

| ABSTRACT | Keywords |
|---|---|
| Background: The incidents Coronary Artery Disease (CAD) has increased significantly compared to other cardiovascular diseases. Symptoms of CAD cause chest pain, increased heart rate, and increased blood pressure. Pharmacological therapy is sometimes resistant which ultimately fails to decrease blood pressure, thus introducing various non-pharmacological therapies, one of which is acupressure. The purpose of this study was to provide nursing care to CAD patients by applying acupressure to decrease blood pressure. The research method used was a case study on Mrs. MT with a descriptive approach based on caring for CAD patients. The application for acupressure was given on August 1-5 2024. The results showed significant changes in systolic and diastolic values. Acupressure is provided at points PC6, LI4, and LR3 once a day on average decrease systolic values while stabilizing diastolic values. Conclusion: Acupressure therapy contributed to the reduction of blood pressure in a CAD patient followig post-Percutaneous Coronary Intervention (PCI), indicating its potential as an effective complementary intervention in nursing care for cardiovascular patients | **Coronary Artery Disease, Acupressure, Blood Pressure** |

## INTRODUCTION

Coronary Artery Disease (CAD) is one of the heart diseases that has shown a notable increase among young adults, this condition is characterized by blockage in the coronary vessels either due to cholesterol deposits or inflammation. Most CAD occur due to the rupture of atherosclerotic plaque to the formation of blood clots in the coronary vessels. An unhealthy lifestyle is still the most common cause of coronary heart disease (Ministry of Health of the Republic of Indonesia, 2022). In 2022, CAD recorded 315 million cases in worldwide. Central Europe, Eastern Europe, and Central Asia recorded the highest prevalence with 8019 per 100.000 individuals affected by CAD (Sark, Johnson, and Roth, 2024). According to the Behavioral Risk Factor Surveillance System (BRFSS) survey The

highest prevalence adjusted for age was in West Virginia (5.6%) and the lowest was in Colorado (2.4%). In the Multi-Ethnic Study of Atherosclerosis (MESA) of 3116 participants who did not have detectable coronary artery calcification at baseline followed for 10 years and found that 53% of individuals were identified with coronary artery calcification in the first year (American Heart Association, 2024).

The rise in coronary heart disease surpasses the average increase observed in other cardiovascular diseases, primarily due to lifestyle habits adopted at a young age such as smoking, obesity, and increased cholesterol. Moreover, this disease represents one of the largest contributions financially of health insurance that must be shouldered by the government (Ministry of Health, 2023).

Patients diagnosed with coronary artery disease often require in hospitalized to receive comprehensive medical care. Patients can experience various psychological symptoms of the disease such as anxiety and depression to changes in physiological indices such as increased heart rate, increased respiratory rate, increased blood pressure, and decreased oxygen saturation. CAD sufferers will experience activation of the adrenergic system which can affect hemodynamic values such as increased heart rate and cardiac output contributing to blood pressure (Richalet, Hermand, and Lhuissier, 2024).

Patients with high blood pressure experience resistance to pharmacological therapy even though they have taken several different types of drugs. This can occur due to the complexity of the causes of the disease (American Heart Association, 2024). In addition, the fact that pharmacological methods have unwanted side effects such as tachycardia, constipation, nausea, and vomiting has led to an increase in non-pharmacological methods to control

symptoms of the disease such as hemodynamic instability (Düzel, Çam Yanik, Kanat, and Altun Uğraş, 2023).

Xu, Wu, Jiang, and Fan (2021) emphasized the urgency of basic human needs based on Maslow's theory in CAD patients, the strongest are physiological needs, safety, attribution, and love during treatment, while respect and realization are at the next level. Unstable hemodynamics will affect basic physiological needs which will systematically impact other basic needs. Restawan, Sjattar, and Irwan (2023) Acupressure as a complementary therapy was introduced as a simple therapy and carries minimal side effects, thereby enhancing patients quality of life.
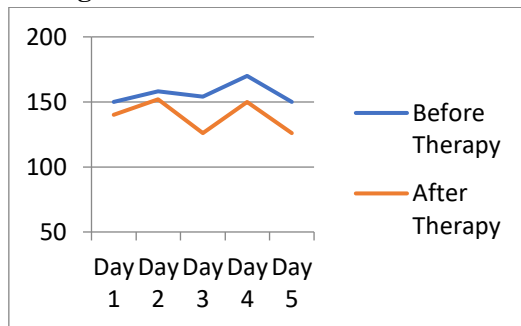
The aim of this study is to provide nursing care to Mrs. MT and to analyze the application of acupressure to blood pressure regulation.
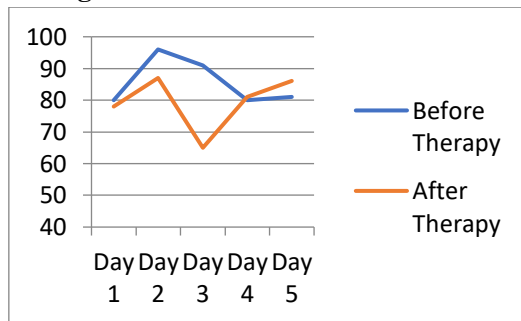
## METHOD

This study utilized a qualitative study design with a descriptive case study approach. The case study was conducted focusing on nursing care for Mrs. MT for 5 days and the implementation of acupressure to assess changes or targetting in Mrs. MT's blood pressure regulation. Acupressure was applied daily between 10:00 AM and 12:00 AM on 3 points: PC6, LI4, and LR3. The nursing care process covered stages from assessment through evaluation. The case study was carried out in the cardio-vascular and brain center (CVBC) treatment room, 3rd floor, Prof. Dr. dr. R. D. Kandou Manado General Hospital. The subject was a single female, Mrs. MT, a 70-year-old with a medical diagnosed CAD.

## RESULTS

**Picture 1. Systolic Blood Pressure Changes**



**Picture 2. Diastolic Blood Pressure Changes**



On the first day of treatment, a blood pressure decreased after acupressure to 140/78 mmHg. On the second day, there was a small decrease after acupressure with blood pressure of 152/87 mmHg. On the third day, there was a significant change to 126/65 mmHg. On the fourth day treatment, the patient's blood pressure dropped to 150/81 mmHg after acupressure. On the last day, the patient's blood pressure was in the normal range of 126/86 mmHg until the patient went home for further outpatient care.

## DISCUSSION

Mrs. MT underwent acupressure therapy during treatment and notable reduction in blood pressure. The patient was given acupressure once a day for approximately 15 minutes while monitoring vital signs. According to Huang et al (2021) Acupressure is a complementary therapy that works by stimulating sensory nerve cells in the acupoint area which are forwarded to the spinal cord and then to the midbrain and hypothalamic-pituitary complex, all of which are released in channeling endorphins producing a sense of comfort and peace. Acupressure also stimulates histamine which affects the dilation of blood vessels, all of the uses of acupressure can reduce blood pressure. The application of acupressure is given 5-6 hours after the administration of pharmacological antihypertensive therapy by captopril with a mechanism of action that inhibits the formation of angiotensin II so that there is no narrowing of the blood vessels with a peak phase 1 hour after consumption.

Consequently, the application of acupressure that has been carried out can support changes in blood pressure results after acupressure without pharmacological influence. This supports the statement of Marte, Sankar, and Partel (2024) that captopril with oral drug consumption has absorption with peak plasma concentrations reaching one hour after administration. The evaluation on the patient's last day showed changes in normal blood pressure after acupressure at three acupressure points temporarily with monitoring half an hour after acupressure.

Ister and Altinbas (2022) reported significant but short-lived improvements in systolic and diastolic pressure within an hour post-treatment, raises questions about the sustainability and clinical relevance of acupressure as a standalone therapy. Suryawan, Arneliwati, and Jumaini (2022) explained acupressure to hypertensive patients would affect blood pressure by reducing systolic and diastolic regulation. Acupressure points stimulates sensory nerve cells in the acupressure area which affects blood pressure. Bal and Gun (2024) the application of acupressure therapy in CAD patients following coronary angiography

**3**

also can effectively reduce anxiety, stabilize mean blood pressure, heart rate, and respiration.

Changes occur temporarily with a duration of less than one hour after acupressure is given. Acupressure therapy can be a complementary therapy with pharmacological administration. This statement is based on research by Düzel, Çam Yanik, Kanat, and Altun Uğraş (2023) that CAD patients undergoing angiography showed changes in pain scale, oxygen saturation, and vital signs after acupressure due to the emergence of feelings of relaxation and completion of procedures such as coronary angiography. However, over time the body will limit the neuroendocrine response which will affect hemodynamic parameters.

Nevertheless, other studies have also revealed that effects of accupressure therapy are likely to vary. This variability may results from differences in procedures, individuals, or other factors. The characteristics of patients would also influence the overall outcomes of accupressure treatment. It is also invites exploration into combining acupressure with other lifestyle or pharmacologic interventions to optimize patient outcomes (Ister, Akyüz, Yıldırım, & Çelik, 2023).

Acupressure therapy is similar to acupuncture therapy in its treatment concept, the meridians. Acupressure does not injure the body, and non-invasive actions. Massaging or pressing on meridian points, the acupuncture points, will facilitate the flow of Chi (Qi) energy to balance Yin and Yang energy in the body by stimulating the release of endorphins, which cause effects the relaxation, happiness and blood pressure dynamics (Restawan, Sjattar, and Irwan, 2023).

In essence, while this case study and supporting literature suggest promising adjunctive benefits of acupressure in blood pressure management for CAD patients, the current evidence base remains limited by small sample sizes, methodological heterogeneity, and short duration of effect. Future research should prioritize rigorous randomized controlled trials, mechanistic studies, and evaluations of long-term clinical outcomes to substantiate acupressure's role in integrative cardiovascular care.

## CONCLUSIONS

The demostrates of non-pharmaological acupressure therapy significantly reduces blood presure for Mrs. MT as a subject in this case study that providing valuable insights. The results that targeted acupresure stimulate to blood pressure regulation. While promising, these finding limited by the single-subject design, necessitating further research with larger, controlled samples and explore underlying mechanisms.

## REFERENCES

American Heart Association Council on Epidemiology and Prevention Statistics Committee and Stroke Statistics Subcommittee. (2024). Heart Disease and Stroke Statistics: A Report of US and Global Data From the American Heart Association. Circulation, 149(8), e347–e913.

Bal, S. K., & Gun, M. (2024). The effects of acupressure on pain, anxiety and vital signs in patients undergoing coronary angiography: a randomized and sham-controlled trial. Explore, 20(1), 101-109.

Huang, S., Li, L., Liu, J., Li, X., Shi, Q., Li, Y., ... & Sun, X. (2021). The Preventive Value of Acupoint Sensitization for Patients with Stable Angina Pectoris: A Randomized, Double-Blind, Positive-Controlled, Multicentre

Trial. Evidence-Based Complementary and Alternative Medicine, 2021(1), 7228033.

Ister, D., & Altinbas, Y. (2022). Effect of acupressure on the blood pressure, heart rate, and pain severity of patients who underwent coronary angiography: a randomized controlled trial. Altern Ther Health Med.

Ister, I., Akyüz, A., Yıldırım, E., & Çelik, H. (2023). The effect of acupressure on blood pressure and anxiety levels in patients after coronary angiography: A randomized controlled trial. *Journal of Cardiovascular Nursing*, 38(5), 549–553.

Kemenkes. (2022). Penyakit Jantung Penyebab Utama Kematian, Kemenkes Perkuat Layanan Primer. https://sehatnegeriku.kemkes.go.id/baca/rilis-media/20220929/0541166/penyakit-jantung-penyebab-utama-kematian-kemenkes-perkuat-layanan-primer/

Kemenkes. (2023). Penyakit Kardiovaskular sebabkan kematian terbanyak di RI. https://www.antaranews.com/berita/3742317/kemenkes-penyakit-kardiovaskular-sebabkan-kematian-terbanyak-di-ri

Nowrouzi-Sohrabi, P., Soroush, N., Tabrizi, R., Shabani-Borujeni, M., Rezaei, S., Jafari, F., Hosseini-Bensenjan, M., Stricker, B. H., van Hoek, M., & Ahmadizar, F. (2021). Effect of Liraglutide on Cardiometabolic Risk Profile in People with Coronary Artery Disease with or without Type 2 Diabetes: A Systematic Review and Meta-Analysis of Randomized Controlled Trials. Frontiers in pharmacology, 12, 618208.

Marte, F., Sankar, P., dan Patel, P. (2024). Kaptopril. Di: StatPearls [Internet]. Pulau Harta Karun (FL): Penerbitan StatPearls; 2024 Januari-. Tersedia dari: https://www-ncbi-nlm-nih-

Meliyani dan Siregar. (2023). Atasi Kelelahan Kerja Perawat dengan Terapi Akupresur. Sukoharjo: Pradina Pustaka Grup

Restawan, I. G., Sjattar, E. L., & Irwan, A. M. (2023). Effectiveness of acupressure therapy in lowering blood pressure in patients with hypertension: A systematic review. Clinical Epidemiology and Global Health, 21, 101292.

Richalet, J. P., Hermand, E., & Lhuissier, F. J. (2024). Cardiovascular physiology and pathophysiology at high altitude. Nature reviews. Cardiology, 21(2), 75–88.

Shahjehan RD, Bhutta BS. Coronary Artery Disease. (2023). In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2024 Jan.

Suryawan, P. A., Arneliwati, A., & Jumaini, J. (2022). Terapi Akupresur Terhadap Tekanan Darah pada Penderita Hipertensi: Literature Review. Jurnal Kesehatan Holistic, 6(2), 46-52.

Xu, J. X., Wu, L. X., Jiang, W., & Fan, G. H. (2021). Effect of nursing intervention based on Maslow's hierarchy of needs in patients with coronary heart disease interventional surgery. World journal of clinical cases, 9(33), 10189–10197. https://doi.org/10.12998/wjcc.v9.i33.10189

**ORIGINAL RESEARCH**

# DEEP BREATHING RELAXATION AND SANYINJIAO ACUPRESSURE THERAPY (SP6) AS A PAIN MANAGEMENT FOR PRIMARY DYSMENORRHEA IN ADOLESCENTS

**Cantika Iva Nugrahani[1], Elisa Christiana[1], Fitri Hijri Khana[2]**
[1]Madura State Polytechnic
[2]University of Bumi Persada
Corresponding Email:cantika.iva22@gmail.com

| ABSTRACT | Keywords |
|---|---|
| Dysmenorrhea, commonly known as menstrual pain, is a sensation of pain or abdominal cramps that occurs before and during the menstrual period. The use of drugs to reduce pain has negative side effects, so holistic care such as deep breathing relaxation techniques and acupressure therapy are one alternative to reduce dysmenorrhea pain. Deep breathing relaxation is a technique that involves slow and deep breathing to help reduce stress and anxiety (Trivia, 2021). While acupressure is a massage technique at certain points, proven to be effective in reducing menstrual pain. This type of research uses a quasy experiment design with a one group pretest and posttest design. The population in this study were all 2nd year female students of the Nursing Study Program at the Madura State Polytechnic. This study used purposive sampling, with the inclusion criteria of female adolescents aged 17-20 years, who had taken Holistic Care Medicine courses, experienced primary dysmenorrhea pain and did not use pharmacological therapy such as analgesics during the research data collection process. The exclusion criteria were having certain gynecological diseases or secondary dysmenorrhea and very severe pain levels. The sample in this study was 52 people. Data collection used a Visual Analog Scale measuring instrument with an intensity scale of 0-10 and a checklist of deep breathing relaxation therapy and SP6 acupressure techniques, data were processed using SPSS software version 26. Univariate analysis used frequency distribution and bivariate analysis used the Wilcoxon test with a p-value <0.05. The results of the data distribution test obtained an abnormal data distribution, so it was statistical test using the Wilcoxon test obtained a value of 0.000 (<0.05). Thus proving that the combination of deep breathing therapy and acupressure is effective in reducing primary dysmenorrhea pain in adolescents. | **Dysmenorrhea, Acupressure, Relaxation, Sanyinjiao** |

## INTRODUCTION

Dysmenorrhea, or commonly called menstrual pain, is a sensation of pain or abdominal cramps that occurs before and during the menstrual period. Almost all teenagers who experience normal menstruation feel this menstrual pain. Pain is very disruptive to activities, especially for teenagers who have many activities. Improper handling of menstrual pain can risk disrupting reproductive health in teenagers. The use of drugs to reduce pain certainly also has negative side effects. So, currently, holistic care is one of the good sciences to be developed. One of the holistic healing methods is acupressure, or the action of pressing on certain points with the aim of reducing dysmenorrhea pain. In addition, the application of deep breathing relaxation techniques is also one of the effective ways to relax.

Deep breathing relaxation techniques are techniques that involve slow, deep breathing to help reduce stress and anxiety (Trivia, 2021). This technique has been shown to be effective in reducing menstrual pain by increasing relaxation and reducing muscle tension. This technique involves deep, slow breathing, which helps slow the heart rate and lower blood pressure, thereby reducing the body's response to stress. Research shows that deep breathing relaxation can significantly reduce menstrual pain in adolescent girls. One study found that the median menstrual pain intensity before deep breathing relaxation was 5, and after therapy decreased to 0.43 on the second day and 0.83 on the third day, with a statistically significant difference ($p < 0.05$) (Trivia, 2021).

Acupressure is a traditional Chinese technique, proven effective in reducing menstrual pain, also known as dysmenorrhea, in adolescent girls. This technique involves applying pressure to certain points on the body, such as the Sanyinjiao point (SP6), which is believed to stimulate the release of endorphins, the body's natural painkillers. Endorphins are hormones that can induce feelings of relaxation and block pain receptors in the brain. Research shows that acupressure therapy can significantly reduce the intensity of menstrual pain in adolescent girls. For example, a study found that the median intensity of menstrual pain before acupressure therapy at the Sanyinjiao point was 5, and after therapy it decreased to 0.43 on the second day and 0.83 on the third day, with a statistically significant difference ($p < 0.05$) (Sari, 2021). Another study compared the effectiveness of Sanyinjiao acupressure therapy with deep breathing relaxation techniques and found that acupressure therapy was 15 times more effective in reducing primary menstrual pain (dysmenorrhea) than deep breathing relaxation techniques ($p = 0.000$, $p < 0.05$) (Natalia, 2020). The effectiveness of acupressure therapy in reducing menstrual pain is due to its ability to stimulate the release of endorphins, which can block pain receptors in the brain and create a feeling of relaxation. In addition, acupressure therapy can also improve blood circulation, which can help reduce menstrual pain by increasing blood flow to the uterus and other organs.

Based on a preliminary study conducted with 30 adolescents, it was found that all adolescents felt pain during menstruation. 19 adolescents admitted that they did not know non-pharmacological methods to relieve menstrual pain. In addition, 6 female adolescents consumed analgesics or labor pain relievers. Based on the preliminary study conducted, it can be seen that most adolescents do not know effective non-pharmacological techniques to reduce primary dysmenorrhea pain.

The combination of deep breathing relaxation and acupressure therapy is expected to be a safe and effective non-

pharmacological method to reduce menstrual pain in adolescent girls. This is a simple and non-invasive technique that is easy to learn and practice, making it an effective way to treat menstrual pain. This is a novelty in this study.

## METHOD

This type of research uses a quasy experiment design with a one group pretest and posttest design. The population in this study were all female students in the nursing study program at the Madura State Polytechnic. This study used purposive sampling, with inclusion criteria of female adolescents aged 19-22 years (late adolescents), 2nd and 3rd-year students who had taken Holistic Nursing courses, experienced primary dysmenorrhea pain during the study and did not use pharmacological therapy such as analgesics during the research data collection process. The exclusion criteria were having certain

## RESULTS

**Table 1. Frequency Distribution Based on Age of Adolescent Girls**

| Age | N | % |
|-----|----|----|
| 19 | 0 | 0 |
| 20 | 4 | 7.7 |
| 21 | 27 | 51.9 |
| 22 | 21 | 40.3 |
| **Total** | **52** | **100** |

The results of the study from 52 respondents were that, there were no respondents aged 19 years, there were 4 respondents or 4% who were 20 years old, 27 or 51.9% were 21 years old, and 21 or 40.3% were 22 years old.

**Table 2. Frequency Distribution Based on Age of Adolescent Girls Experiencing Dysmenorrhea Pre-Intervention**

gynecological diseases or secondary dysmenorrhea and students who felt very severe pain levels. The number of samples in this study was 52 people. This study was conducted from August to November 2024.

The level of dysmenorrhea pain was measured using a standard instrument with a Visual Analog Scale measuring instrument with an intensity scale of 0 - 10 (starting from no pain to, moderate pain to the worst possible pain). Acupressure therapy was performed 30 times with a duration of 5-10 seconds of pressure on the sanyinjiao point (SP6). Respondents were asked to perform deep breathing relaxation techniques during the acupressure process.

Data analysis using SPSS software version 26. Data normality test using Kolmogorov Smirnov and obtained data not normally distributed (sig <0.05), so bivariate analysis using Wilcoxon Test with p-value <0.05.

| Dismenore | Frekuensi | | | | | |
|-----------|-----------|----|----|----|----|----|
| | Nyeri Ringan | | Nyeri Sedang | | Nyeri Berat | |
| | N | % | N | % | N | % |
| **Usia** | | | | | | |
| 20 | 4 | 23.53 | 0 | 0 | 0 | 0 |
| 21 | 8 | 47.06 | 16 | 53.33 | 3 | 60 |
| 22 | 5 | 29.41 | 14 | 46.67 | 2 | 40 |
| **Total** | 17 | 100 | 30 | 100 | 5 | 100 |

Based on table 2 above, out of 52 respondents, there were 23 people who experienced mild dysmenorrhea pain with respondents aged 20 years, as many as 4 respondents (17.39%), 8 people aged 21 years and 11 respondents aged 22 years. There were 24 respondents who experienced moderate dysmenorrhea pain with a distribution of 16 respondents aged 21 years and 8 respondents aged 22 years. While there were 5 respondents who experienced severe dysmenorrhea pain with a distribution of 3 respondents aged 21 years, and 2 respondents aged 22 years

**Table 3. Frequency Distribution of Pain Levels Before and After Intervention**

| Measurement | Frequency | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Mild Pain | | Moderate Pain | | Severe Pain | | No Pain | |
| | N | % | N | % | N | % | N | % |
| Pre-intervention | 17 | 32.69 | 30 | 57.69 | 5 | 9.62 | 0 | 0 |
| Post-intervention | 37 | 71.15 | 11 | 21.15 | 0 | 0 | 4 | 7.69 |

The results of the study showed that of the 52 respondents who experienced dysmenorrhea, after the intervention, 37 respondents (71.15%) experienced mild pain, 11 respondents stated moderate pain (21.15%), no respondents experienced severe pain, and 4 respondents (7.69%) no longer felt pain.

**Table 4. Analysis of the Effectiveness of SP6 Breath Relaxation Therapy and Acupressure in Adolescent Girls with Dysmenorrhea**

| Measurement | Mean | Mean Different | SD | P Value |
|---|---|---|---|---|
| Pre-Intervention | 4.81 | 2.29 | 1,910 | 0.000 |
| Post-Intervention | 2.52 | | 1,565 | |

Table 4 shows that after intervention with deep breathing therapy and SP6 acupressure, the average intensity of dysmenorrhea pain was 2.52. The difference in the average intensity of dysmenorrhea pain before and after the intervention was 2.29 with the results of statistical tests using the Wilcoxon Test 0.000. Thus proving that deep breathing therapy and acupressure are effective in reducing dysmenorrhea pain in adolescents.

## DISCUSSION

**Dysmenorrhea Occurrence in Adolescents**

According to WHO, the age limit for adolescents is 18 to 24 years and not yet married (WHO, 2022). Adolescence is a transition period from childhood to adulthood. There are several growth and development processes, including the occurrence of menarche in adolescent girls.

Based on Mulyani's research in 2022, it was stated that the incidence of dysmenorrhea is influenced by the age of menarche or the first time menstruation occurs. Early menarche before the age of 12 years, has a greater risk of experiencing dysmenorrhea because the development of the reproductive system at that age is not yet perfect, such as the number of primary ovarian follicles is still small, resulting in low estrogen hormones which result in dysmenorrhea (Nuzula, 2019). Primary dysmenorrhea is a condition of menstrual pain that is often experienced by adolescents, usually without a clear cause in the reproductive organs. This pain often affects daily activities, concentration in learning, and the quality of life of adolescents. Dysmenorrhea is influenced by several factors such as the age of menarche and the menstrual cycle (Apsara, 2022).

Based on the research results, it was found that there were 5 respondents who experienced severe dysmenorrhea pain. Poor eating and exercise habits have a significant influence on the incidence and level of primary dysmenorrhea pain in adolescents (Taqiyah, 2022). Consumption patterns and healthy lifestyles that are carried out routinely help maintain health and immunity in the body, so that the body's metabolism is better. Of the 52 respondents in this study,

the average age was 21-22 years. Vitra, 2016 stated that the age of 21-22 years is classified as late adolescence. Marlia (2019) stated that there is a relationship between age and the treatment of dysmenorrhea in adolescents. Late-stage adolescents are better able to understand themselves well and can clearly relate abstract information to their lives, including finding effective ways to overcome the dysmenorrhea pain they experience (Marlia, 2019).

## The Effect of Deep Breathing Therapy on Reducing the Degree of Dysmenorrhea Pain

Breathing relaxation is one of the effective methods to reduce muscle tension and reduce the perception of pain. This technique works by reducing the body's physiological response to pain, namely by increasing oxygenation and stimulating the production of endorphins which function as natural pain relievers. Through deep breathing exercises, the parasympathetic nervous system is activated, thus triggering a more relaxed and comfortable body response.

Research by Smith (2018) found that deep breathing exercises have a significant effect in reducing the intensity of menstrual pain in adolescents suffering from primary dysmenorrhea. Brahim (2020) with a pre-experimental method on 60 samples found research results that were in line that deep breathing relaxation can effectively reduce menstrual pain.

If done correctly, Deep Breathing Relaxation Technique is effective in reducing dysmenorrhea pain. The relaxation steps carried out in this study were adjusted to the SOP for Deep Breathing Relaxation Technique, several stages of Deep Breathing Relaxation Technique include, closing the eyes, taking a deep breath through the nose in 3 counts, holding the breath for 5 to 10 seconds, and finally exhaling through the

mouth slowly. Deep breathing relaxation technique can relax muscles that experience spasms, improve blood flow, and stimulate the body to release hormones that have analgesic effects, such as endorphins and encephalins. These conditions can reduce pain, especially dysmenorrhea pain.

## The Effect of Acupressure Therapy on Reducing Dysmenorrhea Pain

With the increasing choice of pharmacological treatments such as nonsteroidal anti-inflammatory drugs (NSAIDs) commonly used to treat dysmenorrhea pain, non-pharmacological approaches are starting to be in high demand due to their minimal side effects and potentially high effectiveness. One of the most widely studied non-pharmacological approaches is relaxation techniques and acupressure at certain points to reduce pain intensity. Based on Table 3, the frequency distribution of pain levels before and after the intervention, it is known that there were 4 respondents who no longer felt pain.

In addition, acupressure therapy at the Sanyinjiao point (SP6) is effective in relieving menstrual pain. This is proven by Jatnika's research (2022) which states that acupressure therapy performed at the SP6 point is proven to be effective, especially if done routinely and in the long term. The SP 6 acupressure point is located about three fingers above the inner ankle, known in traditional Chinese medicine for its effects on the reproductive system and blood circulation.

According to research by Chen et al. (2019), stimulation of the SP6 point has been shown to be effective in reducing the duration and intensity of primary dysmenorrhea pain in adolescents. The effect occurs because stimulation of the SP6 point stimulates the release of endorphins, which function as natural analgesics in the body.

## The Effect of Deep Breathing Therapy and SP 6 Acupressure on Reducing the Degree of Dysmenorrhea Pain

The combination of deep breathing relaxation and Sanyinjiao acupressure provides significant results in reducing the intensity and frequency of primary dysmenorrhea pain in adolescents. A study by Zhang et al. (2020) showed that the group of adolescents who underwent this combined therapy felt a more significant reduction in pain compared to the control group who only used relaxation or acupressure methods. The use of this combined method can be a safe, practical, and affordable option, so it has the potential to be developed as a standard intervention in primary dysmenorrhea pain management. Table 3 also shows that the intervention carried out in this study by combining deep breathing relaxation techniques with SP6 acupressure therapy can reduce the scale of dysmenorrhea pain from before the intervention with a scale of mild, moderate and severe pain, to having a scale of mild pain and no pain at all.

The combination of deep breathing techniques and SP 6 acupressure can reduce the intensity of dysmenorrhea pain through the following mechanisms:

1. Increased prostaglandins will trigger uterine muscle contractions which cause pain during menstruation.
2. Relaxation of skeletal muscles experiencing spasms by performing deep breathing relaxation and pressing the SP 6 point will cause vasodilation of blood vessels, resulting in increased blood flow in areas experiencing spasms and/or ischemia.
3. Stimulates the body to activate opioid receptors which provide a strong analgesic effect on the pain experienced in the form of endorphins and enkephalins.
4. Endorphin hormones will bind to opioid receptors in the nervous system and inhibit proteins that act as pain signals.
5. The enkephalin hormone, which is an endogenous pentapeptide substance, will inhibit the process of transmitting pain signals.
6. So by doing deep breathing relaxation accompanied by massaging the SP 6 acupressure point, it can effectively reduce the pain of primary dysmenorrhea.

## CONCLUSIONS

Breath relaxation techniques and sanyinjiao acupressure therapy (sp6) can be effectively used as non-pharmacological alternatives in the treatment of primary dysmenorrhea pain in adolescents.

## REFERENCES

Amdadi, Z., Nurfadila N, Eviyanti, Nurbaeti. (2021). Gambaran Pengetahuan Remaja Putri Tentang Resiko Perkawinan Dini Dalam Kehamilan di SMAN 1 Gowa. Jurnal Inovasi Penelitian. Vol 2 No 7.

Apsara, I.K., Destariyani, E., Baska, D.Y. (2023) Hubungan Usia Menarche dan Siklus Menstruasi dengan Dismenorea. Jurnal Kebidanan Vol. 12 No.2 Oktober 2023

Bernadi M, Lazzeri L, dkk. (2017). Dysmenorrhea and related disorders. Hal 1-7

Chen, L., Hu, J., & Zhang, L. (2019). Effects of SP6 Acupressure on Primary Dysmenorrhea in Adolescent Girls: A Randomized Controlled Trial. *Journal of Pain Management*, 12(2), 159–166.

Dewi, S, Fatma SDP, Aida F, (2021). Efektivitas Masase Effleurage dan Akupresure Sanyinjiao Point Terhadap Intensitas Nyeri Haid. Jurnal Kesehatan Saelmakers PERDANA. Vol. 5 No. 1.

Ghina, T., & Widi, R. E. (2020). Hubungan Gaya Hidup dengan Kejadian Dismenore Primer pada Mahasiswi Program Studi Pendidikan Dokter Fakultas Kedokteran Universitas Tanjungpura. Jurnal Nasional Ilmu Kesehatan (JNIK). Volume 2. Edisi 3.

Hanriyani, F., Suazini, E.R. (2022). Perubahan Fisik, Emosi, Sosial dan Moral pada Remaja Putri. Jurnal Medika Cendekia Vol 9 No 1. 60-67

Hendianti, KA, Wardana NG, Karmaya INM. (2019). Hubungan antara kebiasaan olahraga dengan dismenorea primer pada Mahasiswi Pre-Klinik Program Studi Pendidikan Dokter Fakultas Kedokteran Universitas Udayana Tahun Ajaran 2017. Bali Anat Jurnal. Vol 2 No 1, Hal 9 – 25.

Jatnika, G., Asep B., Yuswandi. (2022). Pengaruh Terapi Akupresur Terhadap Intensitas Nyeri Dismenore. Vol 16. No 3. 263-269.

Marlia, T. (2019). Hubungan Antara Usia dan Tigkat Pengetahuan dengan Penanganan Dismenore Pada Remaja Putri di SMK Widya Utama Indramayu Tahun 2019. Jurnal Kesehatan Masyarakat Vol. 5 No 1 Hal 41-50.

Mulyani, Sudaryanti, & Dwiningsih. (2022). Hubungan usia menarche dan lama menstruasi dengan kejadian dismenorea primer. Jurnal of Health, Education and Literacy (J-Health), Vol 4 No 2. 104-110.

Natalia, W , Sri K, dkk. (2020). Perbandingan Efektifitas Terapi Akupresure Sanyinjio Poin dengan Teknik Relaksasi Nafas dalam untuk Menurunkan Nyeri Menstruasi pada Putri Remaja di Pesantren Asshiddiqiyah 3 Karawang. Jurnal Sistem Kesehatan (JSK) Vol 5 No 3.

Noviani, E. 2018. Hubungan Status gizi Dan Aktivitas Terhadap Kejadian Disminorhea Pada Remaja Kelas X Di SMA Bina Cipta Palembang Tahun (2017). Jurnal Kesehatan dan Pembangunan, Vol. 8, No. 16.

Nuzula dan Oktaviana. 2019. Faktor-Faktor yang Mempengaruhi Kejadian Dismenore Primer pada Mahasiswi AKademi Kesehatan Rustida Banyuwangi. Jurnal Ilmiah Kesehatan, Vol 6 No 1. 1-13.

Purwo Setiyo Nugroho, S.Km. Me. (2020). Analisis Data Penelitian Bidang Kesehatan. Pp 164.

Saputra, Koosnadi. 2017. Akupuntur Dasar. Pp 380.

Sari, AP, Arifah U. (2021) Efektifitas Akupresure Terhadap Disminore Pada Remaja. Jurnal Kedokteran dan Kesehatan. Vol 17. No 2.

Sari, D. P dan Hamranani, T. (2019) 'Pengaruh Terapi Massage Effleurage terhadap Penurunan Nyeri Haid Pada Remaja Putri di Klaten', MOTORIK Journal Kesehatan, 14(02), pp. 123–126.

Smith, J. M., Young, K., & Landis, B. (2018). Deep Breathing Exercises and Pain Relief in Primary Dysmenorrhea. *Journal of Women's Health*, 27(5), 603–609.

Statistik Indonesia. (2020). Jumlah Remaja Indonesia 2019. Badan Pusat Statistik/BPS-Statistics Indonesia. Jumlah Remaja Tahun 2019 di Indonesia. Pages: xl + 748.

Taqiyah, Y., Jama F., Najihah. (2022) Analisis Faktor yang Berhubungan dengan Kejadian Dismenore Primer. Jurnal Ilmiah Kesehatan Diagnosis Vol 17 No 1. Hal 14 – 18.

Trivia, R. (2021). Pengaruh Teknik Relaksasi Napas Dalam Terhadap Penurunan Nyeri Disminore pada Mahasiswa DIII Keperawatan. Jurnal Ilmu Kesehatan Dharmas Indonesia. Vol 1 No 2.

Yuniati M, Mareta R.( 2019). Akupresure titik Hequ Point Efektif Mengurangi Disminore pada Remaja SMP. Jurnal Kesehatan Hal 11.

Zhang, Y., Luo, R., & Wen, Y. (2020).

Combination Therapy Using Deep Breathing and Acupressure on SP6 for Primary Dysmenorrhea: A Clinical Evaluation. *Pain Research and Management*, 25(4), 221–229

Zulia A, Esti R. (2018). Akupresure Efektif Mengatasi dismenoreaa. Jurnal Perawat Nasional Indonesia. Vol 2 No 1 Hal 9.

**ORIGINAL RESEARCH**

# GRADE ANKLE BRACHIAL INDEX (ABI) AS A PREDICTOR OF PERIPHERAL ARTERY DISEASE (PAD) IN DIABETES MELLITUS PATIENTS

**Ima Rahmawati[1], Kend Ramadio Rimba Syah Yogha[2]**
Universitas Bina Sehat PPNI Mojokerto
Corresponding Email: boyyoga782@gmail.com

| ABSTRACT | Keywords |
|---|---|
| Peripheral Artery Disease (PAD) often occurs in diabetes mellitus patients. PAD can be detected early by measuring the Ankle Brachial Index (ABI). ABI measurement should be important for all Diabetes Mellitus (DM) clients and all clients at risk of DM, but is often ignored, causing PAD. The purpose of this study was to determine the Ankle Brachial Index (ABI) as a predictor of Peripheral Artery Disease (PAD) in patients with diabetes mellitus. The design of this study was descriptive with an observational study approach. The population in this study was all 113 diabetes mellitus clients in July 2024. The sampling technique used was purposive sampling, so that 100 people were obtained who met the inclusion and exclusion criteria. The research instrument used a digital tensiometer and an observation sheet. Data analysis used a frequency distribution. The results showed that the normal ankle brachial index value was 40 people (40%), respondents who experienced moderate PAD were 28 people (28%), mild PAD 16 people (16%), ABI tolerated 15 people (15%), and hardening of the arteries 1 person (1%). Data analysis suggested that almost half of the respondents had ankle brachial index PAD values consisting of moderate PAD and mild PAD. Moderate PAD occurs in obese diabetes mellitus patients and those who have suffered from diabetes mellitus for $\geq$ 5 years, and mild PAD occurs in those who have suffered from diabetes mellitus for $\geq$ 5 years and have a history of hypertension. | **ABI, PAD, Diabetes Mellitus** |

## INTRODUCTION

Peripheral Artery Disease (PAD) is a disease that causes reduced blood flow through the peripheral arteries. PAD disease can reduce blood flow to the extremities, which manifests as thigh or calf pain during activity. PAD is one of the many complications of Diabetes Mellitus (DM). Patients with high-risk PAD have high rates of morbidity and mortality, which are associated with major economic declines and reduced quality of life (Tjandra et al.,

2023). PAD, which often occurs in DM clients, can be detected early by using Ankle Brachial Index (ABI) measurements (Hariyono, 2020). ABI measurement should be important for all DM clients and for all clients at risk of DM, but is often ignored, resulting in PAD (Nasution et al., 2019). The phenomenon that occurs in Jatidukuh Village is that early detection of PAD has never been carried out by measuring ABI in diabetes mellitus patients.

WHO data for 2022 states that the prevalence of diabetes in the world is 10.5% (536.6 million) (WHO, 2022). The Indonesian Ministry of Health stated that in 2022, the prevalence of diabetes mellitus patients will be 19.47 million (Indonesian Ministry of Health, 2021). Data from the East Java Health Office in 2020 shows that the number of diabetes mellitus patients in East Java was 875,745 people, while in Mojokerto City itself, it was 4,936 people (East Java Provincial Health Service, 2021).

The results of research (Ismail et al., 2021) in Yogyakarta showed that the prevalence of PAD in type 2 diabetes mellitus patients was 16%. Subsequent research by Tjandra et al (2023) in Manado showed that the prevalence of PAD in diabetes mellitus patients was 55.8%. Another study was also conducted by (Puspitasari et al., 2023) in Surakarta, which showed that the prevalence of PAD in diabetes mellitus patients was 32.3%.

The results of a preliminary study in Jatidukuh Village on March 27 2024, on 10 diabetes mellitus clients showed an ABI value of >1.40 (hardening of the arteries) for 1 person (10%), ABI 1.01-1.40 (normal) for 5 people (50%), ABI 0.91-1.00 (tolerable) in 2 people (20%), ABI 0.81-0.90 (mild PAD) in 2 people (20%). ABI examinations have never been carried out before on diabetes mellitus clients in Jatidukuh Village.

Factors that influence the ABI value are gender, age, smoking, hypertension, diabetes mellitus, and dyslipidemia (Supriyadi et al., 2019). The ABI method can be used for diabetic clients who are suspected of having PAD with the characteristics of complaining of pain in the leg area during activities, and the wound healing process showing no progress, a history of smoking (Bubun et al., 2020). Undetected peripheral artery disease (PAD) can cause claudication, which is a series of symptoms in the form of fatigue, heaviness, cramps in the leg muscles (buttocks, thighs or calves) that occur during activities such as walking or climbing stairs, pain in the legs and/or that interfere with sleeping, wounds on the toes or feet that heal slowly, get worse, or don't heal at all (Sirait & Mustofa, 2021).

The nurse's efforts that are very important in providing nursing care with diabetes mellitus include in terms of promotive, curative, and rehabilitative services by providing counseling to DM clients about meal planning, physical exercise, and consumption of hypoglycemic drugs (Nurarif & Kusuma, 2016). One of the short-term management of diabetes is to prevent complications by doing sports, one of which is foot gymnastics (Hoda et al., 2019). ABI examination must be performed on every DM client to prevent PAD (Nasution et al., 2019). Based on this background, researchers are interested in examining the description of the Ankle Brachial Index (ABI) as a predictor of Peripheral Artery Disease (PAD) in diabetes mellitus patients.

## METHOD

This research uses a descriptive research design. The population in this study was all diabetes mellitus clients in Jatidukuh Village, Gondang District, Mojokerto Regency in July 2024, totaling 113 people. This research uses purposive sampling, a sampling technique that is by the

researcher's considerations 100 respondents (Hidayat, 2021). The sample used in this research is some of the diabetes mellitus clients in Jatidukuh Village, Gondang District, Mojokerto Regency, in August 2024, who met the inclusion and exclusion criteria were 100 people.

## RESULTS

**Table 1. Respondents Caracteristic's**

| *Peripheral Artery Disease* | **Frekuensi** | **Persentase (%)** |
|---|---|---|
| PAD heavy | 0 | 0 |
| PAD currently | 28 | 28,0 |
| PAD slight | 16 | 16,0 |
| Ditoleransi | 15 | 15,0 |
| Normal | 40 | 40,0 |
| Hardening of the Blood Vessels | 1 | 1,0 |
| **Total** | **100** | **100** |

Based on **Table 1.** showed that the majority of respondents were aged ≥ 40 years, namely 72 people (72%). Based on gender, it shows that almost all of them are women, namely 84 people (84%). Most respondents had a BMI > 27.0, namely 51 people (51%). Most respondents had suffered from diabetes mellitus for > 5 years, namely 53 people (53%). showed that the majority of respondents did not have a history of hypertension, namely 54 people (54%).

**Table 2. Frequency Distribution of Respondents Based on Peripheral Artery Disease in Jatidukuh Village, Gondang District, Mojokerto Regency, 2024**

| **Characteristics** | **n** | **%** |
|---|---|---|
| **Age** | | |
| <40 years | 28 | 28,0 |
| ≥40 years | 72 | 72,0 |
| **Gender** | | |
| Man | 16 | 16,0 |
| Woman | 84 | 84,0 |
| **IMT** | | |
| IMT <18,5 | 2 | 2,0 |
| IMT 18,5-24,9 | 32 | 32,0 |
| IMT 25,0-27,0 | 15 | 15,0 |
| IMT >27,0 | 51 | 51,0 |
| **History DM** | | |
| <5 years | 47 | 47,0 |
| ≥5 years | 53 | 53,0 |
| **History Hypertension** | | |
| Yes | 46 | 46,0 |
| No | 54 | 54,0 |
| **Total** | **100** | **100,0** |

Based on **Table 2** Showed that almost half of the respondents had normal ankle brachial index values so they did not experience PAD, namely 40 people (40%), 28 people (28%) experienced moderate PAD, 16 people (16%) had mild PAD, 15 people had tolerable ABI ( 15%), and hardening of the arteries in 1 person (1%).

## DISCUSSION

The research show that almost half of the respondents had normal ankle brachial index values so they did not experience PAD, namely 40 people (40%).

ABI is a non-invasive examination that is carried out easily using a hand Doppler and a blood pressure monitor with a normal value of 0.9-1. Factors that influence the ABI results are intrinsic factors, namely edema, diabetes mellitus which can cause potential calcification of the tunica media so that the ABI value is high, rheumatoid arthritis, and extrinsic factors, namely the

self-confidence and ability of nurses in carrying out procedures, patients cannot relax, brachial systole will be high because of the results of vascular activity, the patient's position can affect the ABI results, accuracy of cuff insertion, rapid deflation of the cuff, excessive pressure on the probe placed on the artery, causing blockage, errors in calculating results, and poor maintenance/damage to the device (Maryunani, 2018).

Researchers assume that the average ABI value of respondents is within the normal range, this is because the difference in ankle and brachial systolic pressure is not too large. The normal ABI value was also caused by the research respondents suffering from diabetes mellitus for less than 6 years, so the effect of high blood sugar levels on the arteries in the ankle area did not appear significant. Respondents with abnormal ABI can be caused by various factors such as age, obesity and smoking habits.

The research show that 28 people (28%) experienced moderate PAD. Patients with moderate PAD consisted of 26.7% of obese respondents and 29.4% of obese respondents, 50.9% of respondents with diabetes mellitus for > 5 years, and 37% of respondents with a history of hypertension. A person who is obese and insulin resistant will experience hyperplasia in perivascular adipose tissue (PVAT) and infiltration of proinflammatory immune cells which contribute to vascular inflammation and impaired endothelial function. Endothelial dysfunction accompanied by adipocyte activity in someone who is obese will encourage chronic sub-inflammatory conditions which will have an impact on the development of cardiovascular disease, including the process of atherosclerosis. Atherosclerosis that occurs in diabetes mellitus sufferers will result in poor blood circulation in the peripheral area, resulting in a decrease in ABI values (Priyantini et al.,

2022). DM patients will experience ABI abnormalities after the course of the disease is >5 years. This pathomechanism occurs due to long-term conditions of glucotoxicosis, causing endothelial dysfunction which triggers the formation of atherosclerosis. This can be exacerbated by other risk factors such as an increase in the lipid profile which causes ankle blood pressure abnormalities and has an impact on ABI (Kartikadewi et al., 2022).

Researchers assume that the higher the BMI of diabetes mellitus sufferers, the greater the chance of experiencing a decrease in ABI values. This can be caused by overweight and obese patients experiencing decreased blood flow to the legs due to fat accumulation in the blood vessels so that the systolic pressure value at the ankle is lower than at the brachial. In addition, the longer you suffer from diabetes mellitus, the higher the chance of experiencing ABI abnormalities. Conditions of high blood sugar levels cause sorbitol deposits in the endothelium and damage the lumen of blood vessels, thereby affecting peripheral vascularization, causing atherosclerosis. Thick blood due to high blood sugar levels carries free radicals in the blood vessels which then accumulate and form plaque. This will cause obstruction of blood flow to the legs so that the ABI decreases. This can cause peripheral artery disease which results in neuropathy and diabetic ulcers.

The research show that 16 respondents (16%) experienced mild PAD. Patients with mild PAD were 30.2% of respondents with a history of diabetes mellitus > 5 years, and 17.8% of respondents with a history of hypertension. The longer a person suffers from Diabetes Mellitus, the greater the risk of developing peripheral arterial disease. This happens because high blood glucose levels can weaken and damage the walls of capillary blood vessels

(Purwandari et al., 2022). Hypertension can cause thickening of the arteries, causing the diameter of the blood vessels to narrow. Narrowing of blood vessels will affect metabolic transport in the blood, so that glucose levels in the blood will be disturbed. The risk of PAD will increase in hypertensive DM sufferers with blood pressure $\geq$ 130/80 mmHg (Widiastuti et al., 2022).

Researchers assume that long-term diabetes and a history of hypertension cause mild PAD in diabetes mellitus sufferers. This is because the long time you have had diabetes for more than 5 years, the longer the blood vessels are traversed by thick blood, so that they become weaker over time, which causes blood flow to decrease further. Hypertension will make this condition worse, because to drain thick blood, the blood vessels compensate by thickening. This thickening will cause the lumen to become narrower so that blood flow to the legs decreases so that ankle pressure is lower than brachial, which causes PAD.

There was 1 respondent who experienced hardening of the arteries, namely a male respondent who was thin, aged > 40 years, had suffered from hypertension for more than 5 years, the respondent also smoked. As a person's age increases, the risk of atherosclerosis increases, where plaque attaches to the blood vessels, which often occurs in old age, where the blood vessels become harder or stiffer (Rahayu, 2023). High blood glucose levels over a long period of time cause an oxidation process in the blood vessel walls resulting in the production of Advanced Glycosylated Endoproducts (AGEs) which can cause destruction and buildup of cholesterol in the blood vessel walls. Other materials such as platelets and leukocytes that accumulate cause hardening and stiffness of blood vessel walls (Hati & Muchsin, 2021). Cigarettes contain more than 4000 chemicals and other active ingredients, one of the active ingredients is nicotine which plays a role in stimulating the release of adrenaline, increasing heart rate and blood pressure. Apart from nicotine, cigarette smoke also contains carbon monoxide (CO2), which is produced as much as 3-6% in a cigarette. Carbon monoxide can bind hemoglobin more strongly than oxygen, so that body cells and heart muscle experience a lack of oxygen and over time the blood vessels will harden because they are not properly nourished (Tampubolon et al., 2023).

Old age combined with long-standing diabetes and smoking makes respondents experience stiff arteries, this can make blood flow to the body's organs become less smooth, thus disrupting the function of these organs. This hardening of the blood vessels does not only occur in the legs but almost throughout the body so that blood flow is not smooth and causes the ABI to increase.

The research show that the majority of respondents were $\geq$ 40 years old, namely 72 people (72%). ABI values are thought to increase with age as a result of arterial stiffness. ABI values decrease with increasing age, possibly due to the increasing prevalence and progression of PAD (Nadrati & Supriatna, 2021). Researchers assume that high ABI values can be found in older respondents because the arteries are stiff, causing differences in blood flow in the legs and arms, and some are decreased because the respondents are smokers.

The research show that almost all of them are women, namely 84 people (84%). According to Beckman (2005), women are more likely to suffer from DM due to premestrual syndrome and post menopause which causes the distribution of fat in the body to accumulate due to estrogen hormonal disorders. A decrease in the hormone estrogen results in vasoconstriction

in blood vessels, increasing levels of low-density lipoprotein (LDL), the process of forming fatty streaks, which is a precursor of atheroma, to the formation of atherosclerosis in the visceral branch arteries, resulting in impaired circulation of blood vessels in the lower extremities, known as PAD ( Widiastuti et al., 2022). Researchers assume that with increasing age, women lose the protective hormone estrogen, causing high levels of CRP and fibrinogen, which increase blood viscosity, causing thrombus formation in the blood vessels, which causes the blood vessels to narrow and blood flow is not smooth, resulting in PAD.

The majority of respondents did not have a history of hypertension, namely 54 people (54%). Hypertension plays a major role in abnormal ABI values. This is because in hypertensive sufferers there is vascular blockage which causes a progressive increase in systolic blood in the lower extremities, causing abnormal ABI values (Kartikadewi et al., 2022). Researchers assume that respondents who do not have a history of hypertension tend to have a normal ABI, while those who have a history but normal ABI values could be because the patient has recently suffered from diabetes mellitus so that the effects of ABI abnormalities have not yet been detected, even though there are indications that the systolic value in the ankle area is lower. from the brachial, due to blockage of blood vessels leading to the lower extremities.

## CONCLUSIONS

The ankle brachial index value in diabetes mellitus patients in Jatidukuh Village, Gondang District, Mojokerto Regency, almost half of the respondents experienced PAD, namely 44 people (44%), consisting of moderate PAD as many as 28 people (28%) and mild PAD 16 people (16%) .

## REFERENCES

Bubun, J., Yusuf, S., Syam, Y., Hidayat, W., & Usman, S. (2020). Skrining Kaki Diabetes Untuk Deteksi Dini Luka Kaki Diabetes pada Pasien Diabetes. *Jurnal Ilmiah Keperawatan (Scientific Journal of Nursing)*, *6*(2), 192–198.

Hariyono. (2020). *Buku Ajar Asuhan Keperawatan Sistem Cardiovaskuler Untuk Profesi Ners.* http://repo.stikesicme-jbg.ac.id/4813/1/3. Buku Ajar Cardio.pdf

Hati, Y., & Muchsin, R. (2021). Senam Kaki Untuk Melancarkan Airan Darah Perifer Peserta Diabetes Mellitus Tipe 2. *JUKESHUM: Jurnal Pengabdian Masyarakat*, *1*(2), 71–77. https://doi.org/10.51771/jukeshum.v1i2.158

Hidayat, A. A. (2021). *Metode Penelitian Keperawatan dan Tenik Analisis Data* (1st ed.). Jakarta: Salemba Medika.

Hoda, F. S., Sani Mahoklory, S., & Elferson Lusi, O. (2019). Pengaruh Terapi Senam Kaki Terhadap Sensitivitas dan Perfusi Jaringan Perifer Pasien Diabetes Mellitus di Ruangan Instalasi Rawat Inap RSUD Prof. Dr. W. Z. Johannes Kupang. *Keperawatan Dan Kesehatan Masyarakat*, *8*(2), 2598–4217.

Ismail, M. T., Hariawan, H., Lutfie, F. F. A., Nugroho, D. B., Susanti, V. Y., Anggraeni, V. Y., Kadafi, S. N., Ayuningtyas, R., Tarigan, T., Triatmaja, R., Artayasa, I. P. A., Ramadhan, G., & Hidayat, S. (2021). Prevalence and Risk Factors of Peripheral Arterial Disease in type 2 Diabets Mellitus in Yogyakarta, Indonesia. *ACI (Acta Cardiologia Indonesiana)*, *7*(2), 5. https://doi.org/10.22146/jaci.v7i2.3520

Kartikadewi, A., Setyoko, S., Wahab, Z., &

Andikaputri, K. (2022). Ankle Brachial Index pada Penderita Diabetes dan Non Diabetes, dan Hubungannya dengan Aktivitas Fisik dan Perilaku Merokok. *Jurnal Kedokteran Dan Kesehatan*, *18*(1), 57. https://doi.org/10.24853/jkk.18.1.57-68

Maryunani, A. (2018). *Perawatan Luka (Modern Woundcare) Terlengkap dan Terkini*. In Media.

Nadrati, B., & Supriatna, L. D. (2021). *Buerger Allen Exercise Dan Ankle Brachial Indeks (ABI) Pada Penyandang Diabetes Melitus*. Pekalongan: Nasya Expanding Management.

Nasution, W. W., Heryaman, H., Martha, J. W., & Ridwan, A. A. (2019). Clinical Manifestation of Peripheral Artery Disease in Type 2 Diabetes Melitus with Ankle Branchial Index Measurement. *Journal of Medicine & Health*, *2*(3), 847–855. https://doi.org/10.28932/jmh.v2i3.1224

Nurarif, A. H., & Kusuma, H. (2016). *Asuhan Keperawatan Berdasarkan Diagnosa Medis & NANDA NIC – NOC*. Yogyakarta: Mediaction.

Priyantini, D., Ambar, N., Prinka, S., & Hanggitriana, A. (2022). Indeks Massa Tubuh Pada Penderita Diabetes Melitus Dengan Nilai Ankle Brachial Index. *Jurnal Ilmiah Keperawatan Stikes Hang Tuah Surabaya*, *17*(2), 144–149.

Purwandari, C. A. A., Wirjatmadi, B., & Mahmudiono, T. (2022). Faktor Risiko Terjadinya Komplikasi Kronis Diabetes Melitus Tipe 2 pada Pra Lansia. *Amerta Nutrition*, *6*(3), 262–271. https://doi.org/10.20473/amnt.v6i3.2022.262-271

Puspitasari, M., Mahmuda, I. N. N.,

Chandra, I. E. F., & Najib, Y. A. (2023). Hubungan Kadar Hba1c dan Kolesterol Total dengan Kejadian Peripheral Arterial Disease pada Pasien Diabetes Mellitus Tipe 2. *Syntax Literate ; Jurnal Ilmiah Indonesia*, *8*(11), 6416–6423. https://doi.org/10.36418/syntax-literate.v8i11.13930

Rahayu, T. G. (2023). Analisis Faktor Risiko Terjadinya Stroke Serta Tipe Stroke. *Faletehan Health Journal*, *10*(01), 48–53. https://doi.org/10.33746/fhj.v10i01.410

Sirait, C. N., & Mustofa, S. (2021). Diagnosis dan Penatalaksanaan Penyakit Arteri Perifer. *Majority*, *10*(1), 1–10. http://repository.lppm.unila.ac.id/id/eprint/34916

Supriyadi, Dewi, N., Hamzah, P., & Selwir, E. W. (2019). Nilai Ankle Brachial Index Pada Penderita Diabetes Melitus Tipe 2. *Jurnal Penelitian Keperawatan*, *5*(2). https://doi.org/10.32660/jpk.v5i2.402

Tampubolon, L. F., Ginting, A., & Saragi Turnip, F. E. (2023). Gambaran Faktor yang Mempengaruhi Kejadian Penyakit Jantung Koroner (PJK) di Pusat Jantung Terpadu (PJT). *Jurnal Ilmiah Permas: Jurnal Ilmiah STIKES Kendal*, *13*(3), 1043–1052. https://doi.org/10.32583/pskm.v13i3.1077

Tjandra, K. J. C., Martin, A., Drew, C., Lestari, M., & Debora, E. (2023). Hubungan antara faktor GDP dengan kejadian PAD pada pasien Diabetes Melitus tipe 2 di RSUP Prof Dr.R.D.Kandou Manado. *Jurnal Kesehatan Tambusa*, *4 (3)*(September), 2342–2346.

WHO. (2022). *World Health Statistics 2022*.

Widiastuti, L., Wati, L., Siagian, Y., &

Sitindaon, S. H. (2022). Deteksi Dini Peripheral Arterial Disease pada Penderita Diabetes Mellitus Tipe 2. *Media Karya Kesehatan*, *5*(1), 15–31. https://doi.org/10.24198/mkk.v5i1.353 84

**ORIGINAL RESEARCH**

# EFFECTIVENESS OF ERGONOMIC EXERCISE ON BLOOD SUGAR IN DIABETES MELLITUS PATIENTS

**Lutfi Wahyuni[1], Umi Azizah Kusumaningrum[2]**
Universitas Bina Sehat PPNI Mojokerto
Corresponding Email: ltf.hidayat@gmail.com

| ABSTRACT | Keywords |
|---|---|
| Diabetes is a chronic metabolic disorder characterized by hyperglycemia because the pancreas is unable to produce enough insulin and the body is unable to use insulin effectively. If diabetes mellitus is not treated properly, it will cause acute and chronic complications. Physical activity training is one of the non-pharmacological management of diabetes mellitus. One form of physical activity training is ergonomic gymnastics. This study aims to determine the effect of ergonomic exercises on blood sugar levels in patients with diabetes mellitus in Krembung Public Health Center. This research is a quantitative study using Pre-Experimental Design One Group Pre- Test Post-Test with 36 respondents. This study shows that there is a decrease in the average blood sugar level on the first day of 234 mg/dL to 209.5 mg/dL, on the second day the average blood sugar level from 211.5 mg/dL to 187.7 mg/dL while the average blood sugar level of the third meeting from 175.7 mg/dL to 148.8 mg/dL. Ergonomic gymnastics involves the main muscles that can make insulin receptors increase and more sensitive so as to reduce blood sugar levels. This is evidenced by the results of the analysis using the Paired T-Test test obtained a p-value of 0.000 ($<0.05$) which shows the effect of ergonomic exercises on blood sugar levels in patients with diabetes mellitus in Krembung Public Health Center. Based on the results of this study, ergonomic exercises are important to be done routinely in patients with diabetes mellitus to reduce blood sugar levels. | **Blood Sugar Levels, Diabetes Mellitus, Ergonomic Exercises** |

## INTRODUCTION

People with diabetes mellitus often experience conditions of hyperglycemia or hypoglycemia (Muhaimin et al., 2024). This condition can occur if diabetics are unable to control their blood glucose levels and can cause the risk of instability in blood glucose levels (Wilda et al., 2022). The phenomenon that often occurs is that

there are still many patients who experience instability in glucose levels. The impact on patients who experience instability in blood sugar levels is macrovascular disease (such as coronary heart disease, leg blood vessels and blood vessels to the brain) and microvascular diseases such as nephropathy, retinopathy and neuropathy (Hasina, 2022). One way to overcome or stabilize blood sugar levels in patients with diabetes mellitus is to do ergonomic exercises. In 2021, there were 19.47 million people with diabetes in Indonesia (Nurisyah & Dewi, 2024). In 2019 the incidence rate of diabetes mellitus in East Java was 807.7 and in 2021 it reached 867.26 (93.3%) cases. Thus, the incidence of diabetes mellitus has increased since the last 3 years (Dinkes, 2022). Diabetes mellitus in East Java province ranks fifth highest in prevalence at 2.6%. In 2019, Sidoarjo district was the second highest in East Java with 72,291 people with diabetes mellitus (Kemenkes, 2018). Based on data from the Sidoarjo Health Office in 2022, the incidence of diabetes mellitus in Krembung Community Health Center, Sidoarjo Regency was 90 people. Management of patients with diabetes mellitus can be with pharmacological therapy and non-pharmacological therapy (Dewi et al., 2023). One of the non-pharmacological therapies that can be the solution is to do ergonomic exercises (Raveendran et al., 2018). This ergonomic exercise involves the main muscles so that it causes increased permeability in the contracting muscles, insulin receptors will be numerous and more sensitive. By doing ergonomic exercises can reduce blood glucose levels by increasing glucose uptake by muscles (Rivai & District, 2020).

## METHOD

This study used an experimental analytic research design of preexperimental type with a pretest-post test one group design approach. The study population was all diabetics in the Krembung Health Center Work Area, Sidoarjo Regency with purposive sampling technique obtained 36 respondents. Independent variable ergonomic gymnastics and dependent variable Blood glucose levels. After the data is collected, editing, coding and tabulating are done. Test analysis using Paired t-Test Test.

## RESULTS

**Table 1. Distribution of Respondents based on General Data**

| Characteristics of Respondents | F | % |
|---|---|---|
| **Age** | | |
| 26-35 Years | 1 | 2,8 |
| 36-45 Years | 3 | 8,3 |
| 46-55 Years | 14 | 38,9 |
| 56-65 Years | 16 | 44,4 |
| >65 Years | 2 | 5,6 |
| **Gender** | | |
| Men | 8 | 22,1 |
| Women | 28 | 77,8 |
| **Education** | | |
| No School | 3 | 8,3 |
| Elementary | 18 | 50,0 |
| High School | 14 | 38,9 |
| Collage | 1 | 2,8 |
| **Use of Blood-Lowering Drugs** | | |
| Insulin Oral | 36 | 100 |
| Insulin Injeksi | 0 | 0 |

Based on table 1 shows that the data of almost half of the respondents aged 56-65 years as many as 16 people (44.4%). based on gender shows that almost all respondents are female as many as 28 people (77.8%). Based on education shows that half of the respondents have basic education (elementary school, junior high school) as many as 18 people (50.0%). based on work shows that almost half of the respondents do not work as many as 16 people (44.6%). based on the use of drugs to lower blood sugar levels shows that all respondents use oral blood sugar lowering drugs (Oral insulin) as many as 36 people (100%).

**Table 2 Frequency distribution of respondents based on blood sugar levels of diabetes mellitus patients before ergonomic gymnastics at Krembung Community Health Center, Sidoarjo Regency.**

| Blood sugar levels | Day-1 | | Day-2 | | Day-3 | |
|---|---|---|---|---|---|---|
| | F | % | F | % | F | % |
| <60mg/dL | 0 | 0 | 0 | 0 | 0 | 0 |
| 60-200 mg/dL | 7 | 19,4 | 11 | 30,6 | 27 | 75 |
| >200mg/dL | 29 | 80,6 | 25 | 69,4 | 9 | 25 |
| Total | 36 | 100 | 36 | 100 | 36 | 100 |
| Minimum | 150 | | 135 | | 102 | |
| Maximal | 362 | | 303 | | 232 | |
| Mean | 234 | | 211,5 | | 175,7 | |
| Std. Deviation | 49,13 | | 36,01 | | 32,94 | |

Table .2 shows that at the 1st day meeting, the blood sugar levels of respondents before ergonomic exercise were almost entirely in the category of >200 mg/dL, namely 29 people (80.6%). On the second day the respondents' blood sugar levels before ergonomic exercise were mostly >200 mg/dL, namely 25 people (69.4%) with an average of 211.5 mg/dL. While on the third day the respondents' blood sugar levels before ergonomic exercises were mostly between 60-200 mg/dL, namely 27 people (75%) with an average of 175.7 mg/dL. Blood sugar levels in patients with diabetes mellitus in Krembung Public Health Center, Sidoarjo Regency on the first and second days before ergonomic exercises were performed, the average blood sugar levels were in the hyperglycemia category, while the average blood sugar levels before ergonomic exercises were in the normal category. This is because at the 3rd meeting the patient has received ergonomic exercises 2 times.

**Table 3 Frequency distribution of respondents based on blood sugar levels of diabetes mellitus patients after ergonomic exercises at Krembung Community Health Center, Sidoarjo Regency.**

| Blood sugar levels | Day-1 | | Day-2 | | Day-3 | |
|---|---|---|---|---|---|---|
| | F | % | F | % | F | % |
| <60mg/dL | 0 | 0 | 0 | 0 | 0 | 0 |
| 60-200 mg/dL | 19 | 52,8 | 25 | 69,4 | 33 | 91,7 |
| >200mg/dL | 17 | 47,2 | 11 | 30,6 | 3 | 8,3 |
| Total | 36 | 100 | 36 | 100 | 36 | 100 |
| Minimum | 122 | | 112 | | 85 | |

| *Maximal* | 328 | 264 | 219 |
|---|---|---|---|
| Mean | 209,5 | 187,3 | 148,8 |
| Std. Deviation | 46,89 | 34,96 | 31,97 |

Table 3 shows that on the first day after ergonomic exercise, most of the respondents' blood sugar levels were 60-200 mg/dL, namely 19 people (52.8%) with an average of 209.5 mg/dL. On the second day the respondents' blood sugar levels after ergonomic exercise were mostly between 60-200 mg/dL, namely 25 people (69.4%) with an average of 187.3 mg/dL. Whereas on the third day the respondents' blood sugar levels after ergonomic exercise were almost entirely between 60-200 mg/dL, namely 33 people (91.7%) with an average of 148.8 mg/dL. On the first day the average blood sugar level of respondents was in the hyperglycemia category. However, on the second and third day meetings the average blood sugar levels of respondents after being given ergonomic exercises were in the normal category. This is because the patient has received ergonomic exercises 2 times within 50 minutes at the previous meeting.

**Table 4 Tabulation of data on the effect of ergonomic exercises on blood sugar levels in patients with diabetes mellitus in krembung public health center, sidoarjo district.**

| Blood sugar levels | N | Mean | Modus | Median | Std. Deviasi | Min-max |
|---|---|---|---|---|---|---|
| Pretest Day-1 | 36 | 234 | 278 | 226,5 | 49,13 | 150-362 |
| Posttest Day-1 | 36 | 209,5 | 190 | 198,5 | 46,89 | 122-328 |
| **Paired t- test results with a p-value of 0.000, t Count = 12.730** | | | | | | |
| Pretest Day-2 | 36 | 211,5 | 204 | 210,5 | 36,01 | 135-303 |
| Posttest Day-2 | 36 | 187,7 | 190 | 188 | 34,96 | 112-284 |
| **Paired t- test results with a p-value of 0.000, t Count = 17.588** | | | | | | |
| Pretest Day-3 | 36 | 175,7 | 170 | 174 | 32,9 | 102-232 |
| Posttest Day-3 | 36 | 148,8 | 140 | 144,5 | 31,9 | 85-219 |
| **Paired t- test results with a p-value of 0.000, t Count = 18.605** | | | | | | |

Table 4 shows that on the first day before ergonomic exercises from 36 respondents, the average blood sugar level of respondents was 234 mg/dL, while the average blood sugar level after ergonomic exercises was 209.5 mg/dL. Based on the Paired t-Test test for blood sugar levels on the first day before and after ergonomic exercise, with a p-value (asymp.sig 2 tailed) of 0.000 <0.05. This shows that there is a difference in blood sugar levels before and after ergonomic exercise, so there is a decrease in blood sugar levels. So it can be concluded that there is an effect of ergonomic exercises on blood sugar

levels in patients with diabetes mellitus. On the second day before ergonomic exercises from 36 respondents, the average blood sugar level of respondents was 211.5 mg/dL, while the average blood sugar level after being given ergonomic exercises was 187.7 mg/dL. Based on the Paired t-Test test for blood sugar levels on the first day before and after being given ergonomic exercise, with a p-value (asymp.sig 2 tailed) of

0.000 < 0,05. This shows that there is a difference in blood sugar levels before and after ergonomic exercise, so there is a decrease in blood sugar levels. So it can be concluded that there is an effect of ergonomic gymnastics on blood sugar levels in patients with diabetes mellitus.

## DISCUSSION

1. Blood Sugar Levels Before Ergonomic Gymnastics

Based on the results of the study, it shows that the average value of blood sugar levels in 36 respondents before being given the ergonomic exercise intervention at the first meeting was 234 mg/dL, at the second meeting with an average value of 211.5 mg/dL. The average results of blood sugar levels at the first and second meetings were included in the hyperglycemia category.

While the average value at the third meeting was 175.7 mg/dL. at the 3rd meeting the average blood sugar level of respondents was in the normal category, namely 60-200 mg/dL. The results of the study were supported by (Febrianti et al., 2021) that the results of research conducted by researchers on 15 respondents showed that the average value of blood sugar levels before diabetic foot exercises was 304.40 mg/dL, where the sugar level was classified as high.

A person can be said to have a risk of diabetes mellitus when the blood sugar level at any time has a result of> 200 mg/dL. Diabetes mellitus itself is a chronic metabolic disorder because the pancreas is unable to produce enough insulin or the body cannot use the insulin produced effectively, causing an increase in blood glucose levels. Increased blood sugar levels can be caused by several risk factors, such as age, lack of physical activity, gender, unhealthy diet.

2. Blood Sugar Levels After Ergonomic Gymnastics.

Based on the results showed that the average value of blood sugar levels in 36 respondents after being given ergonomic gymnastics intervention at the first meeting was 209.5 mg/dL, at the second meeting with an average value of 187.3 mg/dL. While the average value at the third meeting was 148.8 mg/dL. It can be concluded that blood sugar levels in patients with diabetes mellitus in Krembung Public Health Center have decreased every meeting after being given an ergonomic exercise intervention. The average decrease in blood sugar levels in patients with diabetes mellitus after doing ergonomic exercises with 50 minutes is 25.27 mg/dL. From the results of the study showed that there were changes in blood glucose levels after doing gymnastics, researchers assume that the decrease in blood sugar levels after gymnastics is due to the use of energy burned by cells that use blood glucose using insulin catalysts. Ergonomic gymnastics involves the main muscles so that it causes increased permeability in the contracting muscles, insulin receptors will be many and more sensitive. By doing ergonomic exercises can reduce blood glucose levels by increasing glucose uptake by muscles and improving insulin use and improving blood circulation. When

ergonomic exercises are performed where each movement relaxes the body and moves the muscles to the maximum, the muscles in the body will react by using stored glucose so that the stored glucose will decrease.

3. Effect of Ergonomic Gymnastics on Blood Sugar Levels

This study proves that at the first meeting there is a difference in the average value of sugar levels before being given ergonomic gymnastics intervention and after being given ergonomic gymnastics, namely from the pretest results of 234 mg / dL and posttest results of 209.5 mg / dL with the results of the Paired t-Test Test obtained p-value (asymp.sig 2 tailed) of 0.000 <0.05, so that H1 is accepted, which means that there is an effect of ergonomic gymnastics on blood sugar levels in patients with diabetes mellitus in Pukesmas Krembung Sidoarjo Regency.

The results of the second meeting also showed differences in the average value of sugar levels before being given ergonomic exercise interventions and after being given ergonomic exercises, namely from the pretest results of 211.5 mg/dL and posttest results of 187.7 mg/dL with the results of the Paired t-Test Test obtained p-value (asymp.sig 2 tailed) of 0.000 <0.05, so that H1 is accepted, which means that there is an effect of ergonomic exercises on blood sugar levels in patients with diabetes mellitus in Krembung Public Health Center, Sidoarjo Regency.

The results of the third meeting also showed differences in the average value of sugar levels before being given ergonomic exercise interventions and after being given ergonomic exercises, namely from the pretest results of 175.7 mg/dL and posttest results of 148.8 mg/dL with the results of the Paired t-

Test Test obtained p-value (asymp.sig 2 tailed) of 0.000 <0.05, so that H1 is accepted, which means that there is an effect of ergonomic exercises on blood sugar levels in patients with diabetes mellitus in Krembung Public Health Center, Sidoarjo Regency.

## CONCLUSIONS

Based on the results of this study, there is an effect of ergonomic exercises on blood sugar levels in patients with diabetes mellitus in Krembung Public Health Center at every first, second and third meeting using the Paired T-Test Test with a p-value of 0.000 or $<\alpha$ (0.05). The more routine diabetes mellitus patients do ergonomic exercises, the more normal the patient's blood sugar levels are expected.

## REFERENCES

Dewi, R., Budhiana, J., Fatmala, S. D., Yulianti, M., & Arsyi, D. N. (2023). *Pengaruh Senam Diabetes terhadap Penurunan Kadar Gula Darah , Stres , dan Kecemasan pada Penderita Diabetes Melitus Tipe II*. 6(2), 300–318.

Dinkes, K. M. (2022). *Profil Kesehatan Provinsi Jawa Timur*.

Febrianti, N., Wijaya, I., & Kio, A. (2021). PENGARUH SENAM ERGONOMIK TERHADAP PENURUNAN KADAR GULA DARAH PADA LANSIA DENGAN DIABETES MELITUS DI DESA SIDAKARYA, DENPASAR SELATAN. *Jurnal Ilmiah PANNMED (Pharmacist, Analyst, Nurse, Nutrition, Midwivery, Environment, Dentist)*, *16*, 364–368. https://doi.org/10.36911/pannmed.v16i2.1116

Hasina, S. N. (2022). Reducing blood glucose levels in the elderly with diabetes mellitus using ergonomic exercise based on spiritual care.

**27**

*International Journal of Health Sciences*, *6*(July), 6650–6658.

Kemenkes, R. (2018). *Laporan Riskesdas*. Kementerian Kesehatan Republik Indonesia. https://dinkes.babelprov.go.id/sites/default/files/dokumen/bank_data/20181228 - Laporan Riskesdas 2018 Nasional-1.pdf

Muhaimin, A., Rohman, H. F., & Fauzi, A. K. (2024). *Effect of Ergonomic Exercise on Blood Glucose Levels and Anxiety in Type 2 Diabetes Mellitus Patients*. *01*(01), 9–15.

Nurisyah, A. A., & Dewi, R. (2024). EDUKASI HIDUP SEHAT UNTUK PENCEGAHAN DIABETES DENGAN PEMANFAATAN SERBUK INSTAN KAYU SECANG, KAYU MANIS, JAHE DAN SEREH BAGI WARGA KELURAHAN SAMBUNG JAWA KOTA MAKASSAR. *Jurnal Pengabdian Kefarmasian*, *5*(1).

Raveendran, A. V, Chacko, E. C., & Pappachan, J. M. (2018). Non-pharmacological Treatment Options in the Management of Diabetes Mellitus. *European Endocrinology*, *14*(2), 31–39. https://doi.org/10.17925/EE.2018.14.2.31

Rivai, A., & District, B. (2020). EFFECT OF ERGONOMIC EXERCISE ON CHANGES IN BLOOD SUGAR LEVELS IN DIABETES MELLITUS PATIENTS IN THE IN PATIENT ROOM OF DR. ABDUL RIVAI BERAU DISTRICT. *Jurnal Ilmu Kesehatan*, *8*(2), 143–154.

Wilda, L. O., Hutama, F. H., & Kuntari, D. (2022). THE EFFECT OF ERGONOMIC GYMNASTICS ON CHANGES OF BLOOD SUGAR LEVELS IN ELDERLY WITH DIABETES MELITUS. *Nursing Analysis: Journal of Nursing Research*, *2*(2), 128–134.

**ORIGINAL RESEARCH**

# REPOSITIONING AS AN INTERVENTION FOR STROKE PATIENTS WITH PRESSURE ULCER RISK - A CASE STUDY

**Rizky Meuthia Pratiwi[1], Umi Endah[2]**
Universitas Bina Sehat PPNI
Corresponding Email: rizkymeuthiaubsppni@gmail.com

| ABSTRACT | Keywords |
|---|---|
| The risk of pressure ulcers are a risk that can occur in patients with stroke. Limited activity and disorders of motor nerves make it difficult for patients to mobilize, resulting in prolonged bed rest. If the risk of pressure sores is left unchecked, a new problem will emerge, namely pressure sores or what is known as pressure ulcers. Repositioning is one solution so that patients can mobilize even in bed. The aim of this research was to conduct a case study analysis of two stroke patients who experienced immobilization and were at risk of pressure ulcers. Using descriptive design with interview techniques, observation, physical examination and documentation. The Braden score instrument is also used as a basis for assessing the risk of decubitus pressure ulcers before and after repositioning. The results of the initial assessment showed that client 1 had a Braden scale score of 10, client 2 had a Braden score of 13 and client 3 had a Braden score of 14, meaning a high risk of pressure sores. Next, repositioning intervention was carried out for 3 days every 2 hours. Other implementations include monitoring weight and changes, using barriers such as lotion or water-absorbing pads at pressure points or bony prominences, patients are also given special mattresses, and administration of corticosteroids is excluded. The results of the 3 day evaluation were that there were no pressure sores found on the client and a reduction in the risk of pressure sores with the achievement of an increase in the Braden score, namely Patient 1 had an increase in the Braden score from a score of 13 (moderate risk of pressure sores) to 15 (mild risk of pressure sores), patient 2 experienced an increase in the Braden score from 13 to 15. Patient 3, a score of 14 to 16 which from a moderate risk to a mild risk of pressure sores. Implementation of intervention delivery repositioning In patients who comply every 2 hours, it is very effective in preventing the occurrence of pressure sores (decubitus) compared to not providing intervention repositioning. So this intervention can be recommended | **Repositionin, Risk Of Pressure Ulcers, Stroke** |

## INTRODUCTION

Stroke patients can experience impaired neurological function which causes reduced mobility or paralysis of the limbs, causing the patient to experience bed rest for a long time. The location of pressure ulcers most often occurs in the sacrum, buttocks and heels due to pressure and friction in these areas. This is a serious matter because it can increase morbidity, mortality, and requires intensive care, as well as increase the length of time the client is treated.

Prevalence stroke in Indonesia, as many as 10.9 per 1,000 residents experienced it stroke as of 2018 and prevalence stroke in East Java it reached 12.4 per 1000 population (Indonesian Ministry of Health, 2019). The incidence of pressure sores in Indonesia reaches 33.3%, which is quite high compared to the prevalence of pressure ulcers in Southeast Asia, which is only around 2.1-31.3% (Ministry of Health of the Republic of Indonesia, 2023). In Surabaya, East Java, it was found that the average Braden score in stroke patients was 9.87, which means they were at high risk of developing decubitus injuries, however 13.7% of stroke patients developed decubitus (Manan et al., 2024) Data at RSPAL Dr Ramelan Surabaya shows that the number of stroke patients being treated at the room stroke centre in September-November 2023 there were 223 patients, namely 74 patients in September 2023, 65 patients in October 2023 and 84 patients in November 2023 (RSPAL Dr. Ramelan Surabaya, 2023). The number of stroke patients who experienced decubitus from September-November 2023 was 8 people (3.6%) of the total number of stroke patients treated (RSPAL Dr. Ramelan Surabaya, 2023). The results of a preliminary study on 15-18 December 2023 in the Stroke Center Room at RSPAL Dr. Ramelan Surabaya, which was carried out on 5 stroke patients using the Braden scale, showed that 3 patients (60%) were in the high risk category of experiencing decubitus wounds, 1 patient (20%) was on the moderate risk category of having decubitus wounds, and 1 patient (20%) was in the low risk category of having decubitus wounds. Patients who lie or sit for a long time (more than 2 hours) transfer body weight to the patient's bones and cause pressure. This pressure reduces blood flow to body tissues, causing ischemia. This reduction in blood flow (ischaemia) can damage the integrity of the skin and, if left untreated, can cause pressure sores (Potter & Perry, 2015). Pressure on protruding body surfaces can increase capillary pressure in the tissues, resulting in circulation problems. Tissue hypoxia occurs, tissue is damaged, and ultimately necrosis. It is estimated that 30 to 240 minutes is the critical duration of tissue ischemia that can cause pressure sores to form and pressure sores will form 72 hours after compression. (Amirsyah et al., 2020).

The impact of pressure ulcers is felt by patients in the form of increased patient morbidity, pain in the pressure area, affecting emotionally, mentally, physically and socially. The impact of pressure ulcers on the family is associated with relatively high care and treatment costs. Impact of pressure sores this is also felt by health workers, namely increasing the workload of nurses for pressure ulcer treatment. The large impact of pressure sores illustrates the importance of preventive measures against pressure sores (Tarigan et al., 2019). The risk of pressure ulcers can be minimized by mobilizing clients early and this mobilization should begin 24-48 hours after a stroke in clients whose clinical and hemodynamic conditions are stable (Sabbrina & Khamid, 2022).

Repositioning has benefits in preventing pressure sores in clients undergoing treatment in hospital, especially in clients aged 41-60 years. At this age, several changes occur such as thinning of skin tissue, loss of fat tissue, decreased sensory perception function, increased fragility of blood vessels (Kusumah, 2021).

The results of research (Wardani & Nugroho, 2022) show that repositioning every 2 hours can reduce the risk of pressure sores in sufferers, especially post-stroke. Farida et al (2019) in their research also showed that giving a tilted position or repositioning effective in reducing the degree of decubitus wounds. Preventing pressure ulcers is very important in order to minimize pain and improve the quality of life both physically and socially and even reduce the risk of death for clients and prevent long treatment times. Methods for preventing and treating pressure sores can range from risk assessment, skin assessment, activity management, good nutrition, to supporting the client's bed surface and applying repositioning (Primalia & Hudiyawati, 2020).

## METHOD

This research uses a case study with a nursing process approach. The research subjects were three people who met the inclusion criteria, including patients with stroke, patients who experienced mobility problems and the Braden score showed a high risk and the exclusion criteria were stroke patients with complications. The case study was carried out over 3 days. Repositioning is carried out every 2 hours. Data collection using nursing care format instruments, Braden scores and data analysis using explanatory text.

## RESULTS

Patient 1 experienced complete bed rest with a diagnosis of stroke infarction due to immobilization due to muscle weakness in the right (0/0) and left (5/5) extremities, resulting in the patient not having any movement, movement was very limited because the right side was weak, the examination results showed a Braden score of 13 (moderate risk of developing pressure sores), body temperature 37.10C The skin on the protruding part feels warm, the patient's nutritional intake is inadequate, he sweats so

much that it makes the surface of the skin wet, there is an area of reddish bony prominences in the sacrum area, and he is at high risk of developing pressure sores due to long-term immobilization. The results of the assessment of the second and third patients showed the same results where the Braden score for patient 2 was 13 and Patient 3 was 14, so they were classified as being at moderate risk of developing pressure ulcers.

The risk of pressure ulcers occurs because the three patients are stroke patients with immobilization or very limited mobilization due to nerve damage which causes paralysis of the right extremity which makes the patient unable to mobilize. Immobilization for a long time will cause the protruding parts of the body to experience pressure and friction with the base of the bed, putting them at risk of excessive pressure if appropriate intervention is not given. Because the intervention is: repositioning is given to overcome the risk of pressure ulcers. The nursing diagnosis for the three patients was the same, namely risk of pressure ulcers (SDKI, D.0144) proven by a history of stroke.

This diagnosis was made because many risk factors were found that caused the risk of pressure ulcers in the three patients, namely Braden scale score <18, decreased mobilization, increased skin temperature 1-20C, history of stroke, physical immobilization, pressure over bony prominences, and skin surface friction. The clinical conditions experienced by the patient were stroke and immobilization. The difference between the three patients, in patient 2 was added the risk factor of age > 65 years which is considered elderly where in the elderly there are changes in tissue vascularization, including changes in skin elasticity so there is a risk of skin damage and inadequate nutrition because the patient has difficulty swallowing so the portion of food is only eaten 3-4 tablespoons. The Braden scale scores in all three patients were the same, namely a high risk of pressure

ulcers. The interventions designed to treat the risk of pressure ulcers in all three patients were the same, namely prevention of pressure ulcers (I. 12408) in accordance with SIKI standards.

The explanation of pressure ulcer risk interventions according to SIKI (2019) is observation which includes checking pressure sores using a scale (eg, Norton scale, Braden scale), checking for previous pressure sores, monitoring pressure skin temperature, monitoring weight and its changes, monitoring daily skin status, closely monitoring red areas, monitoring skin over bony prominences or pressure points when repositioning, monitoring sources of pressure and friction, monitoring individual mobility and activity, therapeutics which include drying areas of skin that are moist due to sweat, wound fluid, and fecal or urinary incontinence, use a barrier such as lotion or water-absorbing pads, reposition carefully every 1-2 hours, make a schedule repositioning, provide padding on pressure points or bony protrusions, keep bed sheets dry, clean and without wrinkles/folds, use a special mattress, if necessary, avoid massaging over bony protrusions, avoid applying lotion to areas that are injured or red, avoid using warm water and harsh soap when bathing, ensure adequate food intake, especially protein, vitamins B and C, iron and calories, education that includes explaining the signs of skin damage, encouraging reporting if you find signs of skin damage, teaching how to care for the skin, collaboration with administration of analgesics, if necessary and collaboration with administration of corticosteroids, if necessary. The aim of this intervention is that after 3 x 24 hours of nursing action, it is hoped that the integrity of the skin and tissue will increase so that the results criteria show that skin and tissue elasticity will increase, hydration will increase, damage to the skin layer will decrease, and the risk of pressure sores will

decrease (SLKI DPP PPNI Working Group Team, 2019).

Nursing interventions are prepared based on standard care that has been established in SIKI, however, the implementation adapts to the patient's condition and the existing conditions in the hospital so that not all interventions can be implemented. Implementation was carried out for 3 days according to previously planned interventions. All three patients were able to follow cooperatively. However, when implementation was carried out, not everything was in accordance with the interventions that had been prepared. The nurse did not monitor BB because this could not be done because the patient was in bed rest which did not allow the patient to stand so it was difficult to do. Interventions of giving lotion or water-absorbing pads, providing pads on pressure points or bone protrusions and using special mattresses were also not carried out due to limited hospital facilities and facilities.

Evaluation of therapy results repositioning carried out for 3 days resulted in significant changes, namely that the therapy was able to reduce the risk of pressure ulcers in stroke patients. Preventing pressure sores in patients on bed rest can be done by minimizing friction between the skin and the surface of objects or clothing, preventing damage to skin integrity, changing positions, observing the condition of the skin, keeping linen clean, and so on. One action that can be taken to prevent pressure sores is changing positions or mobilizing. Mobilization can be done easily with good communication between nurses and patients, families and health service providers (Badruja Maluddin et al., 2022). This is in accordance with research conducted by (Damayanti & Karyanah, 2017) that provides therapeutic repositioning every 2 hours for 3 days can reduce the risk of decubitus injuries Nursing actions need to be carried out at home regularly so that patients do not experience

pressure sores. Therefore, giving KIE to patient 2 who was KRS after 4 days of being treated to carry out repositioning at home, patient 1 continued treatment until the 5th day until the patient's condition improved slightly and the intervention was continued by the family or duty nurse.

Giving repositioning effective in preventing pressure sores until patient 1 did not experience pressure sores after 6 days of treatment, patient 2 was discharged from the hospital after the 5th day and was treated in the hospital without experiencing pressure sores, patient 3 was discharged from the hospital after the 3rd day of treatment at the hospital also without experiencing pressure sores. So that the three patients who were initially at risk of developing pressure sores, after this repositioning did not experience pressure sores or decubitus ulcers. Maintenance repositioning regularly and appropriately can reduce the risk of pressure ulcers in stroke patients because of the many benefits that can be obtained from this therapy. Evaluation It can be concluded that therapy repositioning can be done as one way to overcome the nursing problem of the risk of pressure ulcers in stroke patients.

## DISCUSSION

Repositioning done every 2 hours. Client 1 is repositioned every 2 hours in a position of 2 hours on the right side, 2 hours on the left side, and 2 hours on the back. Timetable repositioning carried out every 2 hours except when the patient is sleeping at night (23.00-05.00 WIB). Repositioning It is also carried out by the patient's family who have been educated. Therapy repositioning to avoid ulkus pressure namely by tilting left and right every 2-3 hours (Rachmawati et al., 2019). The patient did repositioning every 2 hours has a very low incidence rate of pressure sores. Repositioning this is done to change the body pressure in certain areas so that there is no imbalance in body weight at a point which can cause disruption of

blood circulation in the stressed area. The assessment of Patient 1 was based on the criteria that had been carried out at the third meeting.

After therapy repositioning, The risk of pressure sores is slightly reduced and the integrity of the skin and tissue is increased so that pressure sores do not occur in patients. Patient 1's movements must be given maximum assistance because the patient is still unable to move freely, can only move on the left extremity, the Braden score results have increased from score 13 (moderate risk of pressure sores) to 15 (mild risk of pressure sores), there is movement on the left extremity and little movement on the right extremity, skin elasticity increases, skin hydration increases, moist skin decreases due to frequent drying, redness in the bony protrusion area in the sacrum area appears to be reduced, there is no tissue damage and no pressure sores. bleeding in protruding tissue, no hematoma. Evaluation of patients 2 and 3 experienced an increase in the Braden score from 13 to 15 and the Braden score from 14 to 16, from moderate risk to mild risk of pressure ulcers. The role of nurses in providing intervention aims to prevent further complications in stroke patients who experience bed rest due to weakness in the extremities, one of which is pressure sores. From the results of this case study, it proves that repositioning is an appropriate implementation to prevent the formation of pressure sores. When the intervention is implemented repositioning there are obstacles, namely when carrying out interventions, some of them are not in accordance with the SOP, for example bending the legs or moving the legs forward. Patients with weak extremities cannot do their best so researchers do not force and support patients to do as much as they can. Apart from that, when implementing the intervention outside of the researcher's shift hours, the intervention was carried out by the family and the nurse on duty. So it requires

33

motivation from the patient and family support.

Based on this, the researcher hopes that in every intervention provided by the researcher and the patient's family, nurses will also provide assistance and participate in monitoring each implementation of the intervention. Researchers did not differentiate between interventions in the three patients, only the main patient should have been given it evidence based nursing while 2 comparison patients were given interventions according to SIKI. This causes there to be no differences between clients 1-3 regarding the risk conditions for pressure ulcers so that effectiveness cannot be known respositioning 2 hours on the risk of pressure ulcers in stroke patients.

## CONCLUSION

The conclusion of this nursing care case study is that Patient 1 did not experience pressure sores after 6 days of treatment, patient 2 was discharged from the hospital after the 5th day of being treated in the hospital in a condition without pressure sores and patient 3 left the hospital after the 3rd day of treatment in the hospital also in the condition of not experiencing pressure sores.

During the 3 days of implementation, the patient's results showed that there were no pressure sores and a decrease in the risk of pressure sores with the achievement of an increase in the Braden score, namely Patient 1 had an increase in the Braden score from a score of 13 (moderate risk of pressure sores) to 15 (mild risk of pressure sores), patient 2 experienced an increase in the Braden score from 13 to 15. Patient 3 had a score of 14 to 16, from moderate risk to mild risk of pressure sores.

Implementation of intervention delivery repositioning in patients who comply every 2 hours, it is very effective in preventing the occurrence of pressure sores (decubitus) compared to not providing intervention repositioning. So this intervention can be recommended. The results of this research can be used as a guideline in creating implementation operational standards (SOP) repositioning in stroke patients to reduce the risk of pressure ulcers in order to minimize pain, improve physical and social quality of life, even reduce the risk of death for patients and prevent long treatment times

## REFERENCES

Amirsyah, M., Amirsyah, M., & Putra, M. I. A. P. (2020). Ulkus Dekubitus pada Penderita Stroke. *Kesehatan Cehadum*, *2*(03), 1–8.

Anugrah, S. C. (2022). Asuhan Keperawatan Perawatan Pencegahan Luka Tekan Pada Pasien Stroke Di Ruang Stroke RSUD M Yunus Bengkulu 2022. *KIAN Poltekkes Kemenkes Bengkulu*, *2*(8.5.2017), 2003–2005.

Apriani, M. O., Noorratri, E. D., & Waluyo. (2023). Penerapan Mobilisasi dalam Pencegahan Dekubitus dengan Jam Mobilisasi pada Lansia Stroke di RSUD Kabupaten Sragen. *Termometer: Jurnal Ilmiah Ilmu Kesehatan Dan Kedokteran*, *1*(4), 3–5.

Badrujamaludin, A., Melanie, R., & Nurdiantini, N. (2022). Pengaruh mobilisasi dan massage terhadap pencegahan risiko luka tekan pada pasien tirah baring. *Holistik Jurnal Kesehatan*, *15*(4), 610–623. https://doi.org/10.33024/hjk.v15i4.5558

Batubara, S. O., & Tat, F. (2015). Hubungan Antara Penanganan Awal dan Kerusakan Neurologis Pasien Stroke di RSUD Kupang. *Jurnal Keperawatan Soedirman (The Soedirman Journal of Nursing)*, *10*(3), 143–157.

Damayanti, & Karyanah. (2017). Perubahan Posisi dan Massage Vco (Virgin Coconut Oil) pada Pencegahan Luka

Tekan Pasien Tirah Baring Di Rsud Kabupaten Perubahan Posisi Dan Massage Vco (Virgin Coconut Oil) Pada Pencegahan Luka Tekan Pasien Tirah Baring Di Rsud Kabupaten Tangerang Tahun 2. *Jurnal Keperawatan*, *2*(1).

Endro Haksara, S. A. P. (2018). Endro Haksara,Shafira Aliya Putri. *Urnal Ilmu Kedokteran Dan Kesehatan Indonesia Vol 1 No. 3 (November 2021) Hal 28-44, Penerapan Latihan Range Of Motion (Rom) Pada Kekuatan Otot Ekstremitas Dengan Penderita Stroke Di Wilayah Binaan Puskesmas Gunung Pati Semarang*.

Hasanah, F. A., & Nuban, N. S. (2021). Terapi Berbasis Sel Punca Untuk Stroke Iskemik Kronik Dengan Mesenchymal Stem Cell Alogenik Intravena. *Jurnal Penelitian Perawat Profesional*, *3*(1), 99–106. Https://Doi.Org/10.37287/Jppp.v3i1.338

Kemenkes Ri. (2019). *Hasil Utama Riskesdas 2018*.

Kemenkes Ri. (2023). *Kombinasi Massage & Alih Baring Cegah Dekubitus*.

Krisnawati, D., Faidah, N., & Purwandari, N. P. (2022). Pengaruh Perubahan Possi Terhadap Kejadian Decubitus Pada Pasien Tirah Baring Lama Di Ruang Irin Rumah Sakit Mardi Rahayu Kudus. *The Shine Cahaya Dunia D-Iii Keperawatan*, *7*(1), 15–26. Https://Ejournal.Annurpurwodadi.Ac.Id/Index.Php/Tscd3Kep/Article/View/332

Kuriakose, D., & Xiao, Z. (2020). Pathophysiology And Treatment Of Stroke: Present Status And Future Perspectives. *International Journal Of Molecular Sciences*, *21*(20), 1–24. Https://Doi.Org/10.3390/Ijms21207609

Kusumah, M. T. D. (2021). Pengaruh Perubahan Posisi Dalam Mencegah Dekubitus Pada Pasien Yang Menjalani Perawatan Di Rumah Sakit Aminah Ciledug Tangerang. *Indonesian Trust Health Journal*, *4*(1), 451–455.

Manan, A., Afiyah, R. K., & Muhith, A. (2024). Pengaruh Mobilisasi Miring Kanan Dan Kiri Dengan Menggunalan Bedridden Patient Turning Device Terhadap Ulkus Dekubitus Pada Pasien Stroke. *Jurnal Ilmiah Permas: Jurnal Ilmiah Stikes Kendal: Januari 2024*, *14*(1), 137–146.

Mataputun, D. R., & Apriani, J. (2023). Efektivitas Pemberian Posisi Alih Baring Terhadap Kejadian Dekubitus Pada Pasien Stroke. *Nursing Update : Jurnal Ilmiah Ilmu Keperawatan*, *14*, 469–476.

Mayangsari, B. (2020). Pengaruh Perubahan Posisi Terhadap Risiko Terjadinya Dekubitus Di Rumah Sakit Pgi Cikini. *Jurnal Keperawatan Cikini*, *1*(2), 35–41. Https://Jurnal.Akperrscikini.Ac.Id/Index.Php/Jkc

Morison, M. . (2016). *Manajemen Luka*. Egc.

Mutiarasari, D. (2019). Ischemic Stroke: Symptoms, Risk Factors, And Prevention. *Jurnal Ilmiah Kedokteran Medika Tandulako*, *1*(1), 60–73.

Mutiari, S. E., Roshinta, D., Dewi, L., Zakiah, M., Neurologi, S. M. F., & Pontianak, R. S. (2019). Hubungan Antara Nilai Hematokrit Dan Early Neurological Deterioration Pada Pasien Stroke Iskemik Akut Stroke Menurut World Health Pontianak Memiliki Prevalensi Sebesar 13 , 6 Per 1000 Penduduk Terdiagnosis Dan Memiliki Prevalensi Sebesar 3 , 9 Per 100 Pen. *Jurnal Cerebellum*, *5*, 1376–1387.

Najihah, Ita Sulistiani, Ferly Yacoline Pailungan, Musdalifah, I Kade Wijaya, Abdul Thalib, Alfian Mas'Ud, Takdir Tahir, & Titi Iswanty Afelya. (2022). Reposisi Dan Massage Menurunkan

Derajat Dekubitus Pada Pasien Immobilisasi Dengan Gangguan Neurologis: Case Report. *Window Of Nursing Journal*, *01*(01), 33–47. Https://Doi.Org/10.33096/Won.v1i1.245

Nofiyanto, M., & Limpong, M. R. A. (2018). Kejadian Pressure Ulcer (Luka Tekan) Di Icu Rumah Sakit Di Kabupaten Sleman Tahun 2014-2016. *Jurnal Keperawatan Respati Yogyakarta*, *5*(2), 388–394.

Pajri, R. N., Safri, & Dewi, Y. I. (2018). Gambaran Faktor-Faktor Penyebab Terjadinya Stroke. *Jurnal Online Mahasiswa*, *5*(1), 436–444.

Potter, P. A., & Perry, A. G. (2015). *Buku Ajar Fundamental Keperawatan: Konsep, Proses, Dan Praktik*. Jakarta: Egc.

Prabawa, A., & Rahmanti, A. (2019). … Pengaruh Posisi Lateral Inklin 300 Terhadap Pencegahan Dekubitus Pada Pasien Stroke Di Ruang Cempaka Rs Pantiwilasa Citarum …. *Jurnal …*, *4*(1), 1–6. Https://Jurnal.Stikeskesdam4dip.Ac.Id/Index.Php/Sisthana/Article/View/45%0Ahttps://Jurnal.Stikeskesdam4dip.Ac.Id/Index.Php/Sisthana/Article/Download/45/39

Pribadhi H, P. I. A. (2019). *Perbedaan Kejadian Depresi Pasca-Stroke Pada Pasien Stroke Iskemik Lesi Hemisfer Kiri Dan Kanan Di Rsup Sanglah Tahun 2017. 8*(3).

Primalia, P., & Hudiyawati, D. (2020). Pencegahan Dan Perawatan Luka Tekan Pada Pasien Stroke Di Ruang Icu. *Jurnal Berita Ilmu Keperawatan*, *13*(2), 110–116.

Rachmawati, D., Ulum, E. M., & Sepdianto, T. C. (2019). Pencegahan Dekubitus Pasien Stroke Hemorrhagic Setelah 24 Jam Serangan Di Stroke Center Rsud Ngudi Waluyo Wlingi. *Dunia Keperawatan*, *7*(2), 118. Https://Doi.Org/10.20527/Dk.v7i2.64

88

Rukajat, A. (2018). *Pendekatan Penelitian Kuantitatif: Quantitative Research Approach*. Deepublish.

Sabbrina, O. N., & Khamid, A. (2022). Perbedaan Hidrokoloid Dan Minyak Zaitun Terhadap Luka Tekan Pada Pasien Pressure Ulcers Di Rsud Kabupaten Bekasi. *Malahayati Nursing Journal*, *4*(9), 2223–2232. Https://Doi.Org/10.33024/Mnj.v4i9.6904

Sholiha, A., Sukmaningtyas, H., & Pudjonarko, D. (2016). Korelasi Antara Volume Perdarahan Intraserebral Dengan Nilai Indeks Barthel Pada Stroke Hemoragik. *Diponegoro Medical Journal (Jurnal Kedokteran Diponegoro)*, *5*(4), 275–286.

Sihaloho, A. A. (2020). *Pengkajian Dalam Proses Keperawatan Sebagai Dasar Pemberian Asuhan Keperawatan*.

Sirait, F. L. R. (2019). *Pelaksanaan Asuhan Keperawatan Yang Baik Dengan Memperhatikan Keamanan, Efektivitas Dan Efisiensi*.

Tarigan, S., Yusuf, S., & Syam, Y. (2019). Analisis Ekonomi Pencegahan Pressure Injury (Oral Nutrition, Repositioning, Skin Protection). *Jurnal Keperawatan Muhammdiyah*, *Khusus*, 55–59. Http://Journal.Um-Surabaya.Ac.Id/Index.Php/Jkm/Article/View/2202/1997

Tim Pokja Sdki Dpp Ppni. (2017). *Standar Diagnosis Keperawatan Indonesia*. Dpp Ppni.

Tim Pokja Siki. (2019). *Standar Intervensi Keperawatan Indonesia*. Jakarta: Dpp Ppni.

Tim Pokja Slki Dpp Ppni. (2019). *Standar Luaran Keperawatan Indonesia*. Jakarta: Dpp Ppni.

Waluyo, S. (2012). *100 Questions & Answers*. Media Elex Komputindo.

Wardani, E. M., & Nugroho, R. F. (2022). Implementasi Masase Neuroperfusi Dan Alih Baring Terhadap Risiko Dekubitus Pasien Post Stroke. *Sehatmas: Jurnal Ilmiah Kesehatan Masyarakat*, *1*(1), 09–15. Https://Doi.Org/10.55123/Sehatmas.v 1i1.28

Wiguna, I. N. A. P., Aryani, L. P. S., & Vittala, G. (2022). Penerapan Proper Positioning Dan Waktu Perubahan Posisi Tubuh Pada Pasien Stroke Dalam Mencegah Ulkus Dekubitus. *Jurnal Yoga Dan Kesehatan*, *5*(1), 14–26. Https://Doi.Org/10.25078/Jyk.v5i1.83 4

Wijaya, A., & Putri, Y. (2018). *Keperawatan Medikal Bedah*. Nuha Medika.

Wijaya, A. S., & Putri, Y. M. (2018). *Kmb; Keperawatan Medikal Bedah (Keperawatan Dewasa)*. Nuha Medika.

Wirawan, N., & Putra, I. B. K. (2016). Manajemen Prehospital Pada Stroke Akut. *Stroke*, *12*(4), 397–409. Https://Doi.Org/10.1161/01.Str.12.4.3 97

Wso. (2022). *Global Stroke Fact Sheet 2022 Purpose : Data Sources* (Pp. 1–14). World Health Organization. Https://Www.World-Stroke.Org/Assets/Downloads/Wso_G lobal_Stroke_Fact_Sheet.Pdf

Yilmazer, T., & Tuzer, H. (2019). Pressure Ulcer Prevention Care Bundle: A Cross-Sectional, Content Validation Study. *Wound Management And Prevention*, *65*(5), 33–39. Https://Doi.Org/10.25270/Wmp.2019. 5.3339

# DIGITAL HEALTH INTERVENTIONS TO IMPROVE GLYCEMIC OUTCOMES IN TYPE 2 DIABETES MELLITUS: A LITERATURE REVIEW

**Waras Budi Utomo, Muzdalipah, Reska Ahmad Muhajir, Yulianur Fawzi.**

[1,2,3,4]Nursing Science Study Program, Faculty of Health Sciences, Syarif Hidayatullah State Islamic University, Jakarta

Corresponding Email: warasbudiutomo@uinjkt.ac.id

| ABSTRACT | Keywords |
|---|---|
| Type 2 diabetes mellitus (T2DM) is a growing global health concern marked by persistent hyperglycemia and a high risk of complications. Despite advancements in treatment, many patients fail to achieve optimal glycemic control. Digital health interventions (DHIs) have emerged as promising tools to support self-management and improve outcomes in T2DM care. This literature review aims to evaluate the effectiveness of DHIs in enhancing glycemic control among individuals with T2DM. A literature review was conducted by searching databases such as EBSCOhost, ScienceDirect, ProQuest, and Google Scholar for full-text articles published between 2016 and 2025. Inclusion criteria focused on studies involving adult T2DM populations using mobile apps, telemedicine, or web-based platforms to support glycemic management. A total of 10 studies met the criteria and were analyzed narratively. A total of 10 studies were analyzed in this literature review to evaluate the impact of digital health interventions on glycemic control among T2DM patients. These studies comprised randomized controlled trials, quasi-experimental studies, and cohort studies conducted in various global settings. The findings consistently demonstrated that digital health interventions such as mobile applications, web-based platforms, and telemedicine systems positively affect glycemic control, primarily measured through reductions in HbA1c levels. This literature review concludes that DHIs show strong potential in improving glycemic control in T2DM. The effectiveness of these interventions is influenced by user engagement, digital literacy, and integration with healthcare support. | **Digital Health, Glycemic Control, Telemedicine, Type 2 Diabetes Mellitus** |

## INTRODUCTION

Type 2 diabetes mellitus (T2DM) is a chronic and progressive metabolic disorder characterized by insulin resistance and relative insulin deficiency, leading to sustained hyperglycemia and increased risk of microvascular and macrovascular complications. Globally, T2DM has become one of the most pressing public health concerns. According to the International Diabetes Federation (IDF, 2021), over 537 million adults were living with diabetes in 2021, and this number is projected to reach 643 million by 2030 and 783 million by 2045. Approximately 90% of these cases are T2DM, underscoring its dominant

contribution to the global diabetes burden. In Southeast Asia alone, the number of people with diabetes is expected to rise by more than 50% over the next two decades, with Indonesia among the top ten countries in total cases (International Diabetes Federation, 2021).

Despite significant advancements in pharmacological therapies, clinical care models, and international guidelines, achieving and sustaining optimal glycemic control remains a persistent challenge for individuals with type 2 diabetes mellitus (T2DM). Effective management of T2DM primarily revolves around maintaining blood glucose levels within the target range to prevent both acute and long-term complications such as nephropathy, retinopathy, neuropathy, and cardiovascular disease. However, global evidence indicates a substantial gap between recommended targets and real-world clinical outcomes. A systematic review by Nyström et al (2018) highlighted that more than 50% of patients with T2DM fail to reach the recommended glycated hemoglobin (HbA1c) goal, which is typically set at <7% (53 mmol/mol) by most diabetes management guidelines. This glycemic gap contributes directly to an increased burden of preventable complications and significantly drives up healthcare utilization and costs.

Multiple interrelated factors contribute to this suboptimal glycemic control. Structural barriers such as limited access to healthcare providers, especially in rural and underserved regions, reduce the frequency and quality of diabetes care follow-up. At the patient level, poor medication adherence, often influenced by polypharmacy, cost of treatment, or side effects, remains a significant impediment to therapeutic effectiveness (Polonsky & Henry, 2016). Additionally, low health literacy, psychological distress, and a lack of self-management support often compromise a patient's ability to make informed decisions regarding diet, physical activity, and glucose monitoring (Bassi et al., 2021). Even in well-resourced healthcare systems, clinical inertia, defined as the failure to intensify

treatment despite evidence of poor control, can delay therapeutic adjustments (Nyström et al., 2018).

In this context, innovative solutions are needed to bridge the gap between clinical recommendations and patient outcomes. Digital health interventions offer a promising avenue to overcome these barriers by enhancing patient engagement, enabling remote monitoring, and supporting more personalized, real-time feedback and education. These technologies aim to enhance self-management behaviors, improve communication between patients and providers, and enable real-time monitoring and feedback (Paper et al., 2017). As digital health becomes increasingly integrated into routine care, understanding its impact on glycemic outcomes is essential. This literature review aims to synthesize recent evidence on the effectiveness of digital health interventions in improving glycemic control among patients with T2DM and to identify gaps and opportunities for future implementation.

## METHOD

This study adopted a literature review approach to examine the role of e-Health interventions in improving glycemic control among patients with type 2 diabetes mellitus. Relevant literature was systematically collected from multiple scientific databases, including EBSCOhost, ScienceDirect, ProQuest, and Google Scholar. The search targeted peer-reviewed journal articles published between 2016 and 2025 in English or Indonesian, with only full-text articles eligible for inclusion. Keywords were formulated using Medical Subject Headings (MeSH) and included the following terms: 1) Digital Health; 2) Glycemic Control; 3) Type 2 Diabetes Mellitus; 4) Telemedicine.

The selection process involved manually screening titles, abstracts, keywords, and full content to ensure alignment with the research objective. Inclusion criteria focused on original research articles, systematic reviews, and

meta-analyses that evaluated the effectiveness of digital health technologies, such as mobile apps, telehealth, web-based platforms, or remote monitoring, in managing blood glucose levels in adult type 2 diabetes populations. The final selection of articles was synthesized narratively to identify key outcomes, emerging trends, and implementation challenges, providing an up-to-date and comprehensive overview of the impact of e-Health solutions on glycemic control.

## RESULTS

**Table 1 Article Review**

| Authors (Years) | Aimed | Method (Design, Sample & Sampling, Intervention, Data Analysis) | Results | Outcomes |
|---|---|---|---|---|
| (Abdel Nasser et al., 2021) | To identify the use of electronic health (eHealth) among Saudi patients with type 2 diabetes mellitus (T2DM) and assess its association with diabetic self-management (DSM). | Design: Analytical cross-sectional study<br><br>Sample & Sampling: 2,228 adult Saudi T2DM patients using voluntary response sampling through an online survey.<br><br>Instrument: Use a three-part structured questionnaire, including the Arabic version of the Diabetes Self-Management Questionnaire (DSMQ).<br><br>Data Analysis: Descriptive statistics, Kruskal-Wallis U test, and binary logistic regression | The result showed that 87.1% of participants reported using eHealth platforms, primarily Google and the SEHA app. The average Diabetes Self-Management (DSM) score among participants was 5.2 out of 10. Notably, patients classified as eHealth-dependent demonstrated significantly lower DSM scores (5.3 vs. 5.6; p = 0.000), reduced utilization of healthcare services (5.6 vs. 6.7; p = 0.000), and poorer glucose management (4.0 vs. 4.7; p = 0.000) compared to their eHealth-independent counterparts. Furthermore, DSM was identified as a significant predictor of eHealth dependency (OR = 1.022; p = 0.007), suggesting that lower self-management performance may drive increased reliance on digital health tools. | Most patients used eHealth and were satisfied, but eHealth dependency was linked to poorer DSM performance. The findings highlight the need for integrated physician support and telemedicine to enhance self-management and ensure safe use of digital health tools. |
| (Al-Ozairi et al., 2018) | To evaluate the effectiveness of a motivational text message intervention (DATES) delivered via mobile phones on glycemic control in people with | Design: Single-blind, two-arm parallel randomized controlled trial.<br>Sample & Sampling: 572 adults aged 18–75 years with poorly controlled T2DM (HbA1c >8%), fluent in Arabic or English, recruited from diabetes clinics | The impact of a 12-month mobile text messaging intervention based on motivational interviewing on glycemic control in patients with type 2 diabetes. While the protocol outlines a comprehensive analysis plan, including mixed-effects models to assess changes in HbA1c, BMI, | The study investigates whether tailored mobile text interventions can improve diabetes self-care and glycemic outcomes. It emphasizes the feasibility of |

| | | poorly controlled type 2 diabetes in Kuwait. | in Kuwait using random sampling. Intervention: 12-month text messaging program based on motivational interviewing, including standard, personalized, and biofeedback-driven messages; participants received 4 messages per day and used wearable activity monitors. Data Analysis: Mixed-effects models, intention-to-treat analysis using STATA 13, comparison of HbA1c at baseline and 12 months. | and psychosocial outcomes | scalable, low-cost mHealth tools to support lifestyle behavior change in populations with high diabetes prevalence and limited clinical psychology resources. |
| --- | --- | --- | --- | --- | --- |
| (Bassi et al., 2021) | | To assess the efficacy of eHealth interventions in improving glycemic control and psychosocial outcomes in adults with type 1 or type 2 diabetes mellitus. | Design: Systematic review and meta-analysis following PRISMA guidelines, registered in PROSPERO. Study: 13 RCTs with 1315 adults (T1DM or T2DM) aged 18–65; interventions ranged from phone calls and SMS to web/app-based telemedicine. Intervention: Various eHealth modalities aiming at glycemic and/or psychosocial improvement. Data Analysis: Meta-analysis using SMD and OR; subgroup and meta-regression analyses conducted for moderators. | The meta-analysis conducted by Bassi et al. (2021) demonstrated a significant improvement in HbA1c levels at the end of the eHealth intervention period (SMD = -0.40; 95% CI = -0.70 to -0.12; $p < 0.05$); however, this effect was not sustained at follow-up (SMD = -0.13; 95% CI = -0.31 to 0.05). Additionally, a significant reduction in depressive symptoms was observed (SMD = -0.18; 95% CI = -0.33 to -0.02), indicating a positive psychosocial impact. On the other hand, the interventions showed no significant effects on quality of life or diabetes-related distress. | eHealth interventions are effective for short-term glycemic control and reducing depressive symptoms but show limited effects on long-term outcomes and other psychosocial factors. Integration of psychosocial support components is needed to enhance intervention effectiveness. |
| (Duong et al., 2025) | | To examine the effectiveness of digital health interventions (DHIs) in | Design: Systematic review based on PRISMA guidelines; protocol registered in PROSPERO. Sample & Sampling: 53 studies with | The study revealed that among studies targeting type 2 diabetes mellitus (T2DM) prevention, only 1 study (1.9%) reported positive outcomes, 9 studies (17%) showed | DHIs effectively improved dysglycemia, especially with multi-component |

**41**

| | | | |
|---|---|---|---|
| | preventing type 2 diabetes mellitus (T2DM) and managing dysglycemia, based on the quadruple aims of healthcare (population health, consumer experience, provider experience, and healthcare costs). | 34,488 participants from 2014 to 2024 across various settings and countries. Study: DHIs categorized using WHO's classification (e.g., targeted communication, personal health tracking, telemedicine, etc.). Data Analysis: Qualitative synthesis; outcomes categorized as positive, neutral, or negative; risk of bias assessed using RoB 2 and ROBINS-I tools. | neutral effects, and 4 studies (7.5%) lacked sufficient data. For interventions focused on dysglycemia management, 23 studies (43.4%) demonstrated positive results, 24 studies (45.3%) were neutral, and 6 studies (11.3%) provided insufficient evidence. While consumer experiences with digital health interventions were mixed, there was very limited evidence regarding outcomes related to healthcare providers (1.9%) and healthcare costs (5.7%), highlighting a need for more comprehensive evaluations across the quadruple aims of healthcare. | tools and healthcare provider interaction. Evidence for T2DM prevention is emerging but limited. Longer duration (>9 months) and integrated HCP support are critical for optimal impact. |
| (Grady et al., 2025) | To evaluate the effectiveness of Bluetooth-connected blood glucose monitoring (BGM) integrated with four popular digital health therapeutic apps (Noom, Fitbit, Cecelia Health, Welldoc) in improving glycemic outcomes in people with type 2 diabetes (PwT2D). | Design: Real-world, 3-month decentralized intervention study. Sample & Sampling: 191 participants with T2DM (A1c 7.5–12.0%), recruited online in the U.S., self-selected digital apps. Intervention: OneTouch Verio Reflect meter, OneTouch Reveal app, and one of four digital therapeutics (Noom, Fitbit, Cecelia Health, Welldoc). Data Analysis: Descriptive statistics, confidence intervals (95% CI), comparisons of baseline and 3-month A1c, glucose, RIR, and RITR; analyzed using Python, R, and SPSS. | The study reported a mean HbA1c reduction of −0.77% (95% CI −0.98 to −0.56) across all intervention groups using Bluetooth-connected blood glucose monitoring integrated with digital health apps. Among the specific platforms, the greatest reduction was observed in the Noom group (−1.03%), followed by Cecelia Health (−0.76%), Fitbit (−0.56%), and Welldoc (−0.55%). Notably, 56% of participants achieved a reduction in HbA1c of ≥ 0.5%, while 36% achieved a reduction of ≥ 1.0%. Additionally, positive trends were observed in mean blood glucose levels and in the proportion of readings in range (RIR) and tight range (RITR). However, not all of these improvements reached statistical significance. | Integrating BGM with digital therapeutics showed clinically meaningful A1c improvements within 3 months. The approach reflects real-world settings and supports the scalability of digital tools in diabetes self-management. Personalized engagement and self-selected interventions enhanced outcomes. |

| (Hummel et al., 2022) | To evaluate whether using the DiaCert smartphone app, which promotes daily step activity, improves health-related quality of life (HRQoL) in patients with type 2 diabetes. | Design: Randomized controlled trial. Sample & Sampling: 181 adults with T2DM recruited from 6 healthcare centers in Stockholm, Sweden; randomized 1:1 into intervention and control groups. Intervention: 3-month physical activity program using the DiaCert app alongside routine care; control group received routine care only. Data Analysis: Wilcoxon signed-rank test for within-group comparisons; generalized estimating equations for between-group differences; HRQoL measured with RAND-36 at baseline, 3 months, and 6 months | At 3 months, the intervention group showed significant improvements in HRQoL domains: role limitations due to physical health problems (−16.9; 95% CI −28.5 to −5.4), role limitations due to emotional problems (−13.9; 95% CI −25.8 to −2.1), and emotional well-being (−5.7; 95% CI −10.4 to −1.0). No significant effects were sustained at 6 months. | The DiaCert app improved select physical and emotional aspects of HRQoL after 3 months, but the effects diminished post-intervention, suggesting the need for ongoing engagement to maintain benefits. |
|---|---|---|---|---|
| (Khyoosh Al-Eqabi et al., 2024) | To evaluate the effectiveness of digital health interventions (DHIs) in managing glycated hemoglobin (HbA1c) levels among individuals with type 2 diabetes mellitus. | Design: Randomized Controlled Trial (RCT). Sample & Sampling: 192 patients with T2DM from Babylon Diabetes and Endocrinology Center, Iraq. Inclusion criteria: T2DM ≥1 year, aged 18–75, smartphone users, etc. Exclusion: severe complications, psychiatric issues, etc. Random block sampling was used. Intervention: A customized medication management smartphone app with a reminder, visual/audio | The results showed no significant difference in HbA1c levels between the groups at baseline, but a significant reduction was observed in the intervention group at both three and six months. Meanwhile, the control group did not show any meaningful changes throughout the study period. These findings indicate that digital health interventions are effective in reducing HbA1c levels and support the integration of digital technologies in diabetes management to improve glycemic control. | DHIs significantly reduced HbA1c in the intervention group over 6 months. Supports the use of mobile health tools in improving glycemic control. Highlights the role of reminders and self-management support in diabetes care. |

| | | features, and educational content (in Arabic). Data Collection: HbA1c measured at baseline, 3 months, and 6 months; demographics recorded. Data Analysis: SPSS v20, t-tests for intergroup comparison, Post Hoc Tests for within-group comparison. | | |
|---|---|---|---|---|
| (Paper et al., 2017) | To investigate whether a telemonitoring and health counseling intervention improves HbA1c levels, clinical variables, and health-related quality of life (HRQoL) in patients with type 2 diabetes. | Design: Pragmatic randomized controlled trial in Sweden as part of the Renewing Health project. Sample & Sampling: 166 patients with T2DM randomly assigned to intervention (n=87) or control (n=79). Inclusion: diagnosed >3 months, HbA1c >6.5%, age ≥18, PC literate. Intervention: Web-based self-management program using "Prescribed Healthcare" for telemonitoring blood glucose and blood pressure, combined with health counseling. Data Analysis: Intention-to-treat principle. Comparisons were made using chi-square, Mann-Whitney U, and t-tests. | No significant difference in HbA1c change between groups after 19 months (p-value=0.33; α <0.05). No significant improvements in HRQoL or other clinical measures. High dropout rate in the intervention group (42%). | The intervention did not significantly improve HbA1c or HRQoL. Differences in outcomes may relate to patients' digital literacy and readiness for behavioral change. Highlights the importance of tailoring digital interventions to patient capabilities and needs. |
| (Stevens et al., 2022) | To evaluate the effectiveness of diabetes-specific digital health technologies | Design: Systematic review. Sample & Sampling: 25 randomized controlled trials (RCTs) including 3,360 participants | Mobile health (mHealth) interventions have demonstrated effectiveness in reducing HbA1c levels among individuals with diabetes, with an average reduction | Digital health interventions can effectively reduce HbA1c across diabetes types. However, |

| | | | |
|---|---|---|---|
| (DHTs), especially mHealth apps, on reducing HbA1c in patients with T1DM, T2DM, and prediabetes. | with T1DM, T2DM, or prediabetes.<br>Intervention: mHealth interventions such as smartphone apps for diabetes self-management.<br>Data Analysis: Pooled mean differences in HbA1c between intervention and control groups; subgroup analysis by diabetes type. | of 0.46% in those with type 1 diabetes mellitus (T1DM), 0.90% in type 2 diabetes mellitus (T2DM), and 0.26% in individuals with prediabetes. Out of 25 intervention groups analyzed, 23 showed measurable improvements, indicating that mHealth tools can play a significant role in supporting glycemic control across various stages of diabetes. | methodological quality varied, and more research is needed, especially for T1DM and prediabetes. |
| (Zimmermann et al., 2021) | To evaluate whether participation in the Vida Health digital diabetes management program leads to improvements in glycemic control (HbA1c) among adults with type 2 diabetes, and to assess how program usage relates to HbA1c change. | Design: Single-arm retrospective cohort study.<br>Sample & Sampling: 950 adults with T2DM (baseline HbA1c ≥ 7.0%) enrolled via two insurance plans; 258 (27.2%) had a laboratory follow-up HbA1c ≥ 90 days after enrollment.<br>Intervention: The Vida Health program—app-based self-management tools (educational lessons, glucose logging, meal and activity tracking) plus one-to-one remote coaching sessions and in-app messaging with trained dietitians/health coaches.<br>Data Analysis: Paired t-tests for HbA1c change; repeated-measures ANOVA comparing pre-enrollment, baseline, and follow-up HbA1c; cluster-robust multiple regression to assess impact of high vs. low program usage (median split of | The average HbA1c level decreased by 0.81 points from a baseline of 8.68 to 7.88 at follow-up, indicating a significant improvement in glycemic control. Among participants classified as high-risk, with baseline HbA1c levels of 8 or higher, the reduction was even more pronounced at 1.44 points. Follow-up HbA1c levels were significantly lower not only compared to baseline but also compared to pre-enrollment measurements. Furthermore, higher engagement with the program, as reflected in greater usage of its features, was strongly associated with greater reductions in HbA1c, highlighting the importance of active participation in achieving better health outcomes. | Clinically meaningful and statistically significant HbA1c improvements were observed following enrollment in a digitally delivered diabetes management program, particularly among higher-risk participants. Greater engagement with both coaching and app-based content was associated with larger glycemic gains, suggesting the value of combined human support and digital self-management tools in T2DM care. |

| | |
|---|---|
| sessions, messages, lessons) on HbA1c change. | |

A total of 10 studies were analyzed in this literature review to evaluate the impact of digital health interventions on glycemic control among patients with Type 2 Diabetes Mellitus (T2DM). These studies comprised randomized controlled trials, quasi-experimental studies, and cohort studies conducted in various global settings. The findings consistently demonstrated that digital health interventions such as mobile applications, web-based platforms, and telemedicine systems positively affect glycemic control, primarily measured through reductions in HbA1c levels. Most reviewed studies reported a statistically significant improvement in HbA1c among participants using digital health tools compared to control groups receiving standard care.

## DISCUSSION

This literature review synthesized evidence from 10 studies examining the effectiveness of digital health interventions (DHIs) in enhancing glycemic control among patients with type 2 diabetes mellitus (T2DM). The findings collectively support the role of e-Health tools in improving clinical outcomes, particularly glycated hemoglobin (HbA1c) levels, through a range of digital platforms including mobile apps, web-based programs, and telemedicine services. A consistent pattern across the reviewed studies was the short-term improvement in HbA1c levels following e-Health interventions. For example, Bassi et al. (2021) found a statistically significant reduction in HbA1c (SMD = -0.40, p < 0.05) during the intervention period. Similarly, Grady et al (2025) observed a

mean HbA1c reduction of 0.77% through Bluetooth-enabled blood glucose monitoring combined with mobile health apps, highlighting the feasibility of such tools in real-world settings. These findings were reinforced by Stevens et al (2022), whose meta-analysis showed an average HbA1c reduction of 0.90% in T2DM patients using mobile health interventions.

The evidence also indicates that user engagement and personalization are critical to the success of these interventions. Zimmermann et al (2021) reported that participants who engaged more frequently with the Vida Health digital program experienced greater reductions in HbA1c, underlining the importance of interactive features and individualized coaching. On the other hand, studies such as Paper et al (2017) and Abdel Nasser et al (2021) highlighted the potential limitations of e-Health when users lack digital literacy or adequate healthcare provider support, resulting in suboptimal outcomes or even lower self-management scores. Despite the generally positive outcomes, the sustainability of glycemic improvements remains a concern. Bassi et al (2021) noted that HbA1c reductions were not maintained at follow-up, suggesting that ongoing engagement or periodic reinforcement may be necessary. This aligns with Hummel et al (2022) who found that quality-of-life benefits from the DiaCert app declined after the intervention ended, reinforcing the importance of long-term support mechanisms.

Furthermore, integration with clinical care and provider involvement appears to be a key determinant of success.

Duong et al (2025) emphasized that interventions with multi-component features and healthcare professional interaction yielded more favorable outcomes. However, the minimal impact on provider experience and healthcare costs in most studies signals a need for broader systemic evaluations beyond patient outcomes alone. Overall, the evidence affirms that digital health technologies can effectively support glycemic control in T2DM, especially when interventions are personalized, include behavioral support, and are integrated with traditional healthcare services. Future research should focus on long-term outcomes, cost-effectiveness, and optimizing hybrid care models that combine human and digital elements to maximize impact.

## CONCLUSIONS

This literature review concludes that digital health interventions (DHIs) show strong potential in improving glycemic control in type 2 diabetes mellitus (T2DM), with most of the 10 studies reviewed reporting significant HbA1c reductions. The effectiveness of these interventions is influenced by user engagement, digital literacy, and integration with healthcare support. While short-term outcomes are promising, sustaining long-term benefits remains challenging, highlighting the need for ongoing support, personalized approaches, and further research to optimize and scale e-Health solutions in diabetes care.

## REFERENCES

Abdel Nasser, A., Alzahrani, R. M., Ghandoura, A. N., & Sultan, I. (2021). Use of Electronic Health (eHealth) Among Saudi Type 2 Diabetic Patients and Its Association With Their Diabetic Self-Management: A Cross-Sectional Study. *Cureus*, *13*(3), 1–9. https://doi.org/10.7759/cureus.13882

Al-Ozairi, E., Ridge, K., Taghadom, E., De Zoysa, N., Tucker, C., Stewart, K., Stahl, D., & Ismail, K. (2018). Diabetes and TelecommunicationS (DATES) study to support self-management for people with type 2 diabetes: A randomized controlled trial. *BMC Public Health*, *18*(1), 1–8. https://doi.org/10.1186/s12889-018-6136-8

Bassi, G., Mancinelli, E., Dell'arciprete, G., Rizzi, S., Gabrielli, S., & Salcuni, S. (2021). Efficacy of ehealth interventions for adults with diabetes: A systematic review and meta-analysis. *International Journal of Environmental Research and Public Health*, *18*(17). https://doi.org/10.3390/ijerph18178982

Duong, T., Olsen, Q., Menon, A., Woods, L., Wang, W., Varnfield, M., Jiang, L., & Sullivan, C. (2025). Digital Health Interventions to Prevent Type 2 Diabetes Mellitus: Systematic Review. *Journal of Medical Internet Research*, *27*. https://doi.org/10.2196/67507

Grady, M., Holt, E., Cameron, H., & Edelman, S. (2025). Improved glycemic outcomes in people with type 2 diabetes using smart blood glucose monitoring integrated with popular digital health therapeutics. *Scientific Reports*, *15*(1), 1–10. https://doi.org/10.1038/s41598-025-93605-1

Hummel, M., Bonn, S. E., & Trolle Lagerros, Y. (2022). The effect of the smartphone app DiaCert on health related quality of life in patients with type 2 diabetes: results from a randomized controlled trial. *Diabetology and Metabolic Syndrome*, *14*(1), 1–11. https://doi.org/10.1186/s13098-022-00965-z

International Diabetes Federation. (2021). *IDF Diabetes Atlas (10th ed.).*

https://diabetesatlas.org/

Khyoosh Al-Eqabi, Q. A., Niazy, S. M., & Radhi, M. M. (2024). Effectiveness of Digital Health Interventions in Managing Glycated Haemoglobin: A Randomized Controlled Trial. *National Journal of Community Medicine*, *15*(9), 747–753. https://doi.org/10.55489/njcm.150920 244442

Nyström, T., Holzmann, M. J., Eliasson, B., Svensson, A. M., & Sartipy, U. (2018). Estimated glucose disposal rate predicts mortality in adults with type 1 diabetes. *Diabetes, Obesity and Metabolism*, *20*(3), 556–563. https://doi.org/10.1111/dom.13110

Paper, O., Lindberg, I., & Ribu, L. (2017). Telemonitoring and Health Counseling for Self-Management Support of Patients With Type 2 Diabetes : A Randomized Controlled Trial. *JMIR Diabetes*, *2*(1). https://doi.org/10.2196/diabetes.6884

Polonsky, W. H., & Henry, R. R. (2016). Poor medication adherence in type 2 diabetes: Recognizing the scope of the problem and its key contributors. *Patient Preference and Adherence*, *10*, 1299–1306. https://doi.org/10.2147/PPA.S106821

Stevens, S., Gallagher, S., Andrews, T., Ashall-Payne, L., Humphreys, L., & Leigh, S. (2022). The effectiveness of digital health technologies for patients with diabetes mellitus: A systematic review. *Frontiers in Clinical Diabetes and Healthcare*, *3*(October). https://doi.org/10.3389/fcdhc.2022.93 6752

Zimmermann, G., Venkatesan, A., Rawlings, K., & Scahill, M. D. (2021). Improved glycemic control with a digital health intervention in adults with type 2 diabetes: Retrospective study. *JMIR Diabetes*, *6*(2), 1–12. https://doi.org/10.2196/28033

**ORIGINAL RESEARCH**

# SEDENTARY LIFESTYLE AND COMORBIDITIES: OVERVIEW OF UPDATED EVIDENCE OF POTENTIAL HEALTH RISK

**\*Aristanto Prambudi[1], Ika Ainur Rofi'ah[2]**
[1]Faculty of Public Health, Airlangga University
[2]Faculty of Health Sciences Bina Sehat PPNI University
\*Corresponding Email: prambudiaristantanto@gmail.com

| ABSTRACT | Keywords |
|---|---|
| Sedentary lifestyle has become a significant public health concern worldwide, contributing significantly to the rising prevalence of non-communicable diseases such as hypertension, type 2 diabetes (T2DM), and obesity. Characterized by prolonged sitting or low-energy activities, it has been associated with physical and psychological health risks. This literature review examines and synthesizes recent evidence on the relationship between sedentary lifestyle and the development of common comorbidities. A literature review design was employed, sourcing relevant full-text articles published between 2018 and 2025 from databases including ScienceDirect, EBSCOhost, ProQuest, and Google Scholar. Inclusion criteria focused on studies that investigated the association between sedentary lifestyle and adult comorbidities, using quantitative, observational, and meta-analytical methods. The results of this study included eight peer-reviewed studies, including observational, cross-sectional analyses, systematic reviews, and randomized clinical trials. The findings showed a significant association between sedentary lifestyles and a variety of comorbidities, including hypertension, T2DM, and obesity. This literature review confirms that a sedentary lifestyle significantly contributes to the risk of hypertension, T2DM, and obesity. As sedentary lifestyles become increasingly common, particularly among the elderly, it is crucial to implement public health initiatives, encourage active living, and develop culturally appropriate interventions to reduce the impact of associated non-communicable diseases. | **Comorbidities, Hyperglycemia, Hypertension, Obesity, Sedentary Lifestyle** |

## INTRODUCTION

Sedentary lifestyle, defined as any waking activity characterized by an energy expenditure ≤1.5 METs while in a sitting, reclining, or lying posture, has become a pervasive global health issue (Tremblay et al., 2017). Rapid urbanization, digitalization, and lifestyle shifts have increased physical inactivity across all age groups, particularly among adults and the elderly. The World Health Organization (2024) reports that approximately 1 in 4 adults worldwide is not active enough, and sedentary behavior is responsible for more than 3.2 million deaths annually. The global prevalence of a sedentary lifestyle is linked with a substantial increase in comorbidities such as hypertension, hyperglycemia (type 2

diabetes), dyslipidemia, and obesity. For example, a systematic review found that adults engaging in more than 8 hours of sedentary behavior per day had a significantly higher risk of all-cause mortality and cardiovascular disease, even after adjusting for physical activity (Patterson et al., 2018). In Southeast Asia, recent national health surveys indicate that more than 35% of older adults spend over 6 hours daily in sedentary activities, correlating with the rise in chronic diseases (World Health Organization, 2020).

Comorbid conditions associated with a sedentary lifestyle impair individual quality of life and significantly increase the economic, clinical, and logistical burdens on national healthcare systems, particularly in low- and middle-income countries. Hypertension, type 2 diabetes, dyslipidemia, and obesity are frequently observed together in populations with low physical activity, exacerbating complications and treatment complexity (Katzmarzyk et al., 2022). According to Foss et al (2023), hypertension and diabetes alone account for over 70% of outpatient care visits among elderly individuals in rural health clinics, highlighting the increasing pressure on primary care services. Moreover, global estimates suggest that physical inactivity contributes to nearly $54 billion in direct healthcare costs and an additional $14 billion in productivity losses annually. These figures are projected to rise as sedentary lifestyles become more prevalent in aging populations. In Indonesia, the Basic Health Research 2018 reported that the prevalence of hypertension among individuals aged 55 and over reached 63%, while diabetes mellitus was found in 34.4% of the same group. These numbers are closely correlated with prolonged sedentary behaviors such as sitting, screen time, and lack of structured physical activity (Kementrian Kesehatan Republik Indonesia, 2019).

Given the growing evidence, a sedentary lifestyle is now recognized as an independent risk factor for non-communicable diseases (NCDs), and its modification is considered a strategic priority in preventive public health interventions (World Health Organization, 2020). Addressing this behavioral risk through education, community engagement, and health promotion, especially among vulnerable elderly groups, can significantly reduce the comorbidity burden and improve long-term outcomes. Understanding the link between sedentary lifestyles and comorbidities is essential to guide public health policies and community-based interventions. Therefore, this literature review aims to synthesize recent evidence regarding the impact of a sedentary lifestyle on common comorbidities such as hypertension, hyperglycemia, and obesity. This work highlights the critical need for preventive measures, especially in populations enrolled in chronic disease management programs.

## METHOD

This study employed a literature review design to explore the relationship between sedentary lifestyles and comorbidities, particularly hypertension, hyperglycemia, and obesity. Relevant literature was systematically gathered from multiple scientific databases, including EBSCOhost, ScienceDirect, ProQuest, and Google Scholar. The search focused on peer-reviewed journal articles published between 2018 and 2025, in either English or Indonesian, and only full-text access articles were considered for analysis. Keywords were structured using Medical Subject Headings (MeSH) terminology, including: 1) Comorbidities; 2) Hyperglycemia; 3) Hypertension; 4) Obesity; 5) Sedentary Lifestyle. Article selection was conducted manually through several screening stages: evaluating titles, keywords, abstracts, and the main content of each publication to ensure relevance to the topic. The inclusion criteria emphasized original research, systematic reviews, and meta-analyses that

directly examined the association between sedentary lifestyle and comorbidity risks in adult populations. The final data set was synthesized narratively to highlight key findings, emerging trends, and gaps in the literature, offering a comprehensive and updated understanding of the health implications associated with sedentary lifestyles.

## RESULTS

**Table 1 Article Review**

| Authors (Years) | Aimed | Method | Results | Outcomes |
|---|---|---|---|---|
| (Flashner et al., 2020) | To investigate whether obesity and a sedentary lifestyle are associated with fractional exhaled nitric oxide (FeNO), a marker of airway inflammation, in adolescents who were not selected based on allergic disease. | Design: Observational cohort study (Project Viva)<br><br>Sample & Sampling: 929 adolescents, median age 12.9 years, from a pre-birth cohort (Project Viva); non-random, follow-up sampling.<br><br>Data Analysis: Linear regression with log-transformed FeNO as outcome. Models were adjusted for demographic, socioeconomic, and asthma-related confounders. | After adjusting for asthma, watching$\geq$2 hours of TV per day was associated with 12% lower FeNO (95% CI: $-21\%$, $-2\%$).<br><br>Higher body fat percentage (measured by DXA) was associated with 9% lower FeNO per IQR increase (95% CI: $-17\%$, $-1\%$).<br><br>Low BMI (<5th percentile) was associated with 22% lower FeNO, and high BMI ($\geq$85th percentile) with 13% lower FeNO compared to normal BMI. | Sedentary lifestyle and both high and low BMI are significantly associated with reduced FeNO, even after adjusting for asthma. These findings suggest that lifestyle and body weight affect airway inflammation markers, with implications for interpreting FeNO in clinical practice. |
| (Guo et al., 2020) | To quantitatively assess the dose–response relationship between total sedentary behaviour and TV viewing with risks of overweight/obesity, | Design: Dose–response meta-analysis<br><br>Sample & Sampling: 1,071,967 participants across 58 studies (21 on overweight/obesity, 23 on type 2 diabetes, 14 on hypertension). Inclusion based on MOOSE guidelines | A dose–response meta-analysis found a significant association between sedentary behavior and increased risk of chronic health conditions. | These findings indicate that both total sedentary behavior and television viewing independently contribute to the development |

| | | | | |
|---|---|---|---|---|
| | type 2 diabetes, and hypertension. | from PubMed, EMBASE, and Web of Science.<br><br>Data Analysis: Pooled Relative Risk (RR) calculated via random-effects model, using restricted cubic spline models for linear/non-linear relationships. | Specifically, each additional hour per day of total sedentary time was associated with a 5% increase in the risk of developing type 2 diabetes (RR: 1.05, 95% CI: 1.04–1.07), a 4% increase in the risk of hypertension (RR: 1.04, 95% CI: 1.00–1.07), and a non-linear increase in the risk of overweight or obesity, with a relative risk of 1.38 (95% CI: 1.20–1.58) observed at three hours of sedentary time per day. Furthermore, time spent watching television showed even stronger associations. Each additional hour of TV viewing per day increased the risk of type 2 diabetes by 8% (RR: 1.08), hypertension by 6% (RR: 1.06), and obesity by 53% at three hours per day (RR: 1.53). | of major metabolic and cardiovascular comorbidities. |
| (Joardar et al., 2020) | To investigate the prevalence and risk factors of | Design: Cross-sectional study. | The study found that the prevalence of | Advancing age and family history are |

| | | | | |
|---|---|---|---|---|
| | hypertension among urban dwellers with a sedentary lifestyle in Dhaka, Bangladesh. | Sample & Sampling: 149 adults (≥18 years) with sedentary lifestyle, selected using simple random sampling from Dania Union, Dhaka.<br><br>Data Analysis: Univariate analysis and binary logistic regression | hypertension among urban dwellers with a sedentary lifestyle was 39%. The risk of developing hypertension increased significantly with age, particularly among individuals aged 51–60 years (Adjusted Odds Ratio [AOR]: 3.11) and those aged 61 years or older (AOR: 5.83). Additionally, having a family history of hypertension was strongly associated with a higher risk (AOR: 3.59). Interestingly, individuals with high socioeconomic status had a 71% lower risk of hypertension compared to those with low socioeconomic status. On the other hand, abdominal obesity was not found to be a statistically significant factor in this study. | significant risk factors for hypertension. High socioeconomic status appears to be protective. Preventive strategies should promote physical activity and address lifestyle-related factors. |
| (Patterson et al., 2018) | To examine the dose–response relationship between sedentary behaviour and the risk of all-cause | Systematic review and dose–response meta-analysis of prospective studies; included 34 studies with over 1.3 million participants. Sedentary behaviour was | Each one-hour increase in daily sitting time was associated with a 2% higher risk of all-cause | High sedentary time is associated with increased risks of mortality and |

| | | | mortality and a 5% higher risk of type 2 diabetes, with non-linear relationships observed. The risk of all-cause mortality rose more steeply after 8 hours of sitting per day, while the risk of cardiovascular disease (CVD) mortality increased more sharply after 6 hours per day. Although adjusting for physical activity attenuated these risks, it did not eliminate them. | type 2 diabetes, even after adjusting for physical activity. Reducing sedentary time could have public health benefits. |
| mortality, cardiovascular disease (CVD) mortality, cancer mortality, and incident type 2 diabetes. | typically measured via self-report or accelerometers. | | |
| (Priasmoro & Lestari, 2023) | To examine the prevalence of a sedentary lifestyle and its influence on chronic disease risk and stress levels in Malang, Indonesia. | Quantitative descriptive study involving 420 respondents aged 17–55 years. Data were collected using the International Physical Activity Questionnaire (IPAQ) and Perceived Stress Scale (PSS). Statistical analysis used the Chi-Square and Odds Ratio tests. | A total of 83.8% of respondents were identified as having a sedentary lifestyle. While sedentary behavior was not significantly associated with the risk of chronic diseases such as obesity, diabetes, and heart disease (p = 0.867), it showed a significant association with moderate to severe stress levels (p = 0.001), indicating that prolonged inactivity may be a contributing factor to increased psychological | In the studied population, sedentary lifestyle is a dominant predictor of stress but not of chronic diseases. It emphasizes the need for increased physical activity to manage stress and promote better mental health. |

| | | | stress within the population. | |
|---|---|---|---|---|
| (Silveira et al., 2022) | To investigate the prevalence of sedentary behavior (SB) and physical inactivity (PI), their association with obesity, and the methods and cut-off points used for assessment in adults and older adults. | Systematic review and meta-analysis of 23 studies (n = 638,000), including 111,851 individuals with obesity. Data were collected using both objective (accelerometers/pedometers) and subjective (questionnaires) methods. | The combined prevalence of SB was 31% and PI was 43%. Obesity was significantly associated with SB (OR = 1.45) and PI (OR = 1.52). Subjective methods showed stronger associations than objective ones. | There is a high prevalence of sedentary behavior and physical inactivity in individuals with obesity. Both behaviors are significantly associated with increased obesity risk, highlighting the need for standardized assessment tools and targeted public health interventions. |
| (Sofra & Badami, 2020) | To assess the adverse effects of sedentary lifestyles and evaluate an alternative exercise method's impact on inflammation, oxidative stress, and metabolic health in diabetic and prediabetic individuals. | A one-month double-blind randomized clinical trial with 20 obese diabetic/prediabetic patients using a simulated multi-exercise regimen device. Measurements included blood tests, sonography, BMI, fat/muscle composition, and structured interviews. | Significant reductions in fasting and postprandial glucose and insulin, triglycerides, visceral and overall fat. Increases in HDL and skeletal muscle mass were observed. Sonography showed resolution of fatty liver in 7 patients. | The alternative exercise method was effective in improving metabolic health, reducing inflammation markers, and decreasing oxidative stress indicators in sedentary diabetic and prediabetic individuals. It may serve as a viable substitute for traditional exercise. |
| (Van Oort et al., 2020) | To examine the causal associations of 18 cardiovascular and | Two-sample Mendelian randomization using genetic data from large European GWAS datasets, including | Six modifiable risk factors (BMI, triglycerides, | Identified modifiable causal risk factors of |

| | | | |
| --- | --- | --- | --- |
| lifestyle-related risk factors with hypertension using Mendelian randomization (MR). | FinnGen and UK Biobank cohorts. | alcohol dependence, type 2 diabetes, smoking initiation, and insomnia) were positively associated with hypertension risk. HDL-C and higher educational level were negatively associated. | hypertension, providing insights into prevention strategies. Findings support prioritizing HDL-C, BMI, and sleep in hypertension prevention. |

This literature review included eight peer-reviewed studies, including observational studies, cross-sectional analyses, systematic reviews, and randomized clinical trials. The findings consistently demonstrate a significant association between sedentary lifestyles and a variety of comorbidities, including hypertension, type 2 diabetes, and obesity. Based on the reviewed studies, it is evident that sedentary behavior is strongly associated with various adverse health outcomes, including metabolic, cardiovascular, and psychological conditions. Sedentary time has been linked to increased risks of type 2 diabetes, hypertension, and obesity, as well as elevated all-cause mortality. Moreover, sedentary activities such as prolonged television viewing pose even greater risks. In adolescents, reduced markers of airway inflammation suggest that even respiratory health may be affected by inactivity. The observed dose-response relationships highlight that the health risks escalate with each additional hour of sedentary behavior, underscoring the importance of reducing prolonged sitting in daily routines.

In addition to physical health outcomes, a sedentary lifestyle has been shown to contribute to psychological stress, as demonstrated by findings from the Indonesian population. Meanwhile, studies examining interventions, such as low-impact exercise regimens, provide promising evidence for mitigating these risks and improving metabolic health indicators. The causal role of lifestyle factors, especially BMI, triglycerides, and insomnia, in hypertension further reinforces the need for targeted public health strategies. Collectively, these findings emphasize the urgent need to reduce sedentary behavior through structured interventions, policy efforts, and education to improve overall population health and prevent non-communicable diseases.

## DISCUSSION
### Hypertension

The relationship between sedentary lifestyle and hypertension has been consistently highlighted across various studies, underscoring its role as a significant modifiable risk factor. Guo et al (2020) demonstrated that each additional hour of sedentary behavior was associated with a 4% increased risk of hypertension, and this risk was amplified with extended periods of television viewing. This dose–response relationship suggests that the amount and nature of sedentary behavior (e.g., passive screen time) may influence

56

cardiovascular health outcomes. Supporting this, Patterson et al (2018) found that the risk of cardiovascular disease (CVD) mortality increased sharply after six hours of sitting per day, even after adjusting for levels of physical activity. This indicates that prolonged sedentary time exerts an independent effect on blood pressure regulation and cardiovascular risk.

Further evidence from a cross-sectional study in Bangladesh by Joardar et (2020) revealed a hypertension prevalence of 39% among urban adults with sedentary lifestyles. Advancing age and a family history of hypertension were identified as strong predictors, while higher socioeconomic status appeared to offer a protective effect. These findings suggest that sedentary behavior interacts with other demographic and genetic factors, compounding the risk of hypertension. Moreover, Van Oort et al (2020) using Mendelian randomization methods, confirmed the causal role of several lifestyle-related risk factors in the development of hypertension, including body mass index (BMI), triglycerides, smoking initiation, alcohol dependence, type 2 diabetes, and insomnia. Their study also highlighted protective associations with higher levels of HDL cholesterol and educational attainment, suggesting the influence of both biological and social determinants.

These findings support a multifaceted understanding of hypertension as a lifestyle-related condition influenced by both behavioral and genetic risk factors. The consistent association between prolonged sedentary behavior and elevated blood pressure across diverse populations reinforces the need for public health interventions that promote regular movement and reduce sedentary time. Integrating physical activity promotion into hypertension prevention strategies could be particularly beneficial in high-risk groups such as older adults, urban residents, and individuals with existing metabolic comorbidities. Moving forward, policy measures that encourage active lifestyles, limit screen time, and improve access to health education could play a pivotal role in reducing hypertension prevalence and its associated disease burden (Guo et al., 2020; Patterson et al., 2018; Van Oort et al., 2020).

**Type 2 Diabetes**
The growing body of evidence highlights a strong link between sedentary behavior and the risk of developing type 2 diabetes, indicating that prolonged physical inactivity is a significant behavioral determinant of metabolic dysfunction. According to a comprehensive dose–response meta-analysis by Guo et al (2020), each additional hour of sedentary time was associated with a 5% increase in the risk of type 2 diabetes. Furthermore, more specific sedentary activities, such as television viewing, demonstrated even stronger associations each additional hour per day increasing diabetes risk by 8%. This supports the idea that different types of sedentary lifestyles have varying levels of risk, with passive screen-related activities potentially having more harmful metabolic effects, likely influenced by accompanying habits such as frequent snacking or extended periods of sitting without breaks.

In line with these findings, Patterson et al., 2018 reported that sedentary time independently predicted the incidence of type 2 diabetes, even after

controlling for physical activity levels. Their meta-analysis, involving over 1.3 million individuals, found a non-linear relationship, where the risk rose more steeply with prolonged daily sitting, particularly beyond 8 hours per day. This suggests that while regular physical activity is essential, it may not fully mitigate the metabolic risks of extended sedentary periods. Adding further depth, Van Oort et al (2020) Through a Mendelian randomization approach, evidence was provided supporting the causal relationship between type 2 diabetes and hypertension. This indicates shared pathophysiological pathways likely influenced by obesity, insulin resistance, and chronic inflammation.

Interestingly, intervention-based studies also support these associations. Sofra & Badami (2020) demonstrated that reducing a sedentary lifestyle through an alternative exercise method significantly improved glucose and insulin levels in diabetic and prediabetic individuals. Their findings showed reduced fasting and postprandial glucose, decreased triglycerides and body fat, and increased HDL and muscle mass. These improvements indicate that even low-intensity or simulated physical activity can yield substantial metabolic benefits for individuals at high risk or already diagnosed with type 2 diabetes.

These studies underscore the importance of addressing a sedentary lifestyle as a critical modifiable factor in diabetes prevention and management. Public health policies and clinical guidelines should go beyond promoting physical activity and emphasize strategies to reduce total sitting time and interrupt prolonged bouts of inactivity. Tailored interventions that incorporate behavioral

counseling, environmental modifications, and structured activity alternatives may be particularly effective in reducing the burden of type 2 diabetes in both developed and developing regions.

**Obesity**

Obesity is one of the most prevalent and complex health conditions influenced by lifestyle behaviors, and a sedentary lifestyle has emerged as a critical contributing factor. The evidence consistently shows that individuals who engage in prolonged sedentary activities face a significantly higher risk of becoming overweight or obese. In a large-scale dose–response meta-analysis, Guo et al (2020) found that a sedentary lifestyle was strongly associated with increased obesity risk, with a relative risk (RR) of 1.38 at three hours of sitting per day. Television viewing presented an even higher risk, where three hours per day correlated with a 53% increased risk of obesity (RR = 1.53). These findings suggest that the duration and context of sedentary activity play a role, potentially due to accompanying behaviors such as unhealthy eating and reduced metabolic expenditure.

Silveira et al (2022) further, a systematic review and meta-analysis involving over 638,000 individuals confirmed this relationship. They reported that a sedentary lifestyle and physical inactivity were significantly associated with obesity, with odds ratios of 1.45 and 1.52, respectively. Interestingly, the subjective assessment method showed stronger associations than objective tools like accelerometers, suggesting that self-reported data might capture contextual factors (e.g., screen time, social inactivity) linked to weight gain. These findings highlight the need for improved,

standardized methods to assess a sedentary lifestyle in obesity-related research.

In addition to observational studies, intervention-based research has demonstrated that reducing a sedentary lifestyle can yield measurable improvements in obesity-related markers. Sofra & Badami (2020) conducted a randomized clinical trial on obese diabetic and prediabetic patients using an alternative low-impact exercise regimen. The intervention significantly reduced visceral and overall body fat and improved metabolic parameters such as triglycerides and HDL levels. These findings underscore the potential of even non-traditional or simulated physical activity in combating obesity, particularly in populations with limited mobility or comorbid conditions.

The evidence illustrates a robust association between sedentary lifestyles and obesity. Given the rising global burden of obesity and its complications, reducing sedentary time should be prioritized in public health strategies. Interventions should not only promote physical activity but also aim to break up prolonged sitting, especially in high-risk groups such as adults with existing metabolic conditions or those in sedentary occupations. Future research should continue to explore culturally adapted, accessible interventions that integrate behavioral, environmental, and technological components to reduce a sedentary lifestyle and curb obesity rates.

## CONCLUSIONS

This literature review confirms that a sedentary lifestyle significantly contributes to the risk of hypertension, type 2 diabetes, and obesity. As sedentary lifestyles become increasingly common, particularly among urban and elderly populations, it is crucial to implement public health initiatives, encourage active living, and develop culturally appropriate interventions to help reduce the impact of associated non- communicable diseases.

## REFERENCES

Flashner, B. M., Rifas-Shiman, S. L., Oken, E., Camargo, C. A., Platts-Mills, T. J., Workman, L., Litonjua, A. A., Gold, D. R., & Rice, M. B. (2020). Obesity, sedentary lifestyle, and exhaled nitric oxide in an early adolescent cohort. *Pediatric Pulmonology*, *55*(2), 503–509. https://doi.org/10.1002/ppul.24597

Foss, R., Fischer, K., Lampman, M. A., Laabs, S., Halasy, M., Allen, S. V., Garrison, G. M., Sobolik, G., Bernard, M., Sosso, J., & Thacher, T. D. (2023). Disparities in diabetes care: Differences between rural and urban patients within a large health system. *Annals of Family Medicine*, *21*(3), 234–239. https://doi.org/10.1370/afm.2962

Guo, C., Zhou, Q., Zhang, D., Qin, P., Li, Q., Tian, G., Liu, D., Chen, X., Liu, L., Liu, F., Cheng, C., Qie, R., Han, M., Huang, S., Wu, X., Zhao, Y., Ren, Y., Zhang, M., Liu, Y., & Hu, D. (2020). Association of total sedentary behaviour and television viewing with risk of overweight/obesity, type 2 diabetes and hypertension: A dose–response meta-analysis. *Diabetes, Obesity and Metabolism*, *22*(1), 79–90. https://doi.org/10.1111/dom.13867

Joardar, A. I., Khaled, M. F. I., Mahabub, S. E., Singha, C. K., & Haque, M. A. (2020). Factors Associated with Hypertension among Urban Dwellers with Sedentary Lifestyle: A Cross-Sectional Study. *Journal of National Institute of Neurosciences Bangladesh*, *6*(2), 129–134. https://doi.org/10.3329/jninb.v6i2.50780

Katzmarzyk, P. T., Friedenreich, C.,

Shiroma, E. J., & Lee, I. M. (2022). Physical inactivity and non-communicable disease burden in low-income, middle-income and high-income countries. *British Journal of Sports Medicine*, *56*(2), 101–106. https://doi.org/10.1136/bjsports-2020-103640

Kementrian Kesehatan Republik Indonesia. (2019). *Laporan Riskesdas 2018 Nasional.pdf.* https://repository.badankebijakan.kem kes.go.id/id/eprint/3514/1/Laporan Riskesdas 2018 Nasional.pdf

Patterson, R., McNamara, E., Tainio, M., de Sá, T. H., Smith, A. D., Sharp, S. J., Edwards, P., Woodcock, J., Brage, S., & Wijndaele, K. (2018). Sedentary behaviour and risk of all-cause, cardiovascular and cancer mortality, and incident type 2 diabetes: a systematic review and dose response meta-analysis. *European Journal of Epidemiology*, *33*(9), 811–829. https://doi.org/10.1007/s10654-018-0380-1

Priasmoro, D. P., & Lestari, R. (2023). Prevalence of a Sedentary Lifestyle As a Predictor of Risk of Chronic Diseases and Stress Levels in Malang, Indonesia. *Malaysian Journal of Public Health Medicine*, *23*(1), 11–16. https://doi.org/10.37268/mjphm/vol.2 3/no.1/art.1816

Silveira, E. A., Mendonça, C. R., Delpino, F. M., Elias Souza, G. V., Pereira de Souza Rosa, L., de Oliveira, C., & Noll, M. (2022). Sedentary behavior, physical inactivity, abdominal obesity and obesity in adults and older adults: A systematic review and meta-analysis. *Clinical Nutrition ESPEN*, *50*, 63–73. https://doi.org/10.1016/j.clnesp.2022. 06.001

Sofra, X., & Badami, S. (2020). Adverse Effects of Sedentary Lifestyles: Inflammation, and High-Glucose Induced Oxidative Stress—A Double Blind Randomized Clinical Trial on Diabetic and Prediabetic Patients. *Health*, *12*(08), 1029–1048. https://doi.org/10.4236/health.2020.12 8076

Tremblay, M. S., Aubert, S., Barnes, J. D., Saunders, T. J., Carson, V., Latimer-Cheung, A. E., Chastin, S. F. M., Altenburg, T. M., Chinapaw, M. J. M., Aminian, S., Arundell, L., Hinkley, T., Hnatiuk, J., Atkin, A. J., Belanger, K., Chaput, J. P., Gunnell, K., Larouche, R., Manyanga, T., … Wondergem, R. (2017). Sedentary Behavior Research Network (SBRN) - Terminology Consensus Project process and outcome. *International Journal of Behavioral Nutrition and Physical Activity*, *14*(1), 1–17. https://doi.org/10.1186/s12966-017-0525-8

Van Oort, S., Beulens, J. W. J., Van Ballegooijen, A. J., Grobbee, D. E., & Larsson, S. C. (2020). Association of Cardiovascular Risk Factors and Lifestyle Behaviors with Hypertension: A Mendelian Randomization Study. *Hypertension*, *76*(6), 1971–1979. https://doi.org/10.1161/HYPERTENS IONAHA.120.15761

World Health Organization. (2020). WHO Guidelines on physical activity and sedentary behaviour. In *Routledge Handbook of Youth Sport*. https://www.who.int/publications/i/ite m/9789240015128

World Health Organization. (2024). *Physical activity*. https://www.who.int/news-room/fact-sheets/detail/physical-activity

**ORIGINAL RESEARCH**

# IMPACT OF EATING PATTERNS ON URIC ACID LEVELS IN THE ELDERLY

**Arum Dwi Ningsih**
Faculty of Health Science, Universitas Bina Sehat PPNI Mojokerto, Indonesia
Corresponding Email:arumdn87@gmail.com

| ABSTRACT | Keywords |
|---|---|
| The elderly as a population are at risk of having problems with decreasing body physiology, one of which is uric acid metabolism. One of the factors that influence an increase in uric acid levels is poor diet, namely foods with excessive purine content. The aim of this research is to determine the relationship between diet and uric acid levels in the elderly. The research design used is descriptive analytical research using a cross-sectional research approach. The population in this study were elderly posyandu participants in the working area of the Kedundung Community Health Center, Mojokerto City. Sampling used the "accidental sampling" technique. The results of bivariate correlation analysis using the Spearman's rho test showed that the p value = 0.000. This means that there is a relationship between diet and uric acid levels in the elderly. A bad diet that can cause high uric acid levels is food with a high purine content. | **Eating Patterns, Uric Acid, Elderly** |

## INTRODUCTION

Health problems in humans often occur in certain age groups, one of which is the elderly. As a person ages, there will be changes in the anatomical structure and physiology of the body. This is because the ability of cells and tissues decreases in regeneration and metabolic activity, resulting in a decrease in organ function (Suntara et al., 2022).

Some elderly people as a population at risk have three health risk characteristics, namely, biological risks including age-related risks, social and environmental risks and behavioral or lifestyle risks. (Nikmah & Khomsatun, 2020). A diet high in purine and lack of activity are things that are often experienced by the elderly. This will result in an increase in uric acid levels (Gout) and if not controlled properly, it can lead to complications of further organ disorders.

WHO states that arthritis sufferers in Indonesia reach 81% of the population, only 24% go to the doctor while 71% tend to immediately take over-the-counter pain relievers. This figure places Indonesia as the country with the highest incidence of arthritis when compared with other Asian countries, such as Hong Kong, Singapore, Malaysia and Taiwan. The prevalence of joint disease based on health workers' diagnosis is highest in Bali (19.3%) followed by Aceh (18.3%), West Java (17.5%) and Papua (15.4%)3. From time to time the number of gout sufferers tends to

61

increase. The national prevalence of joint disease is 30.3%(Arjani, 2018).

Elderly people often experience disorders caused by the aging process, including blood circulation disorders (hypertension, blood vessel disorders, blood vessel disorders in the brain and kidneys), joint disorders (osteoarthritis, gout), and various neoplastic diseases. Almost 8% of people aged 50 years and over have joint complaints, for example rheumatic pain, aches and sometimes pain. Everyone suffers from gout. This is caused by 3 trigger factors, namely genetic, hormonal factors and due to poor eating patterns such as frequently consuming foods that contain high purines, for example meat, crab, offal and nuts (Dewi & Ardani, 2013).

Based on preliminary study data conducted by researchers, it is known that the Kedundung Community Health Center is a community health center in the working area of Mojokerto City which has a fairly high elderly population. To provide optimal service to the community. Kedudung Community Health Center carries out posyandu activities for the elderly in 25 places. The results of interviews with elderly posyandu cadres revealed that several elderly people experienced increased uric acid levels. So researchers are interested in conducting an analysis of "The Relationship between Diet and Uric Acid Levels in the Elderly".

## METHOD

Research design used is an analytical descriptive research with using a research approach cross-sectional, the independent variable is eating pattern and the dependent variable is uric acid levels which are measured simultaneously. The population in this study were elderly posyandu participants in the working area of the Kedundung Community Health Center, Mojokerto City. Sampling used the "accidental sampling" technique. The statistical test carried out was univariate analysis in the form of respondent characteristic data consisting of age, gender and education level. Univariate analysis of the two variables, namely diet and uric acid levels. Meanwhile, bivariate correlation analysis uses the Spearman's rho test.

## RESULTS

**Table 1. Respondents' Frequency Distribution Based on Age, Education, and Gender**

| No | Characteristics | Number of Respondents | % |
|----|-----------------|----------------------|-----|
| 1 | Age | | |
| | Midle Age (45-59) | 10 | 25 |
| | Elderly (60-74) | 29 | 72,5 |
| | Old (75-90) | 1 | 2.5 |
| 2 | Gender | | |
| | Male | 5 | 12,5 |
| | Female | 35 | 87,5 |
| h3 | Education | | |
| | elementary school | 2 | 5 |
| | Junior high school | 23 | 57,5 |
| | Senior High School | 15 | 37,5 |
| | Total | 40 | 100 |

Based on the data collection contained in Table 1. It is known that the majority of respondents were in the Elderly age range, 29 (72.5%). Most of the respondents' gender was female, 35 (87.5%). The education level of most of the respondents was junior high school, 23 (57.5%).

**Table 2 Frequency Distribution of Eating Patterns**

| No. | Eating Patterns | Number of Respondents | % |
|-----|-----------------|----------------------|-----|
| 1. | Good | 16 | 40 |
| 2. | Worst | 24 | 60 |
| | Total | 40 | 100 |

Based on table 2, it is known that the majority of respondents have worst eating patterns, 24 (60%).

**Table 3. Frequency Distribution of Respondents based on Uric Acid Levels**

| No. | Uric Acid Level | Number of Respondents | % |
|---|---|---|---|
| 1. | Normal | 16 | 40 |
| 2. | Abnormal | 24 | 60 |
| | Jumlah | 40 | 100 |

Based on table 3, it is known that the majority of respondents had uric acid levels in the abnormal category, 24 (60%).

**Table 4. Relationship between Diet and Uric Acid Levels**

Based on table 4, it is known that 15 respondents (37.5%) have a good diet with normal uric acid levels. A total of 23 respondents (57.5%) had poor eating patterns with abnormal uric acid levels. The results of the Spearman's rho test analysis show a p value of 0.000.

| No | Pola makan | Uric Acid Levels | | | | Total | |
|---|---|---|---|---|---|---|---|
| | | Normal | | Abnormal | | | |
| | | f | % | f | % | f | % |
| 1. | Good | 15 | 37,5 | 1 | 2,5 | 16 | 40 |
| 2. | Worst | 1 | 2,5 | 23 | 57,5 | 24 | 60 |
| | Total | | | | | 40 | 100 |
| | P Value | 0,000 | | | | | |

## DISCUSSION

### Uric Acid Levels

The research results that we can see in table 2 show that the majority of respondents had abnormal uric acid levels, 24 (60%). Hyperuresemia is a condition that occurs due to high levels of uric acid in the blood that exceed the normal threshold value. Hyperuresemia occurs due to disturbances in metabolic processes in the formation of uric acid in the body and due to decreased excretion of uric acid.(Siti Fadlilah & Adi Sucipto, 2018).

Several factors influence uric acid levels, namely age and gender. The research results showed that the majority of respondents were in the Elderly age range, 29 (72.5%). As we get older, there is a decline in the function of the body's organs and systems. The aging process can cause disruption in the formation of the urikinase enzyme which results in the oxidation of uric acid into allotonin, so that the excretion process becomes easier. If there is a decrease in the synthesis of this enzyme, the uric acid excretion process is disrupted and causes the accumulation of uric acid in the blood (Therik, 2019).

The results of this study are in line with research (Novianti et al., 2019). In the univariate analysis data, it was found that 42 (55.3%) elderly respondents had abnormal uric acid levels.

### Dietary Habit

Based on the research results seen in table 2, it is known that the majority of respondents have bad eating patterns, 24 (60%). One factor that influences uric acid levels is diet. Foods high in purine consumed in excess can increase uric acid levels in the blood. Purine is an organic base compound that makes up nucleic acids or cell nuclei, and is included in the group of amino acids, namely as an element that forms proteins (Dungga, 2022).

The results of this study are in line with research (Kussoy et al., 2019) As many as 29 respondents (56.9%) had frequent high-purine eating habits. The uric acid contained in our body should not exceed normal levels. Excess uric acid can be caused by triggers, namely foods and other compounds that contain lots of purine. Purine in the human body is available as much as 85% for its daily needs, so it only needs 15% intake from outside.

## Relationship between Diet and Uric Acid Levels in the Elderly

Based on the results of the bivariate analysis test shown in table 4. The Relationship between Dietary Patterns and Uric Acid Levels, it is known that 15 respondents (37.5%) had good eating patterns with normal uric acid levels. A total of 23 respondents (57.5%) had poor eating patterns with abnormal uric acid levels. The results of the Spearman's rho test analysis show that the p value is 0.000. This shows that there is a relationship between diet and uric acid levels in the elderly.

Diet is a person's way of regulating the amount and type of food in their daily consumption. A person's eating pattern can be seen from the amount, frequency, type, function and method of processing the food. Poor and irregular eating patterns, such as consuming foods high in purine content, can cause an increase in uric acid levels in the blood (Songgigilan et al., 2019).

The results of this study are in line with research (Lidiawati, M. dan Fadhil, 2019). Based on bivariate analysis using the chi-square test ($\alpha$= 0.05), p value = 0.004. This shows that there is a relationship between diet and uric acid levels. Poor eating patterns occur due to irregular eating, as well as consuming foods with a high purine content.

Some food ingredients that are often consumed by people with moderate purine content are beef, chicken, tofu, tempeh, beans, spinach, kangkong, papaya leaves and cassava leaves. This food ingredient is a food ingredient that needs to be limited, consumption should not be excessive because it can increase uric acid levels in the blood.

Uric acid is a substance that is the end result of purine metabolism in the body in crystal form. Purine intake in a normal diet is 600-1000 mg/day. However, for gouty arthritis sufferers, purine intake is limited to 120-150 mg/day. Limiting purine intake means reducing consumption of foods that are high in protein. The recommended protein intake for gouty arthritis sufferers is around 50-70 grams of raw materials per day or 0.8 – 1 gram/kg body weight per day (Barangmanise et al., 2018).

## CONCLUSION

Based on research data using Spearman's rho test analysis, it is known that the p value = 0.000. P value <0.005. This means that there is a relationship between diet and uric acid levels in the elderly. A bad diet that can cause high uric acid levels is food with a high purine content.

## REFERENCES

Arjani, I. (2018). Gambaran Kadar Asam Urat, Glukosa Darah Dan Tingkat Pengetahuan Lansia Di Desa Samsam Kecamatan Kerambitan Kabupaten Tabanan. *Meditory : The Journal of Medical Laboratory*, 6(1), 46–55. https://doi.org/10.33992/m.v6i1.229

Barangmanise, S., Karundeng, Y., & Latif, Y. (2018). Kebiasaan Makan Makanan Tinggi Purin pada Penderita Gout Arthritis di Puskesmas Tuminting. *Prosiding Seminar Nasional*, 1(3), 528–541. https://ejurnal.poltekkes-manado.ac.id/index.php/prosiding2018/article/view/469

Dewi, P. A., & Ardani, I. G. A. I. (2013). *Angka Kejadian serta Faktor-Faktor yang Mempengaruhi Gangguan Tidur (Insomnia) Pada Lansia di Panti Sosial Tresna Werda Wana Seraya Denpasar Bali Tahun 2013 Putu*. 20(1), 1–9.

Dungga, E. F. (2022). Pola Makan dan Hubungannya Terhadap Kadar Asam Urat. *Jambura Nursing Journal*, 4(1),

7–15. https://doi.org/10.37311/jnj.v4i1.13462

Kussoy, V. F. M., Kundre, R., & Wowiling, F. (2019). Kebiasaan Makan Makanan Tinggi Purin Dengan Kadar Asam Urat Di Puskesmas. *Jurnal Keperawatan*, *7*(2), 1–7. https://doi.org/10.35790/jkp.v7i2.27476

Lidiawati, M. dan Fadhil, I. (2019). Hubungan Pola Makan Dengan Kadar Asam Urat Pada Wanita Postmenopause Diposyandu Lansia Wilayah Kerja Puskesmas Krueng Barona Jaya Aceh Besar. *Semdi Unaya*, 306–315. http://jurnal.abulyatama.ac.id/index.php/semdiunaya/article/view/461

Nikmah, K., & Khomsatun, M. (2020). Pelatihan Kader Lansia Dalam Upaya Peningkatan Pelayanan Kesehatan Lansia Pada Keluarga. *Journal of Community Engagement in Health*, *3*(2), 210–216. https://doi.org/10.30994/jceh.v3i2.66

Novianti, A., Ulfi, E., & Hartati, L. S. (2019). Hubungan jenis kelamin, status gizi, konsumsi susu dan olahannya dengan kadar asam urat pada lansia. *Jurnal Gizi Indonesia (The Indonesian Journal of Nutrition)*, *7*(2), 133–137. https://doi.org/10.14710/jgi.7.2.133-137

Siti Fadlilah, & Adi Sucipto. (2018). Analisis Faktor Yang Berhubungan Dengan Kadar Asam Urat Pada Masyarakat Dusun Demangan Wedomartani, Ngemplak, Sleman, Yogyakarta. *Jurnal Keperawatan Respati Yogyakarta*, *5*(1), 1–6.

Songgigilan, A. M. ., Rumengan, I., & Kundre, R. (2019). Hubungan Pola Makan Dan Tingkat Pengetahuan Dengan Kadar Asam Urat Dalam Darah Pada Penderita Gout Artritis Di Puskesmas Ranotana Weru. *Jurnal Keperawatan*, *7*(1), 1–8.

https://doi.org/10.35790/jkp.v7i1.24325

Suntara, D. A., Akba, A. D., & Hutagalung, M. (2022). HUBUNGAN ANTARA AKTIFITAS FISIK DENGAN KADAR ASAM URAT (GOUT) PADA LANSIA DI WILAYAH KERJA PUSKESMAS BATU AJI KOTA BATAM. *Jurnal Inovasi Pendidikan Dan Sains*, *2*(12), 3805–3812.

Therik, K. S. S. (2019). Analisis Faktor-Faktor Yang Mempengaruhi Kadar Asam Urat Pada Pasien Di Puskesmas Naibonat Karya Tulis Ilmiah. *Karya Tulis Ilmiah, Program Studi Analis Kesehatan Politeknik Kesehatan Kementrian Kesehatan Kupang*, 1-46 hal.

**ORIGINAL RESEARCH**

# THE INFLUENCE OF HEALTH EDUCATION THROUGH AUDIOVISUAL MEDIA ON THE IMPLEMENTATION OF GYMNASTICS   EYES ON TEENAGERS AT SMAN XI  SURABAYA

**Binarti Dwi Wahyuningsih**
Universitas Bina Sehat PPNI Mojokerto
binarti.dwiwahyuni@gmail.com

| ABSTRACT | Keywords |
|---|---|
| Using smartphones for hours makes the eyes tired and vision becomes blurred. Eye exercise therapy can improve eye health, with a series of movements carried out by the eye organs so that eye acuity increases. Health education can change unhealthy behavior into healthy behavior, so audiovisual media is needed to support the learning process. The purpose of this study was to prove the effect of health education through audiovisual media on the implementation of eye exercises in adolescents at SMAN XI Surabaya. The research method used was pre-experiment with a one group pre-test post-test design. The population of all grade X students at SMAN XI Surabaya was 426 students. The sampling technique used in this study was simple random sampling so that the sample obtained was 43 students. The instrument in this study was an observation sheet. Based on the results of the chi-square test analysis, the p value = 0.000 and α <0.05 were obtained, so this shows p <α which means that this study shows that there is an effect of health education through audiovisual media on the implementation of eye exercises in adolescents at SMAN XI Surabaya. Providing health education using audiovisual media can provide a lot of stimulus to students, because the audiovisual nature combines sound and images, making it easier for students to do eye exercises independently. | health education, audiovisual media, and eye exercises |

## INTRODUCTION
### 1.1 BACKGROUND

Technology is something that is very closely related to humans today. Through technology, the information window is wide open so that humans can develop in terms of education, economics, creativity and other fields, but we must be careful about its use for children from early childhood to adulthood. Gadget screens emit light called high energy visible or commonly known as blue light which is dangerous for the eyes. There is a risk of problems such as computer vision syndrome, a symptom that arises because the eyes focus too much on the screen, causing an uncomfortable feeling if done for too long a period. Apart from that, prolonged use of gadgets can also cause farsightedness

Good vision is very necessary to support the learning process where vision is one of the pathways for receiving information provided in the learning process. So eye health is very important in supporting the learning process at school (Anisah, 2018). Knowledge is the basis of a person's responses and actions. Knowledge is influenced by seven factors, namely, education, employment, age, interests, experience, culture of the surrounding environment and information. A person's knowledge can be obtained through the information provided (Djajanti et al., 2020). Providing health education is a planned effort to change individual behavior from unhealthy behavior to healthy behavior, so audiovisual media is needed to support the learning process. Audiovisual media is media that combines sound and images to convey content. for example audiovisual media in the form of video, film, television etc. (Fernando Pakpahan et al Andrew, 2020). Eye health must be given more attention, especially for female students. The increasing use of digital devices raises concerns about their eye health. Teenagers are often in front of a laptop or smartphone screen for a longer duration so that their eyes are required to continuously stare at the laptop or smartphone screen. This causes vision problems such as tired eyes, nearsightedness (Anggraeni, 2019). The factor that causes disruption to eye health is uncontrolled or continuous use of smartphones which will have a fatigue effect on the eye eyes, eyes become dry and even refractive errors will appear, reading at a close distance < 30 cm, consuming less fruit and vegetables.Eye exercise therapy is a series of movements carried out repeatedly by the eye organs to train the eye muscles, thereby reducing visual discomfort. Eye exercises are a technique used to get the eyeballs used to being flexible and moving according to the reach of the eye, as well as making the eye muscles and surrounding areas elastic and strong. This exercise requires contraction of a muscle to build eye muscle strength and needs to be done repeatedly as a form of therapy. Eye exercises can be done in a standing, sitting, lying position, or with your eyes closed Eye exercises can be done by anyone who wants to train their eyes, from children to the elderly, men and women (Asmarani, 2020; (Siti Nur Solikah, Kholifah Hasnah, 2022)

### 1.2 RESEARCH OBJECTIVES
#### 1.2.1 General Objectives

To find out whether there is an influence of Health Education through Audiovisual Media on the Implementation of Eye Exercises among Adolescents at SMAN XI SURABAYA

#### 1.2.2 Specific Objectives

1. Identify the implementation of eye exercises before being given health education through audiovisual media at SMAN XI SURABAYA
2. Identify the implementation of eye exercises after being given health education through audiovisual media at SMAN XI SURABAYA
3. Analyze the influence of health education through audiovisual media on the implementation of eye exercises among teenagers at SMAN XI SURABAYA

### 1.3 Benefits of Research
#### 1.3.1 For Respondents

The results of this research can be used as input so that we can better understand the influence of health education through audiovisual media on the implementation of eye exercises among teenagers at SMAN XI Surabaya.

1.3.2 For educational institutions at SMAN XI Surabaya

To increase the experience and knowledge of SMAN XI students on how to care for their eyes to avoid eye disorders, namely by doing eye exercises.

1.3.3 For Further Researchers

The results of this research can be used as reference material for future researchers in choosing learning
methods to improve students' skills.

LITERATURE REVIEW

2.1 Concept of Health Education.

Health education is a planned effort to change individual, group or community behavior from unhealthy behavior to healthy behavior. In this educational process the desired changes are of course based on the assumption that good behavioral changes start from good knowledge. Therefore, the use of the five senses in capturing information is absolutely necessary, and the more you use the five senses, the clearer the knowledge obtained will be. This is where the role of media in health education is as a tool or teaching aid used by health educators in delivering educational or teaching materials.

2.1.2 Objectives of Health Education

Health education according to (Wisyawati, 2020) has the aim of:

1) Establishing health as something that is very important in social life

2) Helping someone to be able to either independently or in a group by holding activities to achieve healthy
    life goals.

Motivate the development and appropriate use of health education to improve health status.

2.1.3 Health Education Strategy

Health education strategies are the methods chosen to deliver material in a health education environment including the nature, scope and sequence of activities that can provide learning experiences to clients. Health education strategies are not only limited to activity procedures, but also include health education materials or packages.

2.1.4 Health Education Methods

According to (Ministry of Health, 2016) health education methods are divided into:

1. Individual education method

This individual method is used to develop behavior or develop someone who is starting to be interested in making a change in behavior

2. Group education method

The method depends on the size of the target group and the formal education of the target.

3. Methods of mass education

This method conveys health messages aimed at the general public (does not differentiate between age, gender, occupation, socio-economic status and so on).

2.2 Concept of Audiovisual Media

Media is a teaching aid to achieve learning goals effectively and efficiently. In order to create effective media in the learning process (Septi, 2021).

2.2.1 Audio Visual Media

Audiovisual media is a media combination of audio and visuals created by self-creating slides combined with audio cassettes. Audio visuals play an important role in the educational process, especially when used by teachers and students. Audiovisual media provides a lot of stimulus to students, because of its audiovisual or sound-image nature. Audio visuals enrich the learning environment, foster exploration, experimentation and discovery, and encourage students to develop conversations and express their thoughts (Fernando Pakpahand et al Andrew, 2020).

2.2.2 Characteristics of Audiovisual Media

The characteristics of Audio Visual media are that it has sound elements and image elements.

This type of media has better capabilities, because it includes both types of media, namely audio and during the learning process, film projector machines, tape recorders and wide visual projectors.

2.2.3 Types of AudioVisual Media

According to (Asrul, 2020) audio visual media is divided into 2:

1) Pure Audio Visual, that is, both sound elements and image elements come from one source such as television, video cassettes, sound films

2) Audio visual is not pure, that is, the sound elements and image elements come from different sources such as sound frame films.

2.3 CONCEPT OF EYE EXERCISES

2.3.1 Definition of Eye Exercises

Eye exercises are a way to train the eyes to stay healthy which can reduce or eliminate eye diseases, prevent the appearance of tumors behind the eyes and in the pituitary gland, eliminate circles and swelling under the eyes or eliminate eye bags, reduce wrinkles around the eyes, makes the eye muscles and surrounding areas elastic and strong, and sharpens vision (Derry, 2015)

2.3.2 Benefits of Eye Exercises

The benefits of eye exercises according to (Sterno, 2019) include:

1. Reduce or eliminate eye diseases

2. Prevents the appearance of tumors behind the eyes and in the pituitary gland (pituitary)

3. Remove circles and puffiness under the eyes or remove eye bags

4. Reduces wrinkles around the eyes

5. Makes the eye muscles and surrounding areas elastic and strong

6. Sharpens vision

2.4 CONCEPT OF ADOLESCENCE

Adolescence is a period of development of dependent attitudes toward parents towards independence, sexual interests, self-reflection, and attention to aesthetic values and moral issues (Shoffa, 2021).

2.4.1 Phases of Adolescence

visual media. Learning through audio-visual is clearly characterized by the use of hardware

According to (Maryam B, 2021) adolescent phase:

1. Adolescence as a Transition Period

2. Adolescence as Change

3. Adolescence as a Problematic Age

4. Adolescence as a Period of Searching for Identity

5. Adolescence is an Age that Causes Fear

6. Adolescence is an unrealistic period

7. Adolescence as the Threshold of Adulthood

## RESEARCH METHODS

The research design used in this research is pre-experimental. This design is to determine the relationship/influence using one/two sample groups before treatment and after treatment, this study does not have a comparison group (control). This research uses a one group pretest posttest design approach. The population in this study were all class X students at SMAN XI Surabaya totaling 426 students. The type of sampling used in this study was simple random sampling.

Taken according to certain procedures so that it can represent the population (Tarjo, 2019). Sampling for research according to (Arikunto, 2010), if the subjects are less than 100 people, all of them should be taken, if the subjects are large or more than 200 people, 10-15% or 20-25% or more can be taken.

3.1 VARIABLES IN THIS RESEARCH

The independent variable in this research is health education through audiovisual media

The dependent variable in this research is the implementation of eye exercises

3.2 Data Analysis

Analysis using the Chi Square Test

RESULTS AND DISCUSSION

4.1 General Data

Table 4. 1 Frequency Distribution of Respondents Based on Gender at SMAN XI Surabaya

| No | Gender | Frekuensi | Presentase (%) |
|----|--------|-----------|----------------|
| 1. | Male | 19 | 44,2 |
| 2. | Female | 24 | 55,8 |
| | Amaunt | 43 | 100 |

Primary data source 2024

Based on table 4.1, it shows that the majority of respondents were female, 24 students (55.8%)

Table 4. 2 Frequency Distribution of Respondents Based on Age at SMAN XI Surabaya

| No | AGE | Frekuensi | Presentase (%) |
|----|-----|-----------|----------------|
| 1. | 14 – 15 Year | 10 | 23,2 |
| 2. | 16 – 17 Year | 33 | 76,8 |
| | AMOUNT | 43 | 100 |

Primary data source 2024

Based on table 4.2, it shows that the majority of respondents were 16-17 years old, 33 respondents (76.8%)

Table 4. 3 Frequency Distribution of Respondents Based on Having Received Information About Eye Exercises at SMAN XI Surabaya

| No | Have you ever received information | Frekuensi | Presenta (%) |
|----|-----------------------------------|-----------|--------------|
| 1. | Already | 19 | 44,2 |
| 2. | Not yet | 24 | 55,8 |
| | Amount | 43 | 100 |

Primary data source 2024
Based on table 4.3 above, it was found that only 19 respondents (44.2%) had received information about eye exercises.

SPECIAL DATA
Table 4. 4 Frequency distribution of eye exercises via audiovisual media before providing health education to students at SMAN XI Surabaya

| No | Pretest | Frekuensi | Presentase (%) |
|----|---------|-----------|----------------|
| 1 | Not enough | 40 | 93,03 |
| 2 | more | 3 | 6,97 |
| | Amount | 43 | 100 |

Primary data source 2024
Based on table 4.4, it shows that the majority of eye exercises before being given health education through audiovisual media were in the poor category with 40 respondents (93.03%).

Table 4. 5 Frequency distribution of eye exercises via audiovisual media after being given health education to students at SMAN XI Surabaya.

| No | Postest | Frekuensi | Presentase (%) |
|----|---------|-----------|----------------|
| 1 | Not enough | 2 | 4,65 |
| 2 | More | 41 | 95,36 |
| | Amount | 43 | 100 |

**Primary data source 2024**
**Based on table 4.5, it shows that most of the eye exercises were carried out after given health education were in the good category as many as 41 respondents (95.36%)**

Table 4. 6 Effects of Health Education through Audiovisual Media on the Implementation of Eye Exercises among Adolescents at SMAN XI Surabaya

| No | category | Pre test | | Post test | | Improvement |
|----|----------|------|--------|------|--------|-------------|
| | | F | % | F | % | |
| 1. | Not Enough | 40 | 93,03% | 2 | 4,65% | |
| 2. | more | 3 | 6,97% | 41 | 95,35% | 88,38% |
| | Amount | 43 | 100% | 43 | 100% | |
| | Uji Chi square test | | | pvalue = 0,000 | | |

## DISCUSSION

Based on table 4.5, it shows that the level of implementation of eye exercises after being given health education was in the good category as many as 41 respondents (95.35%) and in the poor category 2 respondents (4.65%). It can be concluded that the implementation of eye exercises increased after being given health education. This is supported by research results according to (Djajanti et al., 2020) that a person's knowledge can increase by providing information through health education or health education. The use of smartphones to deliver health education is quite effective in increasing health knowledge and attitudes in adolescents (Sudiarto et al., 2019)

The research results obtained after being given health education through audiovisual media regarding the implementation of eye exercises using an observation sheet instrument consisting of 8 stages of eye exercises show that the majority of respondents can do eye exercises well in accordance with the SOP, only a few respondents may have difficulty in doing eye exercises. perform eye exercises according to the SOP. Health education through audiovisual media can influence a person's actions regarding maintaining eye health by doing eye exercises, which are delivered information contains messages that can direct someone to improve a healthy lifestyle (Nurmala, 2018). The presence of new information about something can provide new knowledge for students so that skills are formed about something (Jenita, 2021). Health

Primary data source 2024

Based on the results of statistical testing using the chi square test using SPSS, the significance α=0.05 was obtained and the result was ρ Value = 0.000, which means ρ <0.05, namely H0 is rejected and H1 is accepted, which means there is an influence of health education through audiovisual media on implementation. eye exercises for teenagers at SMAN XI Surabaya. education can influence the attitudes of other people, whether individuals, groups or society, so that someone is able to take actions related to health. In general, health education is an effort to change healthy living behavior based on self-awareness in individuals, groups and communities to maintain and improve health. Health education is said to be successful if the higher the behavioral changes carried out by

educational targets (individuals, groups or communities) in carrying out actions or skills in accordance with the goals set by educational actors (Martina, 2021).

Based on the results of the research, the researchers explained that providing health education through audiovisual media was able to increase students' actions regarding the implementation of eye exercises. Providing health education through audiovisual media about Implementing eye exercises is a process of delivering health education by researchers to students in order to maintain eye health.

Based on the research results, it shows that after being given health education, respondents' actions increased with a good percentage of 3 respondents (6.97%) and 40 respondents (93.03%) and after being given health education it became good for 41 respondents (95.35%) and 2 respondents (4.65%) were in the poor category. This data explains that there was an increase before being given health education and after being given health education through audiovisual media in the implementation of eye exercises.Based on table 4.6 above, it shows that the results of statistical testing using the chi square test using SPSS obtained a significance of α=0.05 and obtained the result ρ Value= 0.000, which means ρ <0.05, it is concluded that H0 is rejected and H1 is accepted, which means that there is an influence of health education through audiovisual media on the implementation of eye exercises among teenagers at SMAN . There were 2 respondents in the poor category because the respondents did not pay enough attention when the speaker explained it and the respondents did not concentrate enough when health education was carried out in class. Based on the results of statistical tests, it is known that health education can improve students' actions in doing eye exercises. This is supported by the theory (Asriwati, 2019) that providing information through health education is an effort to improving action, the action comes

from knowing through sensing a particular object, then understanding and applying the ability to use the material that has been studied. The increase in skills is due to the use of media and interesting ways of conveying information. The advantage of this media is that it is more interesting and more effective to use because it involves image elements and sound elements. This can make students interested in health education delivered by researchers. In accordance with theory (Ermiati et al, 2022) health education through audiovisual media is one means of increasing students' and students' understanding and knowledge regarding eye health by doing eye exercises. Health education is very important to provide students with a basic understanding of eye health so that it is hoped that it can minimize the incidence of myopia. Health education aims to change individual, group or community behavior from unhealthy behavior to healthy behavior (Nurmala, 2018).

From the research conducted by the researcher, it was found that if the respondent did not have good actions regarding the implementation of eye exercises, then the researcher assumed that it would be difficult to realize an act or action that would be carried out. The existence of health education can change respondents' actions related to health. This shows that providing health education through audiovisual media has an effect because the media used is accompanied by sound and images, making it easier for respondents to do eye exercises.

## CONCLUSION

Based on the results of research and discussion regarding the influence of health education through audiovisual media on the implementation of eye exercises among teenagers at SMAN The result is P Value = 0.000, which means PValue < 0.05, which means there is an influence of health education through audiovisual media on the implementation of eye exercises in

adolescents. Providing health education can improve students' ability to do eye exercises because the delivery of health education uses appropriate media

interesting so that it provides a lot of stimulus to students, because the nature of audiovisual media is that it combines sound and images, making it easier for students to do eye exercises independently.

## SUGGESTION

1.For Respondents

It is hoped that respondents who take part in health education can apply the material that has been obtained from health education through audiovisual media regarding the implementation of eye exercises that have been given by researchers so that respondents can carry out eye exercises independently as an effort to maintain eye health.

2. For High Schools

High schools should create eye health education programs and regular eye examinations for students in collaboration with local health institutions. It is best to put up eye exercise posters in each class and make eye exercise therapy activities a mandatory and routine activity with assistance from the class teacher or members of the PMR (Youth Red Cross) on certain days.

3.For Further Researchers

It is hoped that for future researchers, this material regarding eye exercises will be very interesting and important in maintaining eye health, however, there are still many who do not know about eye exercise therapy. It is hoped that future researchers will be able to choose research sites that focus on children so that children can maintain eye health from an early age. Next in terms of

The research technique is expected to provide a control group in the research so that they can compare better results, as a basis for providing health education to adolescents regarding the implementation of eye exercises

## REFERENCES

Andrew, Fernando Pakpahan dkk. (2020). *Pengembangan Media Pembelajaran* (S. P. Abdul Karin (ed.); Cetakan 1). Yayasan Kita Menulis.

Andrew, Fernando Pakpahand dkk. (2020). *Pengembangan Media Pembelajaran* (K. Abdul (ed.); Cetakan 1). Yayasan Kita Menulis.

Anggraeni, S. (2019). Pengaruh Pengetahuan Tentang Dampak Gadget Pada Kesehatan Terhadap Perilaku Penggunaan Gadget Pada Siswa SDN Kebun Bunga 6 Banjarmasin. *Faletehan Health Journal*, *6*(2), 64–68. https://doi.org/10.33746/fhj.v6i2.68

Anisah, yuliana utami. (2018). *TOWARD STUDENTS ' KNOWLEDGE ABOUT THE DANGER OF*.

Asep, S. H. ; B. (2014). *METODE PENELITIAN KUANTITATIF APLIKASI DALAM PENDIDIKAN* (A. Aznar (ed.); Edisi I). DEEPUBLISH CV. BUDI UTAMA.

Asriwati, I. (2019). *BUKU AJAR ANTROPOLOGI KESEHATAN DALAM KEPERAWATAN* (M. S. Cinthia (ed.); Edisi 1). Deepublish Publisher.

Asrul, H. dkk. (2020). *MEDIA ANIMASI DIGITAL BERBASIS HOTS (Higher Order Thinking Skill)* (N. Donny (ed.); Cetakan 1). UNP Press.

Bagus, S. (2020). *TEKNIK SAMPLING* (Anggota UNJ Press (ed.); Cetakan 1). UNJ PRESS.

Billy, N. (2022). *PENGAMBANGAN UJI STATISTIK: Implementasi Metide Regresi Linier Berganda dengan Pertimbangan Uji Asumsi Klasik* (S. Ady (ed.); Cetakan I). CV. Pradina Pustaka Grup.

Burhan, B. (2017). *METODOLOGI PENELITIAN KUANTITATIF* (S. Agus (ed.); Cetakan Ke). PT. Fajar Interpratama Mandiri.

Derry, I. (2015). *Rancangan Bangun Aplikasi Terapi Mata Berbasis Android*. 1–16.

Devara, N., Artawan, C. A., & Wahyudi, A. T. (2019). Perancangan Buku Panduan Interaktif Cara Menjaga Kesehatan Mata Melalui Olahraga Senam Mata Untuk Anak Usia 6 – 12 Tahun. *DKV Adiwarna, UNIVERSITAS KRISTEN PETRA.*, *1 No.14*, 11. http://publication.petra.ac.id/index.php/dkv/article/view/8651/7809

Djajanti, C. W., Sukmanto, P. A., & Wardhani, I. K. (2020). Penyuluhan Meningkatkan Pengetahuan Remaja Tentang Kesehatan Mata. *Jurnal Keperawatan Muhammadiyah*, *5*(1), 248–252. https://doi.org/10.30651/jkm.v5i1.4208

Kementerian Kesehatan RI. (2014). Infodatin (Situasi Gangguan Penglihatan Dan Kebutaan). *Kementerian Kesehatan RI*, *53*(9), 1689–1699.

Maisal, F. M., Ruliati, L. P., Berek, N. C., Roga, A. U., & Ratu, J. M. (2020). Efektivitas Senam Mata untuk Mengurangi Tingkat Kelelahan Mata pada Pekerja Rambut Palsu. *Jurnal Ergonomi Indonesia (The Indonesian Journal of Ergonomic)*, *6*(1), 9. https://doi.org/10.24843/jei.2020.v06.i01.p02

Martina, P. et al. (2021). *Promosi Kesehatan dan Perilaku Kesehatan* (W. Ronal (ed.); Cetakan 1). Yayasan Kita Menulis.

Maryam B, G. (2021). *PERKEMBANGAN REMAJA DAN PROBLEMATIKANYA* (S. Chris (ed.); Cetakan 1). PT. KANIKUS.

Maya, S. P. et al. (2018). *GAMBARAN PERILAKU PENGGUNAAN GAWAI DAN KESEHATAN MATA PADA ANAK USIA 10-12 TAHUN Maya*. *3*(1), 28–34.

Mukhlidah, siregar; Ratna, S. et al. (2021). *METODOLOGI PENELITIAN KESEHATAN* (P. P. R. Yohannes (ed.); Cetakan 1). Yayasan Penerbit Muhammad Zaini.

Nova, O. (2015). *SISTEMATIKA PENULISAN KARYA ILMIAH* (S. Rizky (ed.); Cetakan 1). DEEPUBLISH CV. BUDI UTAMA.

Nur, L. (2018). Gambaran Penggunaan Internet Dalam Mencari Informasi Kesehatan Pada Siswa Sekolah Menengah Pertama (Smp) X. *Jurnal PROMKES*, *6*(2), 188. https://doi.org/10.20473/jpk.v6.i2.2018.188-200

Nurlailis, S. dkk. (2022). *Promosi Kesehatan* (Agustiawan (ed.)). Media Sains Indonesia.

Nurmala, ira et al. (2018). *BUKU PROMOSI KESEHATAN* (Zadina (ed.); Cetakan 1). Airlangga University Press.

Nursalam. (2016). *METODOLOGI PENELITIAN09162019.pdf* (p. 415). Salemba Medika. http://eprints.ners.unair.ac.id/982/1/METODOLOGI PENELITIAN09162019.pdf

Shoffa, saifillah A.-F. (2021). *PSIKOLOGI PERKEMBANGAN* (N. Dwi (ed.); Cetakan 1). DEEPUBLISH CV. BUDI UTAMA.

www.shutterstock.com

Siti Nur Solikah, Kholifah Hasnah, M. (2022). *Monograf Senam Mata Untuk Pencegahan Miopi*. NEM.

**ORIGINAL RESEARCH**

# THE EFFECT OF ENMASROLE THERAPY ON REDUCING THE LEVEL OF ANXIETY OF PREGNANT WOMEN FACING CHILDBIRTH

**Veryudha Eka Prameswari**
Universitas Bina Sehat PPNI Mojokerto
Corresponding Email : veryudhaekap@gmail.com

| ABSTRACT | Keywords |
|---|---|
| Pregnancy is an important period in a mother's life. Changes in pregnant women can trigger psychological problems in pregnant women. The problem that often arises is anxiety, especially in the final trimester when facing the birth process. The body will produce the hormone cortisol, which if excessive can affect the health of the baby and the mother's health. Anxiety experienced by pregnant women is a condition where a person experiences uncomfortable, unpleasant feelings about thoughts that will happen in the future. In this case, the mother is afraid that the baby will be born at any time under normal conditions, or even die. Anxiety of pregnant women triggers stimulation of uterine contractions. Therefore, the anxiety of pregnant women can be overcome with complementary therapy methods, namely ENMASROLE (Endorphin Massage and Lavender Aroma). This study aimed to determine the effect of ENMASROLE therapy on reducing maternal anxiety levels in childbirth. Pre-Experiment research method with Pre-Test-Post Test. | **Endorphin Massage; Lavender Scent; anxiety level; pregnant mother; labor** |

## INTRODUCTION

Pregnancy is an important period in her life and leads to the birth of the baby in her womb. During the pregnancy process, physiological and psychological changes occur so pregnant women need information from health workers through pregnancy checks (I Gede Bagus M, 2012)

Pregnant women feel anxiety in each trimester, but in the third trimester, the level of anxiety felt by mothers increases because they will face the labor process which is getting closer and negative images about childbirth such as fear of not being able to give birth, or labor pain and even complications. (Webb et al., 2021)

Based on Qanita Wulandara's research with the theme of the influence of endorphin massage on anxiety in third-trimester pregnant women, the results showed that there was an increase before and after therapy, namely before 67.57% and after 75.68%. (Qanita Wulandara dkk, 2022)

When pregnant women experience high levels of anxiety, especially in the first trimester, the body will produce the stress hormone cortisol. If excessive levels of this stress hormone can affect the baby's health

because it can enter the amniotic fluid through the placenta, the result is that the baby's growth will become too fast, affecting the fetus' brain and reducing the oxygen supply for the fetus. When facing childbirth, generally mothers (both those who have not given birth and those who have experienced giving birth) experience anxiety, and panic anxiety in pregnant women can arise because the long period of waiting for birth is full of uncertainty and also images of scary things during the birth process. This fear is often felt in first pregnancies or primigravidas, especially when facing childbirth. (Qanita Wulandara dkk, 2022)

Anxiety can interfere with preparation for childbirth so the impact of anxiety can arise due to several factors, including biological factors, where when the body experiences a health problem, it causes anxiety. Handling anxiety There are two ways to reduce anxiety, namely pharmacological and non-pharmacological methods. Pharmacological therapy is therapy that uses drugs, while non-pharmacological therapy is therapy without drugs, one of which is complementary therapy. In this case, the way to reduce anxiety in preparation for childbirth is with complementary therapy, one of which is ENMASROLE therapy (Endorphin Massage and Lavender Aroma). (Aliyah dkk, 2024)

Massage therapy can also overcome anxiety, one of which is endorphin massage, which is massage therapy or light touch which is quite important to give to pregnant women when they feel anxious in preparation for childbirth. This massage can stimulate the body to release endorphins so that the mother feels comfortable. (Hadi Susiarno dkk, n.d.)

Not only complementary therapy with massage but there is therapy using aromatherapy. Aromatherapy is one of the many non-pharmacological methods. Lavender aromatherapy contains 30-50% linalyl acetate which is an ester compound that is very useful for normalizing emotions and in unbalanced body conditions, and also has calming properties. (Setiawan andarwulan, 2021)

## METHOD

The activity was carried out in Balongmojo Village, District. Puri Kab. Mojokerto. On Monday 3 September 2024 at 09.00-11.00 WIB. The population is all pregnant women in the third trimester. The total population is 33 respondents from third-trimester pregnant women. The sample used was total sampling. The method in this research is a quick experiment before and after therapy. To determine the level of anxiety of respondents using a questionnaire given to 33 pregnant women respondents. Anxiety level measurement uses anxiety measurement using the Perinatal Anxiety Screening Scale (PASS) method. Data analysis uses the Wilcoxon test with a P value < 0.005

## RESULTS
*(judul table :bold, table 1, table 2. Font 10)*

**Table 1. Distribution of Anxiety Levels of Pregnant Women Facing Childbirth Before Given ENMASROL Therapy**

| Anxiety | Frequency | Percentage % |
|---|---|---|
| Not Anxious | 9 | 27% |
| Mild Anxiety | 7 | 21% |
| Moderately Anxious | 17 | 52% |
| Severe Anxiety | 0 | 0 |
| Amount | 33 | 100% |

Based on Table 1 The results of the study show that before being given ENMASROL therapy, the majority of respondents experienced moderate anxiety, 17 respondents (52%).

**Table 2. Distribution of Anxiety Levels of Pregnant Women Facing Childbirth After Being Given ENMASROL Therapy**

| Anxiety | Frequency | Percentage % |
|---|---|---|
| Not Anxious | 17 | 52% |
| Mild Anxiety | 11 | 33% |
| Moderately Anxious | 5 | 15% |

| Severe Anxiety | 0 | 0 |
|---|---|---|
| Amount | 33 | 100% |

Based on Table 2, the research results show that after being given ENMASROL therapy, the majority of respondents did not experience moderate anxiety, 17 respondents (52%).

**Table 3. Distribution of respondents based on the effect of ENMASROL therapy on reducing the level of anxiety of pregnant women facing childbirth**

| Anxiety Level | Before being given ENMASROL therapy | | After being given ENMASROL therapy | | P-Value |
|---|---|---|---|---|---|
| | F | % | F | % | 0,000 |
| Not Anxious | 9 | 27% | 17 | 52% | |
| Mild Anxiety | 7 | 21% | 11 | 33% | |
| Moderately Anxious | 17 | 52% | 5 | 15% | |
| Severe Anxiety | 0 | | 0 | | |
| Amount | 33 | 100% | 33 | 100% | |

Based on Table 3, the results show that before being given ENMASROL therapy, the majority of respondents experienced moderate anxiety, 17 respondents (52%), and after being given ENMASROL therapy, the majority of respondents did not experience anxiety, 17 respondents (52%).

The results of the analysis showed that the Pvalue was 0.000. Because the value of 0.000 is smaller than <0.05, it can be concluded that Ha is accepted. This means that there is an influence on anxiety levels before and after being given ENMASROL therapy.

## DISCUSSION

Based on table 3. Distribution of respondents based on the effect of ENMASROL therapy on reducing the level of anxiety of pregnant women facing childbirth, the results of the study show that before being given ENMASROL therapy, the majority experienced moderate anxiety, 17 respondents (52%) and after being given ENMASROL therapy, the majority did not experience anxiety, 17 respondents ( 52%). In this case, some respondents still experienced moderate anxiety even though they had been given ENMASROL therapy because the pregnant woman was primi gravida so there was still no picture so they still felt anxious.

Berdasarkan tabel 3 Distribusi responden berdasarkan Pengaruh Terapi ENMASROL Terhadap Penurunan Tingkat Cemas Ibu Hamil Menghadapi Persalinan, hasil penelitian menunjukan bahwa sebelum diberikan terapi ENMASROL sebagian besar mengalami cemas sedang 17 responden (52%) dan sesudah diberikan terapi ENMASROL sebagian besar tidak mengalami cemas 17 responden (52%). Dalam hal ini responden masih ada yang mengalami cemas sedang meskipun sudah diberikan terapi ENMASROL dikarenakan ibu hamil tersebut primi gravida sehingga masih belum ada gambaran sehingga masih ada merasa cemas.

The results of the analysis showed that the Pvalue was 0.000. Because the value of 0.000 is smaller than <0.05, it can be concluded that Ha is accepted. This means that there is an influence on anxiety levels before and after being given ENMASROL therapy

Pregnancy brings physical and psychological changes, there fore pregnant women need conducive physical and psychological conditions so that the pregnancy and birth process runs smoothly. The most common problem that arises in pregnant women facing childbirth is anxiety. (Emma Robertson Blackmore, Hanna Gustafsson,dkk, 2016)

Preparations for childbirth can be done in the third trimester, the third trimester of pregnancy is often called the waiting and alert period because the mother feels impatient waiting for the birth of her baby, which results in her starting to worry about herself and feeling anxious about her baby at the time of birth. (Mafudiah, 2023)

Anxiety can interfere with preparation for childbirth so the impact of anxiety can arise due to several factors, including biological factors, where when the body experiences a health problem, it causes anxiety. Handling anxiety There are two ways to reduce anxiety, namely pharmacological and non-pharmacological methods. Pharmacological therapy is therapy that uses drugs, while non-pharmacological therapy is therapy without drugs, one of which is complementary therapy. In this case, the way to reduce anxiety in preparation for childbirth is with complementary therapy, one of which is ENMASROLE therapy (Endorphin Massage and Lavender Aroma). (Aliyah dkk, 2024)

## CONCLUSIONS

The research was carried out in Balongmojo Village, District. Puri Kab. Mojokerto. On Monday, September 2, 2024. The number of respondents was 33 pregnant women. The results showed that before being given ENMASROL therapy, the majority of respondents experienced moderate anxiety, 17 respondents (52%), and after being given ENMASROL therapy, the majority of respondents did not experience anxiety, 17 respondents (52%). In this case, some respondents still experienced moderate anxiety even though they had been given ENMASROL therapy because the pregnant woman was primi gravida so there was still no picture so they still felt anxious. Handling anxiety There are two ways to reduce anxiety, namely pharmacological and non-pharmacological methods. Pharmacological therapy is therapy that uses drugs, while non-pharmacological therapy is therapy without drugs, one of which is complementary therapy. In this case, the way to reduce anxiety in preparation for childbirth is with complementary therapy, one of which is ENMASROLE therapy.

## REFERENCES

### (reference from international journal/ English sources)

Aliyah dkk. (2024). *Buku Ajar Komplementer Kebidanan*. Jakarta, Mahakarya Citra Utama.

Emma Robertson Blackmore, Hanna Gustafsson,dkk. (2016). Pregnancy-related anxiety: Evidence of distinct clinical significance from a prospective longitudinal study. *J Affect Disord*, 251–258. https://doi.org/10.1016/j.jad.2016.03.008

Hadi Susiarno dkk. (n.d.). *Tatalaksana Persalinan dan Bayi Baru Lahir Fisiologi di Pelayanan Kesehatan Primer*. Pekalongan. NEM.

I Gede Bagus M. (2012). *Pengantar Kuliah Obstetri dan Ginekologi*.

Mafudiah, L. (2023). Efektifitas Terapi Komplementer untuk Mengurangi Kecemasan dalam Persiapan Persalinan. *Prosiding Seminar Nasional Dan Call for Paper Kebidanan Universitas Ngudi Waluyo /*, *01*(02). https://callforpaper.unw.ac.id/index.php/semnasdancfpbidanunw/article/view/257

Qanita Wulandara dkk. (2022). Pengaruh Pijat Endorphin Terhadap Kecemasan ibu hamil trimester III di UPTD Puskesmas Gandrungmangu I Kabupaten Cilacap. *Media Inf Poltekkes Kemenkes Tasikmalaya*, *18*(02), Qanita Wulandara dkk. https://doi.org/10.37160/bmi.v18i2.44

Setiawan andarwulan, S. (2021). *Terapi Komplementeri Kebidanan*. Surabaya: GUEPEDIA.

Webb, R., Bond, R., Romero-Gonzalez, B., Mycroft, R., & Ayers, S. (2021). Interventions to treat fear of childbirth in pregnancy: A systematic review and meta-analysis. *Psychological Medicine*, *51*(12), 1964–1977. https://doi.org/10.1017/S0033291721002324

http://ijnms.net/index.php/ijnms

## ORIGINAL RESEARCH

# THE EFFECT OF BALLOON BLOWING THERAPY IN PATIENTS WITH PPOK IN IMPROVING OXYGEN SATURATION

**Rantiningsih Sumarni[1] , Anik Suwarni[2] , Widiyono[3] , Tegar Pradipto[4]**
[1, 2, 3] Nursing Study Program, Sahid University Surakarta
[4] Student Nursing Study Program, Sahid University Surakarta
Corresponding Email: *rantiningsihsumarni@gmail.com*

| ABSTRACT | Keywords |
|---|---|
| COPD is a disease of the respiratory system characterized by progressive and irreversible airway obstruction, accompanied by inflammation and systemic effects leading to airway narrowing and increased sputum production. This results in difficulty breathing and shortness of breath, which can be seen through increasingly strong contractions of the respiratory muscles. Prevention can be done through respiratory rehabilitation, such as blowing balloon exercise, which aims to better improve oxygen saturation. One way to measure this is by monitoring oxygen saturation. This study aims to determine the effect of balloon blowing on improving oxygen saturation in COPD patients. The research design used a one group pre-post design. The population of this study were patients with COPD, 30 samples were selected purposive sampling technique and data analysis using Wilcoxon test. The results showed that there was an effect of balloon blowing therapy on increasing oxygen saturation in COPD patients at UNS Hospital (p value 0.000). Researchers recommend that blowing balloon exercise be done regularly and consistently, with three blows every morning for three consecutive days, so that COPD patients can achieve more optimal oxygen saturation and reduce the risk of exacerbations. | **COPD, Oxygen Saturation, Balloon Blowing Therapy** |

## INTRODUCTION

COPD (chronic obstructive pulmonary disease), also known as CPOD (Chronic Obstructive Pulmonary Disease), is a broadly classified disease that includes chronic bronchitis, bronchiectasis, emphysema and asthma. COPD is characterized by flow limitation in the lungs that is not fully reversible. Flow limitation is usually progressive and is associated with an abnormal pulmonary inflammatory response to harmful particles or gases leading to airway narrowing, mucus hypersecretion and changes in the pulmonary vascular system. COPD is one of the diseases that cause death worldwide (Khoiriyah et al., 2022). COPD disease is the third largest contributor to death in the world, with around 3.23 million deaths occurring in 2019. Deaths from COPD are about 90% aged > 70 years dominant in low and middle income countries (Sa'diyah & Suandika, 2023).

The prevalence of COPD is predicted to increase from 11% in 2016 to more than 15% in 2030. This happens

because of air pollution and smoking habits of the people (Yawn et al., 2021). In Indonesia, COPD cases continue to increase, around 9.2 million Indonesians experience COPD (Badan Penelitian Dan Pengembangan Kesehatan Republik Indonesia, 2018). COPD cases in Central Java according to Riskesdas, (2018) reached 359 cases. In UNS Hospital, COPD is the number one inpatient disease with data entered in the last 1 year reaching ± 600 cases.

COPD is a leading cause of chronic morbidity and mortality worldwide. Many people suffer from this disease for years and die prematurely due to complications. Patients with COPD will usually experience difficulty in exhaling due to resistance in the respiratory tract, or hypoventilation (Singh et al., 2022). These changes in the lungs can cause a decrease in blood oxygen levels (SpO2 < 85%) because oxygen flow to the lungs is reduced due to disruption of the oxygen and carbon dioxide exchange process. Normal oxygen saturation values are between 95% - 100% using fingertip pulse oximetry (Sulistiowati et al., 2021).

Seeing the impact of COPD, it requires serious medical treatment both pharmacologically and non-pharmacologically with the aim of preventing progressive disease, reducing symptoms, improving health status, and improving exercise tolerance in COPD patients (Paramitha, 2022). Handling COPD patients in addition to pharmacological therapy can also use non-pharmacological therapy with the Ballow Blowing technique (Khoiriyah et al., 2022). Balloon blowing breathing technique is a breathing relaxation exercise by inhaling air through the nose and expelling air through the mouth into a balloon. Such a technique helps prevent the respiratory muscles from becoming fatigued and increases lung development. This process helps individuals suffering from COPD to achieve more controlled and efficient ventilation, thereby reducing the workload of the lungs and increasing the supply of oxygen and removal of carbon dioxide trapped in the respiratory system (Setiawan et al., 2021).

The results of a study conducted by Astriani et al., (2020) stated that there was an effect of respiratory relaxation with balloon blowing technique on increasing oxygen saturation in COPD patients at Buleleng Regency Hospital. Balloon blowing exercise is also effective for training the ability of the lungs to take in and pump air, but does not affect the size or number of alveoli in the lungs. In addition, this exercise can also increase intra-abdominal pressure during expiration so as to increase bronchial diameter and inspiratory and expiratory flow which can increase oxygen saturation (Khoiriyah et al., 2022). Based on the above, considering that COPD cases continue to increase, and COPD research that has been done before is only limited to the deep breath method and oxygen therapy, the researcher considers it very necessary to examine the effect of Ballow Blowing Therapy on COPD patients in increasing oxygen saturation.

## METHOD

The research design used a one group pre-post test design. Data collection with a sample of COPD patients at UNS Hospital as many as 30 patients with inclusion criteria: Patients with COPD with oxygen saturation below 95%, respondents aged > 18 years-70 years. Exclusion Criteria: Uncooperative patients, patients who have heart disease, patients who have decreased consciousness. Sampling using purposive sampling technique. Data was taken by conducting a pre-test to determine the value of oxygen saturation using pulse oxymetry in COPD patients and post-test after ballow ballowing technique. The ballow ballowing technique intervention was given 3 times a meeting in 3 days with an intervention duration of 15 minutes at each meeting, after the results of the data collected were measured using the Wilcoxon test to determine the effect of the balloon blowing technique to improve oxygen saturation in COPD patients. The measuring instrument in this study is to use SOP (Standard Operating Procedure) Ballow blowing breathing technique that has been standardized so that validity and reliability tests are not carried out and pulse oxymetry

equipment for measuring oxygen saturation. This study obtained a research ethics permit from UNS Hospital with EC number 224/UN27.06.11/KEP/EC/2024.

| Characteristics | Frequency | Percentage (%) |
|---|---|---|
| SD | 1 | 3.3 |
| HIGH SCHOOL | 14 | 46.7 |
| D3 | 4 | 13.3 |
| S1 | 10 | 33.3 |
| S2 | 1 | 3.3 |
| Total | 30 | 100 |

## RESULTS
### Univariate Results

1. Distribution of respondent characteristics by age.

    An overview of the characteristics of respondents based on age in the pulmonary inpatient room. At UNS Hospital is presented in table 1.
    Table 1. Distribution of respondent characteristics based on age

| | N | Mean | Min | Max | Sd |
|---|---|---|---|---|---|
| Age | 30 | 44.7 | 23 | 73 | 12.967 |

Primary data source, (2024)

| Variables | Number (n) | Mean | P. Value |
|---|---|---|---|
| Pre-test | 30 | 76.8 | 0.00 |
| Post-test | 30 | 81,74 | |

Based on table 1 above, it can be seen that the average age of respondents is 44.7 with an age range between 23-73 years. Respondents who have the oldest age are 73 years old and the youngest age is 23 years old out of 30 respondents.

2. Characteristics of respondents based on gender.

    An overview of the characteristics of respondents based on gender in the pulmonary inpatient room. Table 2. Distribution of respondent characteristics based on gender

| Gender | Frequency | Percentage (%) |
|---|---|---|
| Male | 13 | 43.3 |
| Female | 17 | 56.7 |
| Total | 30 | 100 |

Primary data source, (2024)

Based on table 2 above that of the 30 respondents, the frequency distribution of respondents was mostly female and a small proportion of men.

3. Characteristics of respondents based on education

    An overview of the characteristics of respondents based on education in the pulmonary inpatient room. At UNS Hospital is presented in table 3.
    Table 3. Distribution of respondent characteristics based on education
Primary data source, (2024)

Based on table 3 above that of the 30 respondents, the frequency distribution of respondents most of the respondents had a high school education level as many as 14 respondents (46.7%).

### Bivariate Results

In this study, the data obtained can be analyzed with bivariate analysis, namely to determine the effect of *Ballow Blowing* Therapy on COPD patients in increasing oxygen saturation at UNS Hospital, it can be seen in the Wilcoxon test results table below.

Table 4. Distribution of Wilcoxon test

Primary data source, (2024)

Based on table 4 that balloon blowing therapy is very influential in increasing oxygen saturation in COPD patients. Before applying balloon blowing therapy, the average oxygen saturation of COPD patients was 76.43%, while after applying balloon blowing therapy, the average oxygen saturation of COPD patients was 81.74%. Based on the table above, it is known that the majority of COPD patients experience an increase in oxygen saturation. The results of data analysis using the Wilcoxon test obtained a calculated p value of 0.00 <0.05, which means it shows p-value 0.000 it can be concluded that the p value is smaller than 0.05 (p <0.05) which means there is the effect of balloon blowing technique therapy in improving oxygen saturation of COPD patients in the pulmonary inpatient room of UNS Hospital.

## DISCUSSION

### Respondent characteristics

Based on the results of the study, it shows that of the 30 respondents, the majority of COPD respondents based on age were all over 20 years old. This is in line with research from Yuningsih, (2017) that the average person who experiences COPD is middle adulthood where as age increases, the risk of developing COPD increases. In patients diagnosed with COPD before the age of 40, there is most likely a genetic disorder in the form of α1 antitrypsin deficiency. COPD can affect the decline in lung function as well as physiological changes associated with the aging process, eventually leading to airway obstruction. This affects oxygen supply, lung elasticity, and impaired lung ventilation (Astriani et al., 2020).

In line with research conducted by (Tarigan & Juliandi, 2018) the majority of respondents in this study were aged between 60 to 70 years. This suggests that as age increases, the risk of experiencing respiratory distress also increases, where in advanced age there are changes in the shape of the thorax and breathing patterns.

Based on the gender characteristics of respondents who experienced COPD in this study, many cases occurred in women even though the number of cases in men only differed slightly for respondents suffering from COPD obtained in this study. This is in line with research Priastuti et al., (2020) that cases increase women affected by COPD because based on the results of the analysis, it was found that the number of women exposed to cigarette smoke from family or the environment is a significant risk factor for the incidence of COPD. Respondents who are exposed to cigarette smoke have a 4.31 times higher risk of suffering from COPD compared to respondents who are not exposed to cigarette smoke.

This finding is in line with epidemiological research conducted by Oemiati et al., (2020) which states that almost all COPD cases are caused by smoking. Other studies related to cigarette smoke also show that the proportion of COPD history is higher in the passive smoking population, both men and women. Smoking behavior is a very detrimental habit, both for oneself and those around them. Exposure to cigarette smoke is not only harmful to active smokers, but also to other people who accidentally inhale the smoke produced. Therefore, smoking behavior should be avoided for mutual safety (Hartina et al., 2021). This can occur due to increased production of secretions by goblet cells, where the cells produce excessive fluid that can enter the respiratory tract (Hartina et al., 2021).

Based on educational characteristics, it shows that of the 30 respondents, the majority of COPD respondents graduated from high school. In this case, the level of education also greatly affects the severity of the disease condition and the receipt of information received, including those related to self-care. Lower education is associated with higher disease severity. This is in line with research findings showing that individuals with lower education levels tend to experience greater disease severity, worse lung function decline, and more significant physical function limitations. In addition, they are also at higher risk of acute exacerbations in COPD patients (Adiana & Maha Putra, 2023). Patients with low education levels require more specific information to be able to actively participate in their self-care.

Meanwhile, for respondents who have higher education, information can be obtained from various sources. This is in accordance with research by Clari et al., (2017) which states that when individuals feel that information from medical personnel is not enough, they tend to look for alternative sources of information, one of which is from the internet. Thus, respondents who have a low level of education need support related to information about the self-care behavior of COPD patients, which can be obtained from various sources, one of which is the family, who is the closest person to the patient. Hopefully, with this additional information, the patient's knowledge about self-care will increase, so that the patient's self-care behavior can be better (Park, 2017).

**Effect of balloon blowing technique therapy in improving oxygen saturation of COPD patients**

Based on the results of the data analysis test using the Wilxocon test, it shows that there is an effect of balloon blowing therapy on increasing oxygen saturation in COPD patients at UNS Hospital. This is in line with research conducted by the results of a study conducted by Astriani et al., (2020) which states that there is an effect of respiratory relaxation with balloon blowing techniques on increasing oxygen saturation in COPD patients at Buleleng Regency Hospital. Balloon blowing exercises are also effective for training the lungs' ability to take in and pump air, but do not affect the size or number of alveoli in the lungs. In addition, this exercise can also increase intra-abdominal pressure during expiration so as to increase bronchial diameter and inspiratory and expiratory flow which can increase oxygen saturation (Khoiriyah et al., 2022).

In line with research conducted Hidayat et al., (2024) shows the results that there is an effect of blowing balloon exercise pressure on oxygen saturation in COPD patients with a value (p value 0.000) with training for three days and every day three training sessions. Blowing balloon exercise has a significant impact on increasing

oxygen saturation since the first session. However, based on the analysis of the average change in oxygen saturation at each measurement time, it can be seen that after the third exercise, the improvement effect is greater than the first and second exercises (Hidayat et al., 2024).

Blowing balloon exercise is a breathing exercise performed by blowing a balloon using the mouth and inhaling air through the nose. This exercise can help relax the respiratory tract, improve the exhalation process, and support optimal lung development (Tunik et al., 2020). This exercise also plays a role in improving oxygen transportation and can help prolong the respiratory phase (Tunik et al., 2020).

Blowing balloon exercise is an exercise designed to train breathing by exhaling slowly, which can increase the strength of pulmonary pressure and respiratory muscles if done correctly and regularly (Hidayat et al., 2024). Blowing balloon exercise done properly and regularly can also enlarge the chest cavity, which can be seen from the increase in chest circumference after several training sessions. This is in accordance with research conducted by Tarigan & Juliandi, (2018), with an increase in chest circumference size, lung volume and pressure in the chest cavity also increase because the respiratory muscles become stronger, which has the potential to improve respiratory function.

Patients with COPD are strongly advised to perform breathing exercises, such as blowing balloon exercise, with the aim of improving ventilation and synchronizing the work of the abdominal and chest muscles. This breathing exercise is generally done in either three training sessions, by inhaling maximally through the nose (3-4 seconds), holding for 2-3 seconds then blowing into the balloon maximally for 5-8 seconds until the balloon expands. This technique is expected to create pressure during expiration, so that the air flow slows down and increases the pressure in the abdominal cavity which is passed on to the bronchioli, preventing respiratory tract collapse on expiration. Balloon blowing therapy can improve gas exchange, as seen by an increase in arterial oxygen saturation. In

addition, this technique also helps to improve breathing patterns and increase tidal volume. Balloon blowing provides subjective benefits, such as reducing shortness of breath, anxiety, and tension caused by tightness (Tarigan & Juliandi, 2018).

## CONCLUSIONS

The characteristics of respondents based on gender show that the majority of respondents are female, with the youngest age being 23 years old and the oldest age being 73 years old. In the characteristics of education, it was found that the majority of respondents had a high school education. Measurement of oxygen saturation in COPD patients after being given the intervention shows an increase in oxygen saturation, which indicates a positive effect of using the balloon blowing technique on oxygen saturation in COPD patients with a p-value of 0.000. Balloon blowing technique is proven to be effective in helping lung expansion, so as to increase oxygen supply and remove carbon dioxide trapped in the lungs in patients with impaired respiratory function. Balloon blowing exercise can be an effective nursing intervention to improve oxygen saturation in patients with COPD. Based on the results of this study, it is hoped that nurses can improve their knowledge and skills regarding pulmonary rehabilitation, especially in learning and applying the blowing balloon exercise technique more deeply and thoroughly. In its implementation, the researcher recommends that blowing balloon exercises be carried out on patients whose conditions are already stable.

## REFERENCES

Adiana, I. N., & Maha Putra, I. N. A. (2023). Hubungan Antara Tingkat Pendidikan Dan Komorbiditas Dengan Perilaku Perawatan Diri Pasien Penyakit Paru Obstruktif Kronis (PPOK). *Jurnal Riset Kesehatan Nasional*, *7*(1), 72–77. https://doi.org/10.37294/jrkn.v7i1.486

Astriani, N. M. D. Y., Dewi, P. I. S., & Yanti, K. H. (2020). Relaksasi Pernafasan dengan Teknik Ballon Blowing terhadap Peningkatan Saturasi Oksigen pada Pasien PPOK. *Jurnal Keperawatan Silampari*, *3*(2), 426–435. https://doi.org/10.31539/jks.v3i2.1049

Badan Penelitian Dan Pengembangan Kesehatan Republik Indonesia. (2018). Laporan Riskesdas 2018 Nasional.pdf. In *Lembaga Penerbit Balitbangkes* (p. hal 156).

Clari, M., Matarese, M., Ivziku, D., & De Marinis, M. G. (2017). Self-Care of People with Chronic Obstructive Pulmonary Disease: A Meta-Synthesis. *Patient*, *10*(4), 407–427. https://doi.org/10.1007/s40271-017-0218-z

Hartina, S., Wahiduddin, W., & Rismayanti, R. (2021). Faktor Risiko Kejadian Penyakit Paru Obstruktif Kronik Pada Pasien Rsud Kota Makassar. *Hasanuddin Journal of Public Health*, *2*(2), 159–171. https://doi.org/10.30597/hjph.v2i2.13139

Hidayat, A. S., Sofiani, Y., & Agung, R. N. (2024). Efektivitas tiupan blowing balloon exercise terhadap saturasi oksigen pada pasien penyakit paru obstruksi kronik di Rumah Sakit Umum Daerah Karawang. *Jurnal Ilmu Kesehatan Bhakti Husada: Health Sciences Journal*, *15*(01), 219–229. https://doi.org/10.34305/jikbh.v15i01.1083

Khoiriyah, K., Rahayu, F. A., Nurhidayati, T., & Baidhowy, A. S. (2022). Balloon Therapy to Reduce Shortness of Breath in Chronic Obstructive Lung Disease Patients. *Jurnal Aisyah : Jurnal Ilmu Kesehatan*, *7*(S2), 79–84. https://doi.org/10.30604/jika.v7is2.1410

Park, S. K. (2017). Factors affecting self-care behavior in Koreans with COPD. *Applied Nursing Research*, *38*(September), 29–37. https://doi.org/10.1016/j.apnr.2017.09.

85

003

P. Paramitha, "Respon Pasien Penyakit Paru Obstruktif Kronis (Ppok) Dengan Gangguan Pemenuhan Kebutuhan Oksigenasi Terhadap Penerapan Fisioterapi Dada Di Rumah Sakit Khusus Paru 'Respira,'" pp. 8–25, 2020, [Online]. Available:https://eprints.poltekkesjogja.ac.id/id/eprint/2512

Priastuti NF, Karuniawati H. Analisis Drug Related Problems Terkait Dengan Ketidaktepatan Dosis Dan Interaksi Obat Pada Pasien Penyakit Paru Obstruksi Kronik (PPOK) Di RSUD DR. Moewardi Tahun 2015 (Doctoral dissertation, Universitas Muhammadiyah Surakarta).

Sa'diyah, N. B., & Suandika, M. (2023). Implementasi Pada Pasien Dengan Ppok Di Ruang Edelweis Atas Rsud Kardinah Tegal. *Jurnal Ilmiah Global Education*, *4*(2), 996–999. https://doi.org/10.55681/jige.v4i2.910

Setiawan, A., Purwono, J., & Immawati. (2021). Penerapan Fisioterapi Dada Dan Nebulizer DalamMeningkatkan Saturasi Oksigen Pada Pasien Ppok. *Jurnal Cendikia Muda*, *1*(1), 6--12.

Singh, D., Agusti, A., Martinez, F. J., Papi, A., Pavord, I. D., Wedzicha, J. A., Vogelmeier, C. F., & Halpin, D. M. G. (2022). Blood Eosinophils and Chronic Obstructive Pulmonary Disease: A Global Initiative for Chronic Obstructive Lung Disease Science Committee 2022 Review. *American Journal of Respiratory and Critical Care Medicine*, *206*(1), 17–24. https://doi.org/10.1164/rccm.202201-0209PP

Sulistiowati, S., Sitorus, R., & Herawati, T. (2021). Asuhan Keperawatan Pada Pasien Dengan Penyakit Paru Obstruksi Kronik (PPOK). *Jurnal Ilmiah Kesehatan Keris Husada*, *5*(1), 30–38. http://repository.ump.ac.id/1077/5/ENDAH RETNO HAPSARI BAB II.pdf

Tarigan, A. P. S., & Juliandi. (2018). Pernafasan Pursed Lip Breathing Meningkatkan Saturasi Oksigen Penderita Penyakit Paru Obstruktif Kronis (PPOK) Derajat II. *Jurnal Online Keperawatan Indonesia*, *1*(2), 39–46. http://e-journal.sari-mutiara.ac.id/index.php/Keperawatan/article/view/426

Tunik, T., Niningasih, R., & Yuswantoro, E. (2020). The Effectiveness of Breath Relaxation with Balloon Blowing Technique towards Oxygen Saturation of COPD Patients. *Jurnal Pendidikan Kesehatan*, *9*(2), 193. https://doi.org/10.31290/jpk.v9i2.2031

Yawn, B. P., Mintz, M. L., & Doherty, D. E. (2021). Gold in practice: chronic obstructive pulmonary disease treatment and management in the primary care setting. *International Journal of COPD*, *16*, 289–299. https://doi.org/10.2147/COPD.S222664

Yuningsih, Y. (2017). Pengaruh Latihan Nafas Dalam Terhadap Peningkatan Saturasi Oksigen Pada Klien Terpasang Water Seal Drainage (Wsd) Di Rsud Kabupaten Tangerang. *Jurnal Keperawatan Komprehensif (Comprehensive Nursing Journal)*, *3*(2), 72–77. https://doi.org/10.33755/jkk.v3i2.87

**ORIGINAL RESEARCH**

# THE RELATIONSHIP BETWEEN MUROTTAL AL-QUR'AN AND EFFLEURAGE MASSAGE USING JITU OIL BY BREAST MILK GRANDMOTHERS WITH INDEPENDENCE IN BREASTFEEDING MOTHERS

**Dewi Andariya Ningsih[1], Sri Rahayu[2], Innama Sakinah[2].**
[1]Ibrahimy University, Indonesia
[2] Faletehan University, Indonesia
Corresponding Email: dewiandariya01@gmail.com

| ABSTRACT | Keywords |
|---|---|
| The negative influence of grandmother's advice about breastfeeding is related to wrong knowledge and not intentional. When they have adequate information, grandmothers' roles in feeding their grandchildren will be vulnerable and changeable, resulting in better feeding patterns. During the postpartum period, grandmothers can also pass on to their children information that is very useful for daughters/daughters-in-law, some of which can also hinder breastfeeding. In this research, we will examine the effect of Al-Qur'an murottal and Effleurage massage using Jitu Oil on breastfeeding independence in mothers assisted by breastfeeding grandmothers. Postpartum mothers who are giving birth for the first time will be confused about what steps need to be taken to meet the baby's nutritional needs, so the role of those closest to them, especially grandmothers, is needed in ensuring this is achieved. This research uses a quasi-experimental design using a one test only design. The working area of the Arjasa Community Health Center, Situbondo Regency, was used as the location for this research. The research was carried out from December 2023 to February 2024. The research population was postpartum mothers in the TPMB working area of the Arjasa Health Center using purposive samplingas many as 41 people. The resultsMothers who breastfeed independently tend to have a chance of having confidence in breastfeeding which is 3.167x higher than mothers who have low breastfeeding independence. | *Murrotal Al-Quran Effleurage Massage Independence Breast-feed* |

## INTRODUCTION

Breast milk is the most suitable food for babies because it contains the nutrients that babies need to grow and develop. The importance of giving exclusive breastfeeding to newborns up to 6 months of age and continuing to provide breast milk until the child is 24 months old has strong evidence. Breastfeeding for 6 months of life is an ideal start for a baby. Breastfeeding improves the health and cognitive development of babies and mothers in both developed and developing countries, and is the most important preventive approach for saving children's lives.(Marshall & Raynor, 2020).

World Health Organization (WHO) on exclusive breastfeeding for at least the first 6 months, compared to providing complementary foods until the age of 2 years. American Academy of Pediatrics (AAP), Academy of Breastfeeding Medicine (ABM) and Indonesian Doctors Association (IDA) with the same recommendation regarding breastfeeding for at least 6 months (Dewi, 2020). The achievement of exclusive breastfeeding in Indonesia has not reached 80% Based on the 2017 Indonesian Nursing Diagnosis Standards report, the percentage of children under 6 months who received exclusive breastfeeding there has increased in the last 5 years, from 42% to 52%. The percentage of children who did not receive breast milk increased from 8% in the 2012 Indonesian Nursing Diagnosis Standards to 12% in the 2017 Indonesian Nursing Diagnosis Standards (BKKBN, 2018)In Indonesia, only 8% of mothers exclusively breastfeed their babies until they are 6 months old and only 4% of babies receive breast milk from their mothers within one year. the first hour after birth. Whereas around 21,000 newborn deaths (under 28 days old) in Indonesia can be prevented by providing breast milk in the first hour after birth.(Zuidah, 2022).It is known that the coverage of Newborn Babies at Arjasa Health Center isIMD in 2023 was 488 babies out of 558 or 87.5%(UPTD, 2023). It's just that the continuation of the process of providing nutrition at home is regulated by the grandmother and family.

Exclusive breastfeeding is a real manifestation of the fulfillment of the seven basic aspects. Currently, almost all parents realize that breastfeeding can fulfill the physical and emotional needs of our babies and basically babies need physical closeness and warmth from their mothers as much as they need optimal food. The physical and spiritual relationship between mother and baby can be created by providing an opportunity for a mother to care for and breastfeed her baby independently. The independence and knowledge of breastfeeding mothers are very necessary because they can help the smoothness of the breastfeeding process. A mother who is breastfeeding for the first time, although she has a natural instinct, still often experiences difficulties because she is nervous, worried and lacks confidence. However, breastfeeding is not as simple as transferring milk from the breast to the baby, but there are a series of processes that need to be learned. Nowadays, there is a tendency for breastfeeding mothers to be unwilling to provide their breast milk for various reasons or problems that arise related to breastfeeding.

One effort to influence breast milk production is massage using the effleurage technique. This massage functions to increase the hormone oxytocin which can calm the mother, so that breast milk comes out. Effleurage massage is done with light and soothing rubbing movements (soft, slow, and long or unbroken) when starting and ending the massage. This movement aims to warm the muscles so that they are more comfortable.(Sahasrani, 2018). One of the efforts to influence breast milk production that researchers will do is back massage. Back massage is a massage along the spine (vertebra) to the fifth-sixth ribs and is an effort to stimulate the hormones prolactin and oxytocin after giving birth. This back massage functions to increase the hormone oxytocin which can calm the mother so that breast milk comes out(Purwanti & Mukhodim, 2018). Massage has several techniques, one of which is effleurage which is done with light and soothing rubbing movements (gentle, slow and long or continuous) when starting and ending the massage. This movement aims to warm up the muscles so they are more relaxed. In the practice of effleurage massage, there are several types of oil that can be used, one of which is Lavender Essential Oil. Lavender Essential Oil is an oil that is famous for its refreshing, strengthening, enlivening and calming effects on the skin(Zuidah, 2022). The oil is packaged in a

bottle with the name Jitu Oil which is an abbreviation of complementary therapy massage oil, for breastfeeding mothers.(Ningsih et al., 2023). The massage can be done independently by the mother and assisted by other people, especially family.

Family is the closest environment to mother and baby. A comfortable environment will stimulate the oxytocin reflex to stimulate the release of more breast milk.(Ministry of Health, Republic of Indonesia, 2013). Family environment such as the influence of support from husband, parents, in-laws can also affect the success in achieving exclusive breastfeeding. For example, in some highly educated mothers who work outside the home, the baby will be left at home under the care of the grandmother, in-laws. Thus, a fairly high level of education in women does not guarantee that they will abandon the wrong traditions or habits in feeding babies, as long as the social environment in the place of residence does not support this direction.(Waryana, 2016). According to Marlianidiani (2015) that family and environment have a very big role to minimize the risk of postpartum blues, namely by fulfilling the mother's need for rest, accompanying the mother, giving the mother the opportunity to relax, and so on. In addition to the prevention efforts above, currently many types of non-pharmacological therapy are being developed to calm postpartum mothers so that postpartum blues does not occur, one of which is Religious therapy with Murottal Al-Qur'an(Budiyarti & Makiah, 2018).

Massage is carried out at the same time as listening to verses from the holy Qur'an, a Muslim, whether they speak Arabic or not, can feel huge physiological changes. In general, they feel a decrease in depression, sadness and peace of mind(Putri & Utami, 2021). There is a significant influence of giving murottal Al Quran on reducing stress levels. This proves that therapy listening to the Al Quran can make people calm so that stress decreases due to the feeling of relaxation that arises when listening to the Al Quran (Azizah, 2016).

From the author's observations and after a preliminary study was conducted in July 2024, it was found that out of 15 postpartum mothers in the Arjasa Health Center work area, the maternal grandmothers still provided various education and even provided additional food other than breast milk to the baby and the mother did not know how to breastfeed properly. Meanwhile, officers only provide breastfeeding guidance as needed. This causes mothers to be less independent in caring for and breastfeeding their babies, resulting in problems related to breastfeeding, including aspiration, fussy babies, nipple confusion, sore nipples, swollen breasts and most often babies spit up. If this is not addressed immediately, it will lead to problems with babies being reluctant to breastfeed, babies not getting adequate nutrition and the most serious being pneumonia due to aspiration.

Based on this phenomenon, researchers want to know. So this research was conducted to further optimize the method of strengthening breast milk.""Effectiveness of Al-Qur'an Murottal and Effleurage Massage Using Jitu Oil by Breast Milk Grandmothers on the Independence of Breastfeeding Mothers in the First Month of Birth?"

## METHOD

This study used a quasi-experimental design using a one test only design. The Arjasa Health Center Work Area, Situbondo Regency, was used as the location for this study. The study was conducted from December 2023 to February 2024. The study population was postpartum mothers in the Arjasa Health Center TPMB work area. Purposive sampling is the sampling method used in this study. This is based on the researcher's own considerations and past knowledge of population characteristics (Notoadmodjo, 2002). The sample of this study was 41 people. Respondents who met the inclusion criteria were postpartum mothers with spontaneous labor, healthy non-twin newborns, Muslims and liked murottal Al-Quran(Ningsih et al., 2024), No hearing impairment, Postpartum mothers who were treated for 2 (two) days at TPMB in the Arjasa Health Center work area, Postpartum mothers who are willing to undergo Effluerege Massage, Mothers with full-term babies, normal weight 2500-4000 grams, physically healthy and born spontaneously and with standard suction, Mothers with babies in joint care (Rooming in), Mothers with protruding nipples.

The data collection tool in this study used 1 (one) instrument, namely containing a questionnaire regarding respondent characteristic data including: mother's age and parity. This data collection tool also contains objective data on the checklist sheet for applying massage effluerage

using accurate oil by listening to the murottal of the Koran. The assessment is carried out by observing the first breast milk coming out, after the intervention. Monitor the success of breastfeeding positions by checking the baby's bowel movements, urination and weight after birth and at the end of the study. IThe instrument for the independence of breastfeeding mothers uses an instrument adapted from the articleValidation of Nursing Outcomes Related to Breastfeeding Establishment which can improve evaluation of midwifery interventions related to the independence of breastfeeding mothers aimed at mothers and babies(Dias Emidio et al., 2020). The instrument has undergone validity and reliability testing. This research has received ethical approval from Faletehan University with number 185/KEPK.UF/XI/2023.

## RESULTS

Independence means the ability to determine and decide what one wants and be responsible for one's decisions. In other words, the state of being able to stand alone without depending on others. Self-care during the postpartum period has been carried out for a long time according to the customs that prevail in society.

**Interpretation of Validity and Reliability Results of Independence Questionnaire**
The basis for making decisions on the Pearson Product Moment Validity Test is by looking at the significance value (Sig.) where:

1. If the Sig value. < 0.05, then the questionnaire item is declared valid.
2. If the Sig value. ≥ 0.05, then the questionnaire item is declared invalid.

| Questionnaire Items | Sig. Value | Information |
| --- | --- | --- |
| 1 | 0.013 | Valid |
| 2 | 0.017 | Valid |
| 3 | 0.007 | Valid |
| 4 | 0.005 | Valid |
| 5 | 0.005 | Valid |
| 6 | 0.019 | Valid |
| 7 | 0,000 | Valid |
| 8 | 0.010 | Valid |
| 9 | 0,000 | Valid |
| 10 | 0.013 | Valid |
| 11 | 0.008 | Valid |

| Questionnaire Items | Sig. Value | Information |
| --- | --- | --- |
| 12 | 0.001 | Valid |
| 13 | 0.006 | Valid |
| 14 | 0.002 | Valid |
| 15 | 0.018 | Valid |
| 16 | 0.010 | Valid |
| 17 | 0.023 | Valid |
| 18 | 0.005 | Valid |
| 19 | 0,000 | Valid |
| 20 | 0,000 | Valid |
| 21 | 0,000 | Valid |
| 22 | 0,000 | Valid |
| 23 | 0,000 | Valid |
| 24 | 0.004 | Valid |
| 25 | 0,000 | Valid |
| 26 | 0,000 | Valid |
| 27 | 0.003 | Valid |
| 28 | 0,000 | Valid |
| 29 | 0.007 | Valid |

The basis for making decisions on Crobach's Alpha Reliability Test is by looking at the alpha value where:

1. If the alpha value is <0.6, then the questionnaire item is declared unreliable.
2. If the alpha value ≥ 0.6, then the questionnaire item is declared reliable.

| Reliability Statistics | |
| --- | --- |
| Cronbach's Alpha | N of Items |
| ,891 | 29 |

The test results on 29 items of the breastfeeding mother independence questionnaire on 30 respondents obtained a score ofCronbach'sAlpha is 0.891 (≥0.6) which means the questionnaire is declared reliable or can be consistent in repeated measurements. The respondents who filled in were breastfeeding mothers outside of the research respondents. The 29 questions consist of 17 statements about mothers and 12 statements about babies. The researcher adapted the questionnaire from the research questionnaireSuellen Cristina Dias Emidio, Sue Moorhead, FAAN, Henrique Ceretta Oliveira, T. Heather Herdman,, Ana Railka de Souza Oliveira-Kumakura and Elenice Valentin Carmona Validation of Nursing Outcomes Related to Breastfeeding Establishment, International Journal of Nursing Knowledge

**Interpretation of the Results of the Shapiro-Wilk Test of Breastfeeding Mothers' Independence**

Normally distributed data is a requirement for making decisions about research data being processed parametrically or non-parametrically. In determining whether the data is normally distributed or not, a normality test can be used. In this study, because there were a small number of respondents, the normality test used was the Shapiro-Wilk test. The basis for making decisions for the Shapiro-Wilk test is by looking at the significance value (Sig.) where:

1. If the Sig. value < 0.05, then the data is not normally distributed.
2. If the Sig. value ≥ 0.05, then the data is normally distributed.

**Tests of Normality**

| | Kolmogorov-Smirnova | | | Shapiro-Wilk | | |
|---|---|---|---|---|---|---|
| | Statistics | Df | Sig. | Statistics | df | Sig. |
| Independence Day 1 | .112 | 41 | ,200* | ,935 | 41 | .021 |
| Independence Day 5 | ,147 | 41 | .026 | ,966 | 41 | ,244 |
| Independence Day 10 | .135 | 41 | .058 | .959 | 41 | .148 |
| Independence Day 15 | .134 | 41 | .060 | ,949 | 41 | .063 |
| Independence Day 20 | .109 | 41 | ,200* | .986 | 41 | .892 |
| Independence Day 25 | .157 | 41 | .012 | .817 | 41 | .000 |
| 30th Day of Independence | .176 | 41 | ,003 | .909 | 41 | ,003 |

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

The results of the Shapiro-Wilk Test using SPSS ver.25 on data on the independence of breastfeeding mothers for 1 month showed consecutive Sig values. 0.021 (<0.05); 0.244 (>0.05); 0.148 (>0.05); 0.063 (>0.05); 0.892 (>0.05); 0.000 (<0.05) and 0.003 (<0.05) which means that there is data that is not normally distributed (day 1, day 25, and day 30) so that it was decided that parametric testing could not be carried out even though some of the data was normally distributed because all the data was paired data.

**Interpretation of Friedman Test Results for the Independence of Breastfeeding Mothers**

The Friedman test is a non-parametric statistical test used to test the differences of 3 or more related samples. The decisions that can be obtained from the results of the Friedman Test include:

1. Output 1 contains a summary of descriptive statistics from the data in the form of a summary table

**Descriptive Statistics**

| | | | Std. | | | Percentiles | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | 50th | |
| | N | Mean | Deviation | Minimum | Maximum | 25th | (Median) | 75th |
| Independence Day 1 | 41 | 36.56 | 4,087 | 29 | 51 | 33.50 | 37.00 | 39.00 |
| Independence Day 5 | 41 | 43.32 | 5,646 | 30 | 55 | 39.00 | 42.00 | 48.50 |
| Independence Day 10 | 41 | 54.39 | 8,348 | 38 | 69 | 49.50 | 57.00 | 61.00 |
| Independence Day 15 | 41 | 58.59 | 9,638 | 39 | 76 | 50.50 | 60.00 | 66.00 |
| Independence Day 20 | 41 | 66.83 | 4.460 | 58 | 77 | 63.00 | 67.00 | 70.00 |
| Independence Day 25 | 41 | 89.39 | 6,082 | 62 | 102 | 87.00 | 90.00 | 93.00 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 30th Day of Independence | 41 | 132.68 | 9,530 | 110 | 145 | 125.00 | 132.00 | 143.00 |

Descriptive statistics on 41 respondents whose data was collected in 1 month 7 times, namely day 1, day 5, day 10, day 15, day 20, day 25, and day 30 it can be seen that the average level of independence during treatment has increased successively to 36.56; 43.32; 54.39; 58.59; 66.83; 89.39; and 132;68.

2. Output 2 contains the average independence of breastfeeding mothers in ranking form.

**Ranks**

| | Mean Rank |
|---|---|
| Independence Day 1 | 1.09 |
| Independence Day 5 | 2.02 |
| Independence Day 10 | 3.00 |
| Independence Day 15 | 3.90 |
| Independence Day 20 | 5.00 |
| Independence Day 25 | 5.99 |
| 30th Day of Independence | 7.00 |

The ranking of the independence of breastfeeding mothers from lowest to highest in sequence from the first day had the lowest average independence, while the highest average independence was held on the 30th day of treatment with an increase in independence and without even a decrease in independence during data collection. This shows that Murottal Al-Qur'an and Effleurage Massage Using Jitu Oil by Breastfeeding Grandmothers have resulted in an increase in the independence of breastfeeding mothers every day.

3. Output 3, contains an illustration of whether there are significant differences between the data averages. The basis for decision making can be seen from the Sig value. Where:

a. If the Sig value. < 0.05, then there is a significant difference between the results of the independence of breastfeeding mothers and the intervention of Murottal Al-Qur'an and Effleurage Massage Using Jitu Oil by Breastfeeding Grandmothers

b. If the Sig. value ≥ 0.05, then there is no significant difference between the results of the independence of breastfeeding mothers with the intervention of Murottal Al-Qur'an and Effleurage Massage Using Jitu Oil by Nenek ASI

**Test Statistics**

| N | 41 |
|---|---|
| Chi-Square | 243,229 |
| Df | 6 |
| Asymp. Sig. | .000 |
| a. Friedman Test | |

The resulting Sig value. The average difference in independence during treatment produces a value of 0.000 (<0.05), which means that there is a statistically significant difference in the average independence of breastfeeding mothers between before and after giving Murottal Al-Qur'an treatment and Effleurage Massage Using Jitu Oil by Grandmother. breast milk.

**Interpretation of Chi Square Test Results and Odd Ratio Data on Age and Parity on the Confidence and Independence of Breastfeeding Mothers**

The basis for making decisions using the Chi Square Test is to look at the significance value (Sig.) where:

1. If the Sig. value < 0.05, then there is statistical evidence of a significant relationship between Breastfeeding

Independence and Breastfeeding Confidence.

2. If the Sig. value ≥ 0.05 then there is not enough statistical evidence of a significant relationship between Breastfeeding Independence and Breastfeeding Confidence.

The interpretation of the Odd Ratio depends on the resulting value where:

1. If Odd Ratio = 1, it indicates that there is no difference between the comparison groups.
2. If the Odd Ratio > 1, it shows that mothers with a high level of independence have a multiple chance (according to the OR value obtained) of having a high level of confidence.
3. If Odd Ratio < 1, this indicates that mothers with a high level of independence have a slightly lower chance of having a high level of confidence.

|  |  | Not sure | Certain |  |  |  |
|---|---|---|---|---|---|---|
| **Independence of Breastfeeding Mothers** | **Not Independent** | 5 | 15 | 20 | 0.188 | 3,167 |
|  | **Independent** | 2 | 19 | 21 |  |  |
| **Total** |  | 7 | 34 | 41 |  |  |

The results of the Chi Square Test obtained a Sig. value of 0.188 (>0.05) which means that there is not enough evidence for the results of the level of independence of breastfeeding mothers to be related to the results of the level of confidence of breastfeeding mothers, but the OR value obtained shows that mothers who breastfeed independently tend to have a chance of having confidence when breastfeeding which is 3.167x higher than mothers who have low breastfeeding independence.

Interpretation of Shapiro-Wilk test resultsThe Effectiveness of Murottal Al-Qur'an and Effleurage Massage Using Jitu Oil by ASI Grandmothers Againstindependence of breastfeeding mothers. The results of the Shapiro-Wilk Test using SPSS ver.25 on data on the independence of breastfeeding mothers for 1 month showed consecutive Sig values. 0.021 (<0.05); 0.244 (>0.05); 0.148 (>0.05); 0.063 (>0.05); 0.892 (>0.05); 0.000 (<0.05) and 0.003 (<0.05) which means that there is data that is not normally distributed (day 1, day 25, and day 30) so that it was decided that parametric testing could not be carried out even though some of the data was normally distributed because all the data was paired data.

## DISCUSSION

The independence of postpartum mothers after being given guidance by Grandmothers on the correct breastfeeding techniques has increased from before being given guidance. Grandmothers play a role in performing effleurage massage using Jitu Oil while listening to Murottal Al-Qur'an every day. There is a common goal to be able to provide breast milk independently to their babies which is the basis for significant results from this study. This can happen because mothers have independence in breastfeeding which is obtained from the learning process in the form of breastfeeding training and practice guided by grandmothers and health workers on how to breastfeed properly and correctly. Changes in individual behavior after going through the learning process include changes in overall behavior and these changes are active and positive where these changes are

always increasingly aimed at obtaining something better than before.Among the people who exert influence on the teenage mother are her mother (the child's maternal grandmother); she frequently and actively participates in decisions regarding her grandchildren's feeding. Her personal experiences and opinions about breastfeeding can facilitate or hinder this practice. In Brazil, there are at least 3 studies showing that the duration of exclusive breastfeeding may be shorter because the influence of grandmothers, especially from the maternal grandmother(Dias De Oliveira et al., 2014).

Dewi's Research(Ningsih et al., 2023)which can be used as an intervention states that Jitu Oil can increase breast milk production, has a calming effect with a quite good sedative effect and can reduce motor activity by up to 78%, so it can be used in stress management. In this case, it is known that Jitu Oil is a medium that can facilitate the method of increasing breast milk production. Massage using Jitu Oil in conjunction with chanting verses from the Koran. According to(Pedak, 2009)explains in more detail that when listening to the Qur'an, impulses (stimuli) enter the brain through the auditory area. From the cochlea, signals from the verses of the Qur'an are forwarded to the thalamus and delivered to the amygdala (emotional center), which is an important part of the system that influences emotions and behavior, then delivered to the hippocampus (emotional memory center) and hypothalamus (autonomic control center) so that the sound of the recitation of the holy verses of the Qur'an that is heard becomes energy that has a positive effect on the heart.

Effleurage massage performed consecutively can increase the let down reflex which can help in... the release of breast milk production to the baby, to the point of being able to affect the peripheral nervous system. The nervous system can improve communication between nerves and increase stimulation, helping to improve blood flow to tissues and organs of the body to reduce blockage of the milk ducts, thereby increasing the release of prolactin and

oxytocin hormones(Lestari P. Fatimah, Ayuningrum, 2021).Most grandmother-mother couples are not independent units but are part of a larger family system in which the mother is supported by other family members and especially by the grandmother.(Schrijner & Smits, 2018).

Brazilian researcher(Gross et al., 2011)reported that young urban mothers referred to grandmothers as their lifelong guides, 'They provide a sense of security and comfort based on the experiences these women have accumulated and a study of breastfeeding in urban Mexico concluded, 'grandmothers continue to do the same. Playing a leadership role in the family as primary advisors and health promoters. Two studies in Ghana concluded, 'parents consider grandmother as a symbol of wisdom and knowledge regarding the care of newborns(Adama et al., 2018)and it is the husband's mother who makes decisions regarding the care of the newborn(Gupta et al., 2010).

In Nepal, researchers concluded that advice from respected and authoritative grandmothers cannot be rejected(Karmacharya et al., 2017). Indian researchers report the influence of grandmothers in the network of social relations around the mother(Prusty & Unisa, 2017). Similar patterns and influences on younger children also emerge in newborns in non-Western cultural environments: careimportant.coordinated by older women; younger women are learners; and men are rarely directly involved. As the culturally designated authority in newborn care, grandmothers are responsible for transmitting a range of culturally determined practices that include: massage; umbilical cord care; colostrum; prelactal; thermal care; breastfeeding; newborn illnesses and spiritual protection.

Young mothers are expected to follow the advice of their recognized senior advisors. Newborn studies in four African locations documented young mothers' dependence on experienced grandmothers, with mothers often 'only taking full responsibility for their newborns after a few days or weeks'(Iganus et al., 2015)Similarly, in Nepal, new babies are born. Moms can't resist traditional newborn directions. A practice carried out by respected grandmothers(Karmacharya et al., 2017). There is a lot of evidence regarding the influence of grandmothers on how long and how long mothers breastfeed. Although mothers sometimes receive advice from health workers, most women benefit from home breastfeeding coaches, namely grandmothers and other experienced female family members, for example. In Bihar, the mother-in-law is the primary decision maker in breastfeeding initiation, practices and issues.(Nutrition practices in Bihar: results of a formative research study, 2017).

Interpretation of Friedman Test ResultsThe Effectiveness of Murottal Al-Qur'an and Effleurage Massage Using Jitu Oil by ASI Grandmothers AgainstIndependence of Breastfeeding Mothers. Descriptive statistics on 41 respondents whose data were taken in 1 month 7 times, namely day 1, day 5, day 10, day 15, day 20, day 25, and day 30 can be seen that the average level of independence during the treatment increased consecutively 36.56; 43.32; 54.39; 58.59; 66.83; 89.39; da/vn 132;68. Al-Qur'an Murottal Therapy can reduce stress hormones, activate natural endorphin hormones, increase feelings of relaxation, and divert attention from fear, anxiety, and tension, improve the body's chemical system to lower blood pressure and slow down breathing, heart rate, pulse, and brain wave activity. A deeper or slower breathing rate is very good for calming, controlling emotions, thinking deeper, and better metabolism(Heru, 2008).

Research conducted by Ningsih(Ningsih, 2024)stated that there was a difference in the smoothness of breast milk production after back massage with Jitu Oil for 4 consecutive days. Aromatherapy massage with essential oils is the most widely known treatment, because it can penetrate the skin and be absorbed into the body, thus providing a healing effect and benefits various tissues and internal organs. Massage using aromatherapy is one type of treatment that is popular and common in society, the combination of massage and aromatherapy has been proven to provide positive effects according to the purpose of

its use. Lavender and lemon essential oils are one of the popular essential oils and are widely used in the field of clinical health, especially in overcoming psychosomatic problems in the field of gynecology which have a psychological therapeutic effect from the aroma inhaled through inhalation of its volatile components. The use of Jitu Oil through massage causes the content of lavender and lemon essential oils to evaporate and be inhaled by the mother. If the massage using Jitu Oil is done with a gentle touch, the mother can become more relaxed, reduce muscle tension and help smooth breast milk production. Lavender and lemon essential oils are one of the aroma therapies that have sedative, hypnotic, and anti-neurodepressive effects on humans. Massaging the mother's back is one way to stimulate the oxytocin reflex to relax the mother when she has difficulty producing breast milk. The upper back is a point used to facilitate the lactation process. The nerves that innervate the breasts originate from the upper spine, between the shoulder blades. This area is an area where women often experience muscle tension. Massaging the back can relax the shoulders and stimulate the lowering reflex. Massage done on the back with the effleurage technique and combined with lavender aromatherapy oil is very good for mothers because it can make the mother 2x more relaxed and feel comfortable so that the oxytocin hormone increases and breast milk production becomes more

The success of exclusive breastfeeding in the Arjasa Community Health Center Work Area was achieved thanks to the willingness and awareness of breastfeeding mothers to give only breast milk to their babies aged 0 to 6 months. This condition is supported by grandmothers both individually and in groups of elderly who provide support: 1) Giving advice/suggestions for exclusive breastfeeding, 2) Providing motivation, 3) Giving attention, 4) Reminding when the mother is away, 4) Providing stored breast milk when the mother is working . On the other hand, midwives and nutrition officers always provide guidance and education on the importance of exclusive breastfeeding to pregnant women and brides-to-be during check-ups at community health centers. This will increase: 1) Understanding of mothers and prospective brides regarding the benefits of exclusive breastfeeding, 2) Increased awareness of mothers and prospective brides to breastfeed exclusively, 3) Improved attitudes of mothers and prospective brides towards achieving exclusive breastfeeding. Furthermore, it will improve mothers' practice of exclusive breastfeeding in the form of: 1) Overcoming obstacles, 2) Meeting balanced nutritional needs when breastfeeding, 3) Maintaining health, and drinking herbal medicine which is believed to increase exclusive breast milk production. This situation will further influence the success of exclusive breastfeeding. The relationship between the roles of grandmothers and breastfeeding mothers in the process of achieving exclusive breastfeeding in the Arjasa Health Center Work Area.

Most grandmothers in this study considered that: one year is the important and fundamental period for breastfeeding; the introduction of solid foods should begin before the sixth month of life; and infants need a set breastfeeding schedule, as opposed to on-demand feeding. The extent of breastfeeding is inconsistent and depends on social and demographic factors. Nevertheless, WHO, supported by the Ministry of Health, recommends breastfeeding for 2 years or more, and exclusively for the first 6 months(Ministry of Saúde, nd). Another interesting aspect related to giving fluids to babies, is the fact that it is possible that the concept of exclusive breastfeeding is not clear to women, because they understand the practice to mean not giving other types of milk, but being able to give other fluids.(Campos et al., 2015)Another aspect to consider is the fact that the majority of grandmothers (53.85%) consider it important to have a strict breastfeeding schedule, which again shows their lack of knowledge, since what is recommended is to encourage breastfeeding on demand, without time limit. and duration. It is interesting to note that 40% of grandmothers stated that they believed that breast milk

may be weak or insufficient, but they did not know how to objectively identify whether the baby was properly breastfed or not. Weak breast milk is an existing belief and can be passed down from generation to generation. A cross-sectional study conducted in São Paulo analyzed the main causes of early supplementation by mothers; 17.8% of them answered that they gave supplements because their breast milk was "weak", or "could not support" the baby. It is important to remember that "…there is no such thing as weak milk. Every woman, despite her malnutrition (as long as it is not severe malnutrition), produces milk of good nutritional quality that can meet all the baby's needs during the first six months of life.(Nunes et al., 2011). Some authors identify grandmothers as role models for mothers to follow. They also help with household activities, indirectly supporting lactation. However, sometimes grandmothers are reluctant to breastfeed naturally because of their own experiences. This suggests that to support breastfeeding, more than just knowledge of the benefits or handling techniques is needed, and finding out the mother's intentions in breastfeeding, considering that breastfeeding mothers are more vulnerable to advice and pressure from others. third parties(Losa-Iglesias et al., 2013). Considering the closeness of the grandmother and her help in caring for the mother and baby (bathing, changing sanitary napkins, changing diapers, helping with the house, washing and kitchen), it can be concluded that the grandmother has great credibility and potential. Providing a positive influence in the establishment and maintenance of breastfeeding, as long as they obtain adequate knowledge and skills. Their influence is considered positive when the mother or mother-in-law has accumulated experience and importance breastfeeding. When making decisions about breastfeeding, mothers are often faced with the difficult situation of having to choose between the affirmation of health authorities and the traditions of their grandmothers. In this case, grandmothers and family members participate as sources of relevant information about breastfeeding, whose negative/positive influence can justify the incidence and prevalence of breastfeeding that we observe today. It can be assumed that grandmothers, especially maternal grandmothers, can also support or prohibit breastfeeding. However, we cannot say that this is the only influence, because there are many factors, ranging from social, cultural to economic factors at stake. The older generation, especially the grandmother of the baby, plays a central role in various aspects of decision-making regarding pregnancy and raising children in the family unit.(Losa-Iglesias et al., 2013)

In the analyzed domain, this research allows us to conclude that the orientation of daughters and/or daughters-in-law regarding infant feeding, is part of the social role of grandmothers, whose experiences have important cultural values; in addition, breastfeeding is highly valued by grandmothers. It is necessary to look for new ways of viewing and caring for families in everyday life, especially families who are experiencing the process of breastfeeding. It is necessary to consider intergenerational knowledge and family social support, so that breastfeeding mothers can breastfeed calmly and are able to care for new creatures born in the world. , embedded in the knowledge gained. in the family group to which he belongs, in his mother-in-law's group, as well as in other care systems. For this reason, the professional development of health care teams with a family-centered approach, seeking interdisciplinary knowledge in social, human and biological sciences, in such a way that makes it possible to approach families more closely, both in parts and as a whole.

Interpretation of Chi Square and Odd Ratio Test Results for Age and Parity DataThe Effectiveness of Murottal Al-Qur'an and Effleurage Massage Using Jitu Oil by Grandmother ASIOn the Confidence and Independence of Breastfeeding Mothers.The Chi Square Test results get a Sig value. 0.188 (>0.05) which means there is not enough evidence for the results of the level of independence of breastfeeding mothers to be related to the results of the level of confidence of breastfeeding mothers, however the OR value obtained shows that mothers who breastfeed

independently tend to have a chance of having confidence in breastfeeding which is 3.167x more. higher than mothers who have low breastfeeding independence.

One of the main results of this study is that, in the context analyzed, the influence of grandmothers proved to be a determining factor in the continuation of breastfeeding or early weaning. Grandmothers play an important role in transmitting knowledge, wisdom and experience regarding infant feeding. The nursing team can support the autonomy of the subject, taking into account shared responsibility and cultural appropriateness, as well as the interaction of the family group, which – in its dialectical action – modulates, and is modulated by, culture. In environmental analysis, this research allows us to conclude that the orientation given to daughters and/or daughters-in-law regarding infant feeding, is part of the social role of grandmothers, whose experience is recognized as an important cultural value. Apart from that, breastfeeding is also appreciated by grandmothers(MA & ER., 2013). For women in these three generations, the importance of their mothers' and/or grandmothers' experiences was a determining force in shaping the meanings and behaviors that permeated their breastfeeding practices. The women recognized the importance of support and encouragement from their families, especially their mothers, for breastfeeding.(Moreira et al., 2013).

Grandmothers can have both negative and positive influences on the duration of breastfeeding. Their presence is one of the determining factors for the continuation or non-continuation of breastfeeding, because they provide assessments and cause varying responses in breastfeeding mothers. Moreover, the support given by the grandmother when present is clearly considered a supporting element for the continuation of breastfeeding for up to 6 months, especially when there is a transfer of previous learning to her daughter.

According to researchers, factors such as age, education, occupation and parity of respondents are not necessarily direct factors that can influence supported by research.(Dewi Andariya Ningsih, 2018)that there is no relationship between education and breastfeeding behavior of mothers. Confidence and independence in breastfeedingsupported by the characteristics of the participants who are mostly in the reproductive age range. The mother's age during pregnancy and childbirth greatly influences the reproductive health of women to become pregnant, give birth and be ready to provide breast milk to their babies, this is in line with research conducted by(Dewi Andariya Ningsih, 2018)where some respondents are in the reproductive age range of 20-35 years.Older mothers are considered to have more experience in breastfeeding than young mothers, so their knowledge is better than young mothers. Meanwhile, those aged less than 20 years are psychologically not ready to become a mother, so it can be a psychological burden causes depression and makes it difficult to express breast milk(Hanifah et al., 2017).

Independence can be obtained from the learning process. Referring to the "Kingskey" theory, learning is a process where behavior is generated or changed through practice or training. In the learning process, there is a need for assistance or guidance by using various interaction materials, advice and ideas in a nurturing atmosphere based on applicable norms (Prayitno, 1999 ). As in the process of learning to breastfeed for post-partum mothers, guidance from health workers is needed regarding correct breastfeeding techniques so that post-partum mothers are expected to be able and willing to care for and breastfeed their own babies without relying on other people. Based on the results of this statistical test, it shows that guidance on proper and correct breastfeeding techniques can provide evidence that the independence of breastfeeding in post partum mothers increases, in this case it will increase by 2.46 times compared to those who were not given guidance on breastfeeding techniques. This is in accordance with the objectives of lactation management for post partum mothers, efforts to support successful breastfeeding

The results of research by Sehmawati et al.(Sehmawati & Setyobudi, 2022) shows breast milk production in the back effleurage massage group as measured by the frequency of breastfeeding before the intervention with an average value of 6.40 and after the intervention 2.30. The baby's BAC before the intervention had an average value of 4.25 and after the intervention 12.15. The duration of the baby's sleep before the intervention was 11.25 and after the intervention 17.00. The results of the research in the control group who were given back effleurage massage showed that the average value of breastfeeding frequency before the intervention was 6.25 and after the intervention was 10.85. The baby's BAK had an average value of 3.95 and after intervention it was 10.85. The baby's sleep duration with an average value before the intervention was 12.05 and after the intervention was 16.00, so this shows a significant difference with a p-value <0.05. Efflurage massage has been proven to increase feelings of relaxation, more comfortable and quality sleep, reduce pain, reduce stress and help increase the hormones oxytocin and prolactin, making it easier to express breast milk and breast milk production. Breast milk is the best nutrition for babies which influences their growth.

At the time of the study, Grandmother helped the mother's breastfeeding process every day, every 2 to 3 hours, and also when the child was asleep for more than 3 hours, the mother would wake the child up so that he could be breastfed so that his needs were still met. This behavior is also a form of appropriate maternal behavior because breastfeeding every 2 to 3 hours helps the production of breast milk (ASI).(Gartner, nd).

## CONCLUSION

The results of the Chi Square Test obtained a Sig. value of 0.188 (>0.05) which means that there is not enough evidence for the results of the level of independence of breastfeeding mothers to be related to the results of the level of confidence of breastfeeding mothers, but the OR value obtained shows that mothers who breastfeed independently tend to have a chance of having confidence when breastfeeding which is 3.167x higher than mothers who have low breastfeeding independence.

So it can be concluded that the level of independence in breastfeeding in post partum mothers before being given guidance on breastfeeding techniques increases after being given guidance on breastfeeding techniques as contained in the principles or provisions that must be applied in providing guidance services, one of which is the principle of independence. , where the guidance service aims to make the mentor able to stand alone, not depend on other people or be independent

## CONCLUSIONS

*(Tidak perlu menuliskan kesimpulan dan saran cukup ditulis dalam satu poin kesimpulan tanpa penomoran)*

Perception of Nurse Ability in Increasing Hope and Motivation of Patients Hypertension is very important in helping hypertensive patients in hospitals so that this becomes an important component that needs to be considered in helping hypertensive patients.

## REFERENCES

Adama, E., Bayes, S., & Sundin, D. (2018). Parents' experiences of caring for preterm infants after discharge with grandmothers as their main support. *J Clin Nurs*, *27*, 3377–86.

Azizah, N. (2016). *Terapi Mendengarkan Al Qur'an Terhadap Pencegahan Postpartum Blues Pada Ibu Nifas Di RS Tk III 04.06.03 Dr. Soetarto Yogyakarta*.

BKKBN. (2018). *BPS, Kemenkes RI, & USAID. Survei Demografi Dan Kesehatan 2017. USAID*. 1–606. https://e-koren.bkkbn.go.id/wp content/upload/2018/10.Laporan-Standar Diagnosis Keperawatan Indonesia-2017- WUS.pdf

Budiyarti, Y., & Makiah. (2018). Murottal Al Qur ' an Therapy Effect on Ansiety Level of Third Trimester Primigravida

Pregnant Women. *Jurnal Citra Keperawatan*, *xx*(x), 89–99.

Campos, M., Chaoul, C., Carmona, E., Higa, R., & Vale, I. (2015). Prática de aleitamento materno exclusivo informado pela mãe e oferta de líquidos aos seus filhos. *Rev Lat Am Enfermagem*, *23*(2), 283–290.

Dewi Andariya Ningsih. (2018). Faktor-faktor yang mempengaruhi pemberian ASI ekslusif. *Jurnal Penelitian Kesehatan Suara Forikes*, *9*(2), 2013–2015. http://forikes-ejournal.com/index.php/SF/article/view/9204/pdf

Dias De Oliveira, L., Justo Giugliani, E. R., Córdova Do Espírito Santo, L., & Meirelles Nunes, L. (2014). Counselling sessions increased duration of exclusive breastfeeding: A randomized clinical trial with adolescent mothers and grandmothers. *Nutrition Journal*, *13*(1), 1–7. https://doi.org/10.1186/1475-2891-13-73

Dias Emidio, S. C., Moorhead, S., Oliveira, H. C., Herdman, T. H., Oliveira-Kumakura, A. R. de S., & Carmona, E. V. (2020). Validation of Nursing Outcomes Related to Breastfeeding Establishment. *International Journal of Nursing Knowledge*, *31*(2), 134–144. https://doi.org/10.1111/2047-3095.12256

Gartner, L. . (n.d.). Breastfeeding and The Use Of Human Milk. Pediactric. *2005*, *115*(2), 496–506.

Gross, F., Pacheco, I., & Oliveira, N. (2011). Influence of grandmothers on infant feeding: what they say to their daughters and granddaughters. *Acta Paul Enferm*, *24*, 534–40.

Gupta, M., Aborigo, R., & Al., A. P. et. (2010). Grandmothers as gatekeepers? the role of grandmothers in influencing health-seeking for mothers and newborns in rural Northern Ghana. *Glob Public Health*, *15*, 1078–91.

Hanifah, S. A., Astuti, S., & Susanti, A. I. (2017). Gambaran Karakteristik Ibu Menyusui Tidak Memberikan Asi Eksklusif Di Desa Cikeruh Kecamatan Jatinangor Kabupaten Sumedang Tahun 2015. *Jurnal Sistem Kesehatan*, *3*(1), 38–43. https://doi.org/10.24198/jsk.v3i1.13960

Heru. (2008). *Ruqyah Syar'i Berlandaskan Kearifan Lokal*.

Iganus, R., Hill, Z., & Al., M. F. et. (2015). Roles and responsibilities in newborn care in four African sites. *Trop Med Int Health*, *20*, 1258–64.

Karmacharya, C., Cunningham, K., & Al., C. J. et. (2017). Grandmothers' knowledge positively influences maternal knowledge and infant and young child feeding practices. *Public Health Nutr*, *20*, 2114–23.

Kemenkes. RI. (2013). Memupuk Generasi Emas Indonesia Lewat Air Susu Ibu. *MediaKom*.

Lestari P. Fatimah, Ayuningrum, D. (2021). *Pijat Oksitosin, Laktasi Lancar, bayi Tumbuh Sehat*. Elmatera.

Losa-Iglesias, M., Vázquez, R., & RB., B.-V. (2013). *Papel de la abuela en la lactancia materna. Aquichan*. *13*(2), 270–279.

MA, M., & ER., N. (2013). Intersectionality family, generation and breastfeeding. *Rev Kairós Gerontol.*, *15*(5), 191–208.

Marshall, J. E., & Raynor, M. D. (2020). *Myles Textbook for Midwives*. https://shop.elsevier.com/books/myles-textbook-for-midwives/marshall/978-0-7020-7642-8

Ministério da Saúde. (n.d.). Secretaria de Atenção à Saúde. Departamento de Atenção Básica. Saúde da criança: nutrição infantil: aleitamento materno e alimentação complementar. *2015*. http://www.sbp.com.br/fileadmin/%0Auser_upload/pdfs/Aleitamento_Complementar_MS.pdf

Moreira, M., Nascimento, E., & Paiva, M. (2013). Social representations concerning the breastfeeding practices of women from three generations. Portuguese. *Rev Texto Contexto Enferm.*, *22*(2), 432–441.

Ningsih, D. A. (2024). Application Of Areola And Rolling Massage Using Jitu Oil With Al-Quran Murottal Relaxation On Successful. *Jurnal Aisyah : Jurnal Ilmu Kesehatan*, *9*(1), 85–93. https://doi.org/10.30604/jika.v9i1.2430

Ningsih, D. A., Andini, D. M., Aisyah, S. R. N., Nurhidayati, S., & Silaturrohmih. (2024). Edukasi Rolling dan Areola Massage menggunakan Jitu Oil dengan Relaksasi Murottal Al-qur'an untuk pengeluaran ASI. *Poltekita: Jurnal Pengabdian Masyarakat*, *5*(1), 62–70. https://doi.org/10.33860/pjpm.v5i1.2843

Ningsih, D. A., Andini, D. M., Atiqa, S. N., & Fadhilah, S. (2023). *Effect of Fortification of Massage Oil for Breastfeeding Mothers on Physical , Chemical and Organoleptic Tests of Jitu Oil*. 8(1), 89–98.

Nunes, L., Giugliani, E., Santo, L., & Oliveira, L. de. (2011). Reduction of unnecessary intake of water and herbal teas on breast-fed infants: a randomized clinical trial with adolescent mothers and grandmothers. *J Adolesc Health*, *49*(3), 258–264.

Pedak, M. (2009). *Mukjizat Terapi Al-qur'an Untuk Hidup Sukses*. Wahyumedia.

Prusty, R., & Unisa, S. (2017). Effect of social support networks on maternal knowledge of child health in rural Odisha, India. *J Health Soc Sci*, *2*, 99–118.

Purwanti, Y., & Mukhodim, S. (2018). *The Effectiveness of Back Massage on Breast Milk Production. D-III Midwifery Study Program FIKES Muhammadiyah University Sidoarjo*.

Putri, I. M., & Utami, F. S. (2021). *Al Qur'an Healing Therapy Increases Letdown Reflex in Breastfeeding Mothers*. https://doi.org/10.4108/eai.18-11-2020.2311637

Sahasrani, A. fitri. (2018). *Pengaruh Pijat Punggung Teknik Effleurage Menggunakan Minyak Aromaterapi Lavender Terhadap Produksi ASI Ibu Post Partum Di Klinik Pratama Tanjungdeli Tua Tahun 2018* [Jurusan Kebidanan Medan]. https://ecampus.poltekkes-medan.ac.id/xmlui/bitstream/handle/123456789/627/SKRIPSI.pdf?sequence=1&isAllowed=y

Schrijner, S., & Smits, J. (2018). Grandparents and children's stunting in sub-Saharan Africa. *Soc Sci Med*, *205*, 90–8.

Sehmawati, & Setyobudi, D. (2022). Effectiveness Of Oxytocin Massage And Effleurage Massage On The Volume Of Breast Milk In Primipara. *Jurnal Profesi Bidan Indonesia (JPBI)*, *2*(2), 37–44.

Nutrition practices in Bihar: results of a formative research study, (2017).

UPTD. (2023). *Profil Puskesmas Arjasa Tahun 2023*.

Waryana. (2016). Promosi Kesehatan, Penyuluhan dan Pemberdayaan Masyarakat, untuk dosen, mahasiswa, bidan, perawat, tenaga kesehatan dan umum. *Numed*.

Zuidah. (2022). The Effect of Back Massage on Breastfeeding Mothers Using Lavender Essential Oil on Breast Milk Production in Bpm Wahyu Jl. Pertiwi No 58 Village Kolam Kecamatan Percut Sei Tuan Year 2021. *Midwifery Science*, *10*(2), 51–58.

**ORIGINAL RESEARCH**

# FAMILY COMMUNICATION PATTERN RELATION WITH DEPRESSION LEVEL ON ELDERLY IN POSYANDU ELDERLY

**Heri Triwibowo**
Universitas Bina Sehat PPNI Mojokerto
Email: herippni@gmail.com

| ABSTRACT | Keywords |
|---|---|
| Elderly age said to be the final stage of development in the life cycle. In this period a person experiencing a physical setback,mental social gradually decreasing ability to adapt to changes and environmental stress often cause psychosocial disorders in elderly. One of which is depression. To cope with depression in the elderly required functional family communication because of the confidence will increase and the motivation to face problems that ocur will increase. Independent variable that is Family Communication Pattern and Dependent Variable is Depression Level. The research design uses analytical design on cross sectional design. Sample amounted to 30 respondents.With Purposive Sampling.The questionnaires used were two kinds of family communication pattern questionnaire and GDS (Geriatric Depression Scale). .The Stabilistic Test used is the Lambda Correlation test. The result of p (0,032) and α (0,05), so that p (0,032) <α (0,05) meaning that $H_0$ is rejected and $H_1$ accepted which means there is relation of family communication pattern with depression level in elderly at posyandu ugly village Jaringansari Hamlet Karangdiyeng Village .Dysfunctional family communication patterns can cause elderly sad, lonely and experiencing a lot of pressure consequently elderly will experience psychosocial problems especially depression. Functional family communication shows the existence of support to the family and increase the motivation to solve the problem, especially depression experienced by the elderly. | ***Communication Family, Family, Elderly, Depression*** |

## INTRODUCTION

Old age is said to be the final stage of development in the life cycle.(Mellyna Martha Dewi, 2021). During this period, a person experiences gradual physical and mental decline, a decrease in the ability to adapt to change and environmental stress often causes psychosocial disorders in the elderly. In 2025, depression will be at the top of the list, replacing infectious diseases in developing countries, especially Indonesia.(Pabebang, Mangapi, & Kelong, 2022) Depression is more common in the elderly than in the general population. Where someone who reaches old age will increasingly feel isolated and this condition can lead to depression(Manafe & Berhimpon, 2022). Ideally, family support in the form of communication can be a coping mechanism for the elderly in dealing with

depression. Family communication is very necessary as support and as a place of refuge. Family support is the most important element in helping individuals solve problems. If there is support, self-confidence will increase and motivation to face problems that occur will increase. (Gustianti, Kurniawan, & Sari, 2023)

The prevalence of depression in the elderly in the world ranges from 8% -15% and the results of a meta-analysis of reports from countries in the world found that the average prevalence of depression in the elderly is 13.5%..(Pratiwi, Novita, & Daeli, 2024). The prevalence of depression in the elderly based on health research from the University of Indonesia and the Oxford Institute of Aging shows that 30% of the elderly in Indonesia experience depression..(Pragholapati & Munawaroh, 2020). The family is the main support system for the elderly in maintaining their health. The role of the family in caring for the elderly includes looking after or caring for the elderly, maintaining and improving mental status, anticipating socio-economic changes, as well as providing spiritual needs and providing motivation in the form of good communication. It will be more difficult for elderly people to suffer from depression compared to elderly people whose families do not have a support system. who is kind and doesn't care about the affairs of each member of his family.(Subekti & Dewi, 2022)

The cause of depression is interference from predisposing factors (biological theory consisting of genetics and biochemistry) and trigger factors (psychosocial theory consisting of psychoanalysis, cognitive, learning theory, object loss theory)..(Nareswari & Gunadi, 2021)

As a result of the symptoms of depression that arise, the first will have an affective impact, for example anger, anxiety, apathy, annoyance, denial of feelings, melancholy, guilt, helplessness, hopelessness, loneliness, low self-esteem, sadness. The second is physiological, for example abdominal pain, anorexia, back pain, constipation, dizziness, fatigue, sleep disturbances. The third is cognitive, for

example ambivalence, confusion, inability to concentrate, loss of interest and motivation, self-blame, pessimism, uncertainty. The fourth is behavior, for example aggressiveness, agitation, alcoholism, intolerance, changes in activity level, drug addiction, easily irritated, lack of spontaneity, very dependent, poor personal hygiene, social isolation, crying easily, and withdrawing.accept.(Sihaloho, 2021). The higher the family communication, the lower the depression experienced by the elderly.(Damayanti, Wisanti, & Lestari, 2023)

Family support in the form of communication is very necessary as a support system for the elderly in dealing with depression. Communication itself is a social process that results in relationships between humans or interactions that can strengthen the attitudes and behavior of other people and change those attitudes and behavior. Communication is very important for family closeness, recognizing problems, responding to non-verbal roles and recognizing each individual's problems. It is hoped that a good communication process can form a good communication pattern in the family. It is hoped that implementing good communication patterns will provide a good contribution between families and the elderly in solving problems (Lestari, 2023). Based on a preliminary study of JaringansariHamlet, Karangdiyeng Village, Kutorejo District, Mojokerto, from 5 elderly people, it is indicated that separation from children who work outside the area causes loneliness and sadness because their children are no longer with them. This problem is because children no longer communicate frequently with the elderly.

| No | Family Communication Patterns | Frequensi (f) | Percentage (%) |
|----|-------------------------------|---------------|----------------|
| 1 | Fungtional | 13 | 43,3 |
| 2 | Dysfungtional | 17 | 56,7 |
| | Amount | 30 | 100 |

## RESEARCH METHODS

This research uses a correlation analytical design with the research using a cross sectional study approach. The population in this study were all elderly

people in the Posyadu for the Elderly, Jaringansari Hamlet, Karangdiyeng Village, Kutorejo District, Mojokerto, totaling 86 elderly people. In this study, the sample was 30 respondents who were at the Posyandu for the Elderly. The sampling technique in this study was purposive sampling. This research uses questionnaires and observation instruments. The data formed is processed and analyzed by SPSS with statistical tests *korelasi lambda*

## RESEARCH RESULT

1. Family Communication Patterns for the Elderly at Posyandu for the Elderly at Jaringansari Hamlet, Karangdiyeng Village, Kutorejo, Mojokerto

**Table 1 Frequency Distribution of Family Communication Patterns in Posyandu for the Elderly, Jaringansari Hamlet, Karangdiyeng Village, Kutorejo, Mojokerto**

Table 1 above shows that the majority of respondents have dysfunctional family communication patterns, 17 respondents (56.7%)

2. Levels of Depression in the Elderly at Posyandu for the Elderly in Jaringansari Hamlet, Karangdiyeng Village, Kutorejo, Mojokerto

**Tabel 2 Frequency Distribution of Levels of Depression in the Elderly at Posyandu for the Elderly in Jaringansari Hamlet, Karangdiyeng Village, Kutorejo, Mojokerto**

| No | Levels of Depression | Frequensi (f) | Percentage (%) |
|----|----------------------|---------------|----------------|
| 1 | No depression | 10 | 33,3 |
| 2 | Mild Depression | 9 | 30,0 |
| 3 | Moderate Depression | 11 | 36,7 |
| | Amount | 30 | 100 |

Table 2 above shows that half of the respondents experienced moderate/severe levels of depression, 11 respondents (36.7%)

3. The Relationship Between Family Communication Patterns and Levels of Depression in the Elderly at the Elderly Posyandu, Jaringansari Hamlet, Karangdiyeng Village, Kutorejo, Mojokerto

**Tabel 3 Frequency Distribution of Relationships Family Communication Patterns Levels of Depression in the Elderly in the Elderly Posyandu, Jaringansari Hamlet, Karangdiyeng Village, Kutorejo, Mojokerto**

| | | Levels of Depression | | | |
|---|---|---|---|---|---|
| | | No depression | Mild Depression | Moderate Depression | Total |
| Family Communication Patterns | Fungtional | 8 (61,55%) | 3 (23,0%) | 2 (15,3%) | 13 (100%) |
| | Dysfungtional | 2 (11,7%) | 6 (35,2%) | 9 (52,9%) | 17 (100%) |
| Total | | 10 (33,3%) | 9 (30,0%) | 11 (36,6%) | 30 (100%) |

The results of table 3 show that 13 respondents had functional family communication patterns, most of whom were not depressed, 8 respondents (61.5%), 3 respondents had mild depression (23.0%), and 2 respondents had moderate depression (15 .3%). Then there were 17 respondents who had dysfunctional communication patterns, most of whom experienced moderate levels of depression, 9 respondents (52.9%), mild depression, 6 respondents (35.2%), and 2 respondents who were not depressed (11.7%). %).

he results of the lambda correlation test showed that the value of p (0.032) < α (0.05), meaning that the null hypothesis was rejected so that there was a relationship between family communication patterns and the level of depression in the elderly at the Posyandu for the elderly in Networksari

Hamlet, Karangdiyeng Village, Kutorejo, Mojokerto. Because the p value was (0.32). So the interpretation of the correlation coefficient is low because the coefficient interval is 0.20 - 0.399, the level of relationship is low(Sutisna, 2020).

## DISCUSSION

1. Family Communication Patterns for the Elderly at Posyandu for the Elderly at Jaringansari Hamlet, Karangdiyeng Village, Kutorejo, Mojokerto

The results of table 1 show that the majority of respondents have dysfunctional family communication patterns, 17 respondents (56.7%). Family communication is a symbolic, transactional process that creates and shares meaning in the family. Just as every person has a different communication style, so does every family have a unique communication style and pattern. Clear and functional communication between family members is an important tool for maintaining a conducive environment necessary for developing feelings of worth and self-worth and internalizing them.(Rahmi, 2021). On the other hand, unclear communication is believed to be the main cause of poor family functioning.(Yaslina, Murni, & Yeni, 2018). The dysfunctional family communication pattern that occurs in the majority of respondents shows poor interpersonal relationships which are characterized by a lack of openness, not caring about each other, and feeling angry when communicating..

The research results showed that the majority of respondents lived with their biological children, 22 respondents (73.3%). Family forms are a variety of family structures, from traditional nuclear families with two parents to single parents and homosexuals. Family communication is influenced by the type of family form. There has been a lot of research conducted on heterosexual couples and nuclear families with two parents, usually excluding single parent, dual career, step parent, homosexual, and extended families. So far, there has been limited research on communication for traditional family forms, such as step-parent families(Majid, 2022). Most of the respondents live with their biological children, this shows that the communication carried out is open and there is no feeling of awkwardness anymore because the communication pattern has been carried out for a long time and there is already a blood relationship between parents and children. On the other hand, if the respondent lives with stepchildren or adoptees, the communication pattern is not mutually open and will lead to dysfunctional family communication patterns.

2. Levels of Depression in the Elderly at Posyandu for the Elderly in Jaringansari Hamlet, Karangdiyeng Village, Kutorejo, Mojokerto

The results of table 2 show that the majority of respondents experienced moderate depression, 11 respondents (36.7%). Depression in elderly people is manifested by complaints of feeling worthless, excessive sadness, moodiness, lack of enthusiasm, feeling empty, hopeless, self-accusation, suicidal thoughts and lack of self-care or even self-neglect.(Suprapti, Adhisty, & Usman, 2018) . On average, 60-70% of elderly people who visit general practitioner practices are those with depression, but this often goes undetected because elderly people are tired of focusing too much on physical complaints which are actually accompanying emotional disorders. (Mahajudin, 2007in Azizah 2011)(Irawan, 2021). One of human needs is the need to love and be loved, a sense of security and protection, the desire to be appreciated, respected and so on. According to Hawari (1996), someone who loses these affectional needs (loss of love object) can fall into deep sadness. . For example, someone loses a loved one (husband or wife who dies), loses a job/position and the like will cause that person to experience deep sadness, disappointment followed by feelings of regret, guilt and so on, which in turn will cause the person to fall into depression. Depression is also influenced by work and education.(Irawan, 2021)

The research results showed that the majority of respondents with jobs were 23 respondents (76.7%). Other depression

factors included in psychosocial stressors are a history of previous depression, death of a spouse, divorce, recent adverse and unexpected events. Apart from that, loss of job, income, and positional power can also be a psychosocial stressor that increases the risk of depression in the elderly. Loss of job, income, and social support as old age increases is a predisposing factor for older people to experience depression. Low socioeconomic status is also associated with depression in the elderly (Nirwan, 2020). In research conducted by Surya (2010) on depressive syndrome in the elderly at Padang Bulan Health Center, Medan City, depressive syndrome occurred most often in elderly people who did not work (69.2%) than those who worked. From the data above, it shows that the majority of respondents do not work, this indicates that their income is not there, so this can be a factor that can cause depression.

The research results showed that the majority of respondents with education were not in school, namely 14 respondents (46.7%). Depression is a cognitive problem that is dominated by a person's negative evaluation of oneself, one's world, and one's future. developed from the framework of social learning theory, which assumes the cause of depression lies in a lack of positive desire to interact with the environment. One hypothesis to explain depression in the elderly is that individuals receive less gifts or more reward and punishment compared to individuals who are not depressed (Lewinsohn, 1974; Libert & Lewinsohn, 1977; Saimun, 2006. Dalam (Irawan, 2021)). According to Beck (1967; 1976); Saimun (2006) in Azizah 2011, someone who experiences depression because they have negative cognitive abilities to interpret themselves, the world and their future. In research conducted by Siboro (2012), the level of education is the most important thing in facing problems. The higher a person's education, the more life experience they have, so they will be better prepared to face problems that occur. The majority of respondents do not go to school, this shows that respondents have poor cognitive abilities with a negative evaluation of themselves to interpret themselves, the

world and their future. This can cause depression

3. The Relationship Between Family Communication Patterns and Levels of Depression in the Elderly at the Elderly Posyandu, Jaringansari Hamlet, Karangdiyeng Village, Kutorejo, Mojokerto

The results of table 3 show that 17 respondents had dysfunctional communication patterns, the majority experienced moderate levels of depression, 9 respondents (52.9%), 6 respondents (35.2%) had mild depression, and 2 respondents were not depressed ( 11.7%).

The results of the lambda correlation test showed that the value was p (0.032) < α (0.05), meaning that the null hypothesis was rejected so that there was a relationship between family communication patterns and the level of depression in the elderly at the Posyandu for the elderly. Because the p value is (0.32), the interpretation of the correlation coefficient is low because the coefficient interval is 0.20 - 0.399, the level of relationship is low (Sugiyono, 2007).

Unclear communication is believed to be the main cause of poor family functioning (Holman, 1983; Satir, 1983; Satir, Banmen, Gerber, & Gomori, 1991 in (Kholifah & Rusmawati, 2020). The family is the main support system for the elderly in maintaining their health. The role of the family in elderly care includes looking after or caring for the elderly, maintaining and improving mental status, anticipating socio-economic changes, and providing motivation and facilitating the spiritual needs of the elderly. (Maryam dkk, 2008)(PH, Hermanto, & Pratama, 2018). Low socio-emotional support is significantly associated with the prevalence of depressive symptoms in the elderly. The presence of social isolation increases the risk of depression. In contrast to these things, volunteering is reported to reduce the prevalence of depressive disorders in elderly men. Family support and family communication are also independent predictors of depression status in the elderly (Ningrum, 2024)

Poor communication patterns within the family caused respondents to experience various pressures. Because as an elderly

person who is starting to withdraw from the environment, the respondent really needs his family as his main support system. Lack of good communication within the family causes respondents to be confused about discussing the problems they face every day, so that this condition makes respondents depressed and ultimately causes sadness and melancholy which leads to depression.

Meanwhile, 13 respondents who had functional communication patterns had mild depression as many as 3 respondents (23.0%), and moderate depression as many as 2 respondents (15.3%). According to Saimun (2006) in Azizah (2011), there are 5 approaches which can explain the occurrence of depression in the elderly, namely. Psychodynamic approach, for example: losing a job/position and the like will cause the person to experience deep sadness, disappointment followed by feelings of regret, guilt and so on, which in turn the person will fall into depression. Learning Behavior Approach, One of the hypotheses to explain depression in the elderly are individuals who receive less gifts or more appreciation and punishment compared to individuals who are not depressed (Lewinsohn, 1974; Libert & Lewinsohn, 1977; Saimun, 2006. Dalam (Sulistyorini & Sabarisman, 2017)

Cognitive Approach, According to Beck (1967; 1976); Saimun (2006) in (Sulistyorini & Sabarisman, 2017), someone who experiences depression because they have negative cognitive abilities to interpret themselves, the world and their future. Existential Humanistic Approach, Humanistic and existential theories argue that depression occurs because of a mismatch between the reality self and the ideal self. Physiological Approach, Physiological theory explains that depression occurs due to low neurological activity (neurotransmitters norepinephrine and serotonin) in brain synapses which function to regulate pleasure. Family communication patterns are also a form of family support for family members, in this case the elderly. Respondents have functional family communication patterns but have levels of depression that are neither depressed nor moderate/severe depression

caused by factors other than family communication patterns, one of which is because they are elderly and their physiological health has declined a lot so that their psychological problems arise, including depression.

Meanwhile, 2 respondents (11.7%) who had dysfunctional communication patterns did not experience depression. The focus of the psychodynamic approach is dealing with conflicts related to loss and stress. Efforts to treat depression include identifying loss and stress that causes depression, overcoming it, and developing ways to deal with loss and stressors with psychotherapy which aims to restore self-confidence and strengthen the ego.(Erna, 2023). This approach is not only to eliminate symptoms, but also to achieve changes in personality structure and character aimed at improving personal confidence, intimacy, coping mechanisms for stressors, and the ability to experience various kinds of emotions. Respondents who have dysfunctional family communication patterns but do not experience depression are because the respondents have good psychodynamic approach mechanisms and depression management efforts, so that even though communication patterns in the family are dysfunctional, they are still able to overcome these problems well so that they do not cause depression.

## CONCLUSION
### Conclusion
Communication patterns influence the level of depression in the elderly, characterized by the more dysfunctional the family communication pattern, the higher the level of depression experienced by the elderly, while the more functional the communication pattern, the lower the level of depression experienced by the elderly.

### Suggestion
1 For the Elderly
It is hoped that the results of this research can provide input to the elderly that family communication patterns greatly influence the level of depression in the elderly so that they can improve family communication patterns so that levels of depression can be

prevented by frequently communicating with family, maintaining communication with family, and taking time to gather. with family, they often discuss things to solve problems, often talk about what they are experiencing.

2 For Nursing Services

It is hoped that nurses can provide education to elderly posyandu cadres on how to have good deliberations in solving problems clearly and not using a high tone in communication and often spending time with their families to tell stories, share experiences about what they have experienced. Then cadres can convey this to the elderly so that a functional family communication pattern can be achieved.

## REFERENCE

Damayanti, L. A., Wisanti, E., & Lestari, R. F. (2023). Perbandingan Kualitas Hidup Dan Depresi Lansia di PSTW dan Keluarga. *HealthCare Nursing Journal*, *5*(1), 558–566.

Erna, M. A. (2023). UPAYA KONSELOR DALAM MENINGKATKAN KEPERCAYAAN DIRI IBU RUMAH TANGGA (IRT) KORBAN KEKERASAN DALAM RUMAH TANGGA (KDRT) MELALUI KONSELING INDIVIDU DI UNIT PELAKSANA TEKNIS DAERAH PERLINDUNGAN PEREMPUAN DAN ANAK (UPTD PPA) PROVINSI LAMPUNG. UIN RADEN INTAN LAMPUNG.

Gustianti, I., Kurniawan, D., & Sari, N. Y. (2023). Hubungan Dukungan Keluarga dengan Tingkat Depresi pada Lansia di Daerah Lahan Basah. *Jurnal Ners*, *7*(2), 1512–1518.

Irawan, W. (2021). Hubungan tingkat depresi dengan demensia pada lansia didesa Bindang kecamatan Pasean Pamekasan. STIKES BINA SEHAT PPNI.

Kholifah, N., & Rusmawati, D. (2020). Hubungan antara keberfungsian keluarga dengan kontrol diri remaja pada siswa SMAN 2 Semarang. *Jurnal Empati*, *7*(2), 566–571.

Lestari, V. A. (2023). HUBUNGAN TINGKAT PENGETAHUAN KELUARGA TENTANG KOMUNIKASI DENGAN PENERAPAN KOMUNIKASI PADA LANSIA DI RW 04 KELURAHAN BANTARGEBANG TAHUN 2023.

Majid, M. Z. D. I. (2022). ASUHAN KEPERAWATAN KELUARGA TN. M DENGAN ANGGOTA KELUARGA MENGALAMI GANGGUAN SISTEM PERNAPASAN: INFEKSI SALURAN PERNAPASAN AKUT DI KELURAHAN BANGETAYU KOTA SEMARANG. Universitas Islam Sultan Agung Semarang.

Manafe, L. A., & Berhimpon, I. (2022). Hubungan Tingkat Depresi Lansia Dengan Interaksi Sosial Lansia Di BPSLUT Senja Cerah Manado. *Jurnal Ilmiah Hospitality*, *11*(1), 749–758.

Mellyna Martha Dewi, M. (2021). ASUHAN KEPERAWATAN KELUARGA PADA TAHAP PERKEMBANGAN LANJUT USIA. UNIVERSITAS KUSUMA HUSADA.

Nareswari, P. J., & Gunadi, E. (2021). Depresi pada lansia: faktor resiko, diagnosis dan tatalaksana. *Jurnal Medika Hutama*, *2*(02 Januari), 562–570.

Ningrum, A. S. (2024). HUBUNGAN DUKUNGAN KELUARGA DENGAN DEPRESI PASCA STROKE DI PUKESMAS BANGETAYU SEMARANG. Universitas Islam Sultan Agung Semarang.

Nirwan, N. (2020). FAKTOR YANG BERHUBUNGAN DENGAN KEJADIAN DEPRESI PADA LANSIA DI RSUDSAWERIGADING KOTA PALOPO. *Jurnal Kesehatan Luwu Raya*, *6*(2), 26–36.

Pabebang, Y., Mangapi, Y. H., & Kelong, P. (2022). Faktor-Faktor Yang Berhubungan Dengan Mekanisme Koping Pada Lansia Di Lembang Benteng Ka'do Kecamatan Kapalapitu Kabupaten Toraja Utara Tahun 2019.

*Jurnal Ilmiah Kesehatan Promotif*, *6*(2), 157–169.

PH, L., Hermanto, H., & Pratama, N. (2018). Dukungan Keluarga dengan Perawatan Diri pada Pasein Gangguan Jiwa di Poli Jiwa. *Jurnal Kesehatan Manarang*, *4*(1), 11–17.

Pragholapati, A., & Munawaroh, F. (2020). Resiliensi pada lansia. *Jurnal Surya Muda*, *2*(1), 1–8.

Pratiwi, S. D., Novita, A., & Daeli, W. (2024). Analisis Penyebab Stres Pada Lansia Di Panti Sosial Tresna Werdha Budi Mulia 1 Cipayung Tahun 2023. *Vitamin: Jurnal Ilmu Kesehatan Umum*, *2*(2), 264–280.

Rahmi, S. (2021). *Komunikasi interpersonal dan hubungannya dalam konseling*. Syiah Kuala University Press.

Sihaloho, L. B. (2021). Stress yang Timbul di Tengah-Tengah Masyarakat, Keluarga, Lansia, Remaja, Perawat, Petugas Kesehatan, Gangguan Jiwa, Pasien Akibat Situasi Pandemic Covid-19.

Subekti, K. E., & Dewi, S. (2022). Dukungan Keluarga Berhubungan dengan Tingkat Kualitas Hidup Lansia. *Jurnal Keperawatan Jiwa*, *10*(2), 403.

Sulistyorini, W., & Sabarisman, M. (2017). Depresi: Suatu tinjauan psikologis. *Sosio Informa*, *3*(2).

Suprapti, E., Adhisty, W. A., & Usman, Y. (2018). Faktor yang Berhubungan dengan Depresi pada Lansia di Wilayah Puskesmas Tarakan Makassar: Relationship between an age and a parity of pregnant mother with the obedience of antenatal care at puskesmas mamajang makassar. *JURNAL ILMIAH KESEHATAN GEMA INSAN AKADEMIK*, *3*(02).

Sutisna, I. (2020). Statistika penelitian. *Universitas Negeri Gorontalo*, *1*(1), 1–15.

Yaslina, Y., Murni, L., & Yeni, N. S. (2018). Hubungan Pengetahuan Dan Peran Keluarga Dengan Kemampuan Keluarga Dalam Perawatan Diabetes Militus Di Rumah Pada Wilayah Kerja Puskesmas Rao Pasaman Tahun 2018. In *Prosiding Seminar Kesehatan Perintis* (Vol. 1, p. 25).

**117**

# A DESCRIPTIVE STUDY ON TRIGLYCERIDE AND BLOOD GLUCOSE LEVELS IN THE ELDERLY POPULATION

Ika Ainur Rofi'ah**,** Lasiyati Yuswo Yani**.**
[1]Faculty of Health Sciences, Bina Sehat PPNI University, Mojokerto
Corresponding Email: ikaainur.ns@gmail.com

| ABSTRACT | Keywords |
|---|---|
| Aging is associated with increased risks of metabolic disorders, including hypertriglyceridemia and impaired blood glucose regulation. These conditions significantly contribute to cardiovascular morbidity and mortality in the elderly. Despite their importance, routine screening and management of triglyceride and blood glucose levels in community settings remain limited in many rural and semi-urban regions. This descriptive study aimed to examine triglyceride and blood glucose levels among older adults in Tebel Village, within the working area of the Ganting Public Health Center. A total of 50 elderly individuals were selected using a total sampling technique. Data were collected using a glucometer (On Call) and strip tests (MULTICARE IN TG), with measurements recorded in mg/dL. Univariate analysis was employed to summarise the data using mean, median, standard deviation, range, and 95% confidence intervals. The study received ethical approval (No. 195/KEPK/ITSKES-ICME/IX/2024). The median triglyceride level was 183.00 mg/dL (range: 117.00–347.00 mg/dL), while the median blood glucose level was 135.50 mg/dL (range: 70.00–289.00 mg/dL). The majority of respondents were female (88%), unemployed (74%), and had at least one comorbidity (76%). The results underscore the urgent need for community-based health initiatives focused on early screening, education, and lifestyle modification to manage metabolic health among older adults. Strengthening services such as Posyandu Lansia could play a pivotal role in reducing long-term cardiovascular and metabolic risks in this vulnerable population. | **Blood Glucose, Triglyceride, Elderly** |

## INTRODUCTION

Degenerative diseases are diseases that occur due to a decrease in the function of the body's organs due to increasing age, and these diseases can last a long time or be chronic. Degenerative diseases are becoming a big problem throughout the world because there is a trend towards an increase in the elderly population. The prevalence of degenerative diseases in Indonesia also continues to increase in line with increasing life expectancy. Heart disease and diabetes mellitus are degenerative diseases whose incidence continues to increase (Sawitri & Maulina, 2022). The global population is experiencing a significant demographic shift, with the number of older adults rising at an

unprecedented rate. One in six people worldwide will be aged 60 years or over (World Health Organization, 2020). As ageing progresses, physiological changes occur, including metabolic alterations that can predispose older individuals to chronic non-communicable diseases (NCDS), such as diabetes mellitus and dyslipidemia. Among the metabolic markers associated with these conditions, blood glucose and triglyceride levels are critical in determining cardiovascular and metabolic health outcomes in the elderly (National Institute for Clinical Excellence, 2023).

The prevalence of metabolic disorders such as hypertriglyceridemia and hyperglycemia is significantly increasing among the elderly. Globally, the International Diabetes Federation (IDF) reported that in 2021, approximately 24% of adults aged 65–99 years were living with diabetes, and this number is projected to rise further in the coming decades. In Southeast Asia, including Indonesia, the situation is particularly concerning due to lifestyle transitions and limited geriatric healthcare coverage. In Indonesia, the Basic Health Research (Riset Kesehatan Dasar or Riskesdas) 2018 revealed that 1 in 3 elderly individuals had elevated blood glucose levels, and over 25% had abnormal lipid profiles, including increased triglyceride levels. These conditions are often underdiagnosed in community settings due to asymptomatic progression and inadequate access to regular screening services (Kaur et al., 2023; National Institute for Clinical Excellence, 2023).

Triglycerides are a type of lipid found in the blood that, when elevated, increase the risk of atherosclerosis, coronary heart disease, and stroke, particularly in older adults with pre-existing metabolic disorders. Similarly, elevated blood glucose levels, commonly observed in elderly populations, are a key indicator of impaired glucose metabolism and may signify undiagnosed or poorly controlled diabetes. Monitoring these parameters is essential to support early detection and management strategies for age-related metabolic diseases. Elderly

individuals, especially those residing in rural or semi-urban settings, often have limited access to regular health screening and education. Community-based health services, such as Integrated Health Services for the elderly in Indonesia, provide a strategic opportunity to assess and monitor health indicators among older populations. Descriptive studies conducted in such settings contribute valuable insights into the health status of elderly communities and can inform targeted public health interventions (Liu et al., 2017; Su et al., 2021).

Given the importance of understanding lipid and glucose profiles in elderly populations, this study aims to describe the levels of triglycerides and blood glucose among elderly individuals attending the Integrated Health Services for the elderly. The findings are expected to contribute to the growing body of evidence on metabolic health in ageing populations and support health policy formulation at the community level. This study is particularly important because it provides localised data on elderly individuals in a community-based setting, which remains underreported in the literature. By highlighting the metabolic health status of this vulnerable group, the findings can inform community health programs and policy-level decisions to improve elderly care services in Indonesia. This study aims to provide a descriptive overview of triglyceride and blood glucose levels.

## METHOD
This study employed a descriptive design aiming to illustrate the triglyceride and blood glucose levels among the elderly population. A total of 50 older adults from the Integrated Health Services for the elderly in Tebel Village, within the working area of Ganting Public Health Center, were included using a total sampling technique. The instruments used in this study were: (1) a glucometer (On Call) along with a blood

glucose observation sheet (mg/dL), and (2) a strip test (MULTICARE IN TG) accompanied by a triglyceride observation sheet (mg/dL). Data were analyzed using univariate analysis to describe triglyceride and blood glucose variables, presented through the mean, median, standard deviation, minimum and maximum values, and 95% confidence intervals. The Health Research Ethics Commission ethically approved this research under approval number 195/KEPK/ITSKES-ICME/IX/2024.

## RESULTS

**Table 1 Frequency Distribution Based on Gender, Education Level, Occupation, Comorbidities, and Medications**

| Variable | | n | % |
|---|---|---|---|
| Gender | Male | 6 | 12.0 |
| | Female | 44 | 88.0 |
| **Total** | | **50** | **100.0** |
| Level of Education | Illiterate | 1 | 2.0 |
| | Elementary School | 3 | 6.0 |
| | Junior High School | 17 | 34.0 |
| | Senior High School | 20 | 40.0 |
| | Collage | 9 | 18.0 |
| **Total** | | **50** | **100.0** |
| Occupation | Unemployed | 37 | 74.0 |
| | Employed | 1 | 2.0 |
| | Occupational Retirement | 12 | 24.0 |
| **Total** | | **50** | **100.0** |
| Comorbidity | No Comorbidity | 12 | 24.0 |
| | 1 Comorbidity | 12 | 24.0 |
| | 2 Comorbidities | 18 | 36.0 |
| | 3 Comorbidities | 5 | 10.0 |
| | 4 Comorbidities | 3 | 6.0 |
| **Total** | | **50** | **100.0** |
| Medication | No Medication | 20 | 40.0 |
| | 1 Drug | 18 | 36.0 |
| | 2 Drugs | 6 | 12.0 |
| | 3 Drugs | 6 | 12.0 |
| **Total** | | **50** | **100.0** |

**Table 2 Average Age of the Elderly in Posyandu in the Ganting Public Health Center Working Area**

| Variable | Mean | Median | SD | Min-Max | 95% CI |
|---|---|---|---|---|---|
| Age* | 67.16 | 68.50 | 9.62 | 50.00-84.00 | 64.43-69.89 |

*Data is normally distributed

**Table 3 Mean Triglycerides and Blood Glucose**

| Variable | Mean | Median | SD | Min-Max | 95% CI |
|---|---|---|---|---|---|
| Triglyceride | 203.52 | 183.00 | 56.03 | 117.00-347.00 | 187.60-219.44 |
| Blood Glucose Levels | 152.94 | 135.50 | 60.67 | 70.00-289.00 | 135.70-170.18 |

*Data is normally distributed

Based on Table 1, most respondents were female, accounting for 44 individuals (88.0%). A considerable proportion had completed senior high school education,

totaling 20 respondents (40.0%). Most participants were unemployed, with 37 individuals (74.0%) not engaged in any occupation. Additionally, 18 respondents (36.0%) reported having two comorbidities, and 20 respondents (40.0%) indicated they were not taking any medications. Table 2 shows that the mean age of the respondents was 67.16, with a standard deviation of 9.62. Based on Table 3, the median triglyceride level was 183.00 mg/dL, with the lowest value at 117.00 mg/dL and the highest at 347.00 mg/dL. Meanwhile, the median blood glucose level was 135.50 mg/dL, with the lowest recorded at 70.00 mg/dL and the highest at 289.00 mg/dL.
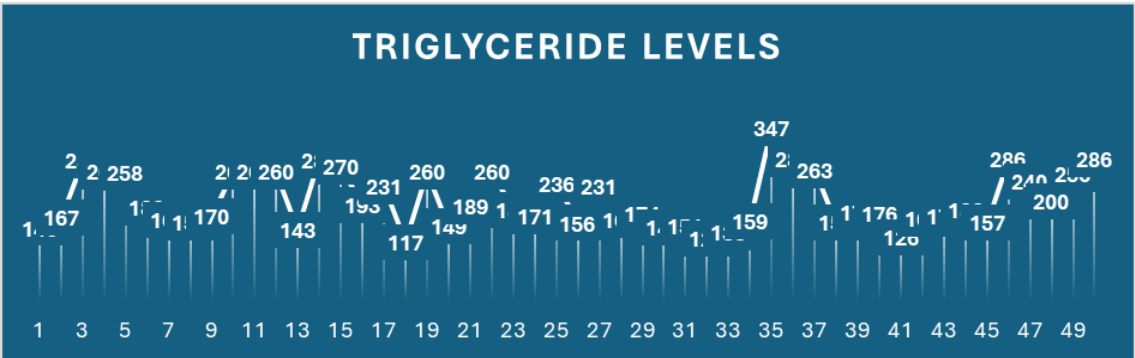


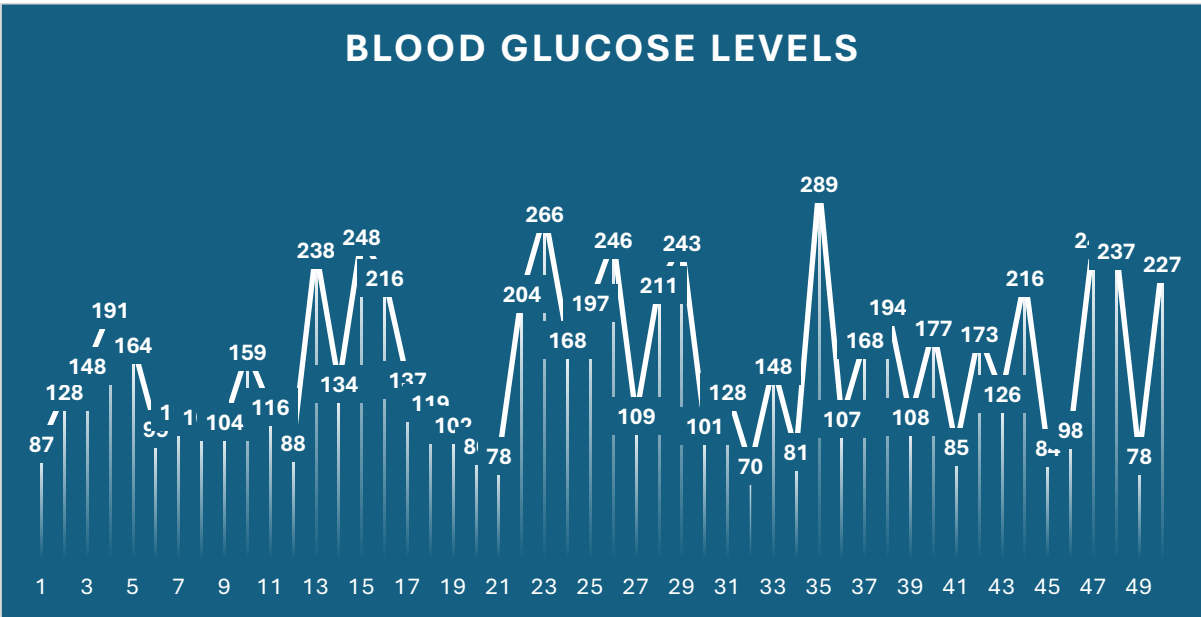**Figure 1. Triglyceride Levels in the Elderly at the Public Health Center**



**Figure 2. Blood Glucose Levels in the Elderly at the Public Health Center**

## DISCUSSION

### Triglyceride Levels

The findings of this study revealed that the median triglyceride level among the elderly participants was 183.00 mg/dL, indicating a tendency toward hypertriglyceridemia, as levels above 150 mg/dL are typically considered elevated. The findings of this study revealed notable trends in the triglyceride levels of elderly individuals attending the Integrated Health Services for the elderly in Tebel Village, located within the working area of Ganting Public Health Center. The mean

triglyceride levels observed in this population fall within a range that warrants attention, as elevated triglyceride levels have been associated with an increased risk of cardiovascular diseases, particularly in older adults. The results of this study align with previous research highlighting the prevalence of dyslipidemia, including elevated triglycerides, in elderly populations. For instance, a study by Liu et al (2017) indicated that older adults with high triglyceride levels have a higher risk of developing cardiovascular events and other comorbidities. Similarly, the high median triglyceride levels observed in this sample support the notion that dyslipidemia is prevalent among older adults and should be closely monitored as part of routine health assessments in community-based health services.

In addition to cardiovascular risks, elevated triglyceride levels in the elderly are often indicative of metabolic disorders, such as insulin resistance, which are more common in aging populations. These findings are consistent with those of (de la Torre Hernandez et al., 2022), who noted that dyslipidemia and abnormal lipid profiles, including high triglycerides, are often present in elderly individuals with impaired glucose metabolism, further increasing their risk of type 2 diabetes and cardiovascular diseases. Interestingly, a considerable portion of the study participants had triglyceride levels higher than the recommended threshold for optimal health, which is typically less than 150 mg/dL. This finding suggests the need for targeted health interventions aimed at improving lifestyle factors such as diet and physical activity, as well as the potential benefit of early screening for dyslipidemia in elderly populations (Wang et al., 2022).

The findings from this study highlight important trends in the metabolic health of elderly individuals, specifically regarding triglyceride and blood glucose levels. The results show that a large proportion of the elderly population in this study has elevated triglyceride levels, which are consistent with previous studies that report high levels of dyslipidemia in aging populations. Elevated triglycerides are considered a major risk factor for cardiovascular diseases, and managing these levels in elderly individuals is crucial for preventing associated complications such as stroke, heart disease, and diabetes. Furthermore, the findings of this study underscore the importance of accessible community-based health programs, such as Integrated Health Services for the elderly, in managing the metabolic health of the elderly. These programs, which provide regular health screenings and follow-up care, have the potential to significantly improve health outcomes in elderly populations, particularly in rural and semi-urban areas. Research has shown that community health interventions focused on early detection and regular monitoring of health indicators, such as lipid levels and blood glucose, are effective in reducing the incidence of chronic diseases among elderly individuals (Tao et al., 2022; Z. Wu et al., 2024; Ye et al., 2019).

**Blood Glucose Levels**

The results of this study demonstrate that blood glucose levels in the elderly participants were generally higher than what is typically considered normal. The median blood glucose level recorded was 135.50 mg/dL, with values ranging from 70.00 mg/dL to 289.00 mg/dL. These findings are consistent with research showing that elderly individuals are at a higher risk of developing impaired glucose metabolism, including prediabetes and type 2 diabetes. Elevated blood glucose levels, particularly in older adults, are a

106

major concern due to the increased risk of microvascular and macrovascular complications. Long-term hyperglycemia can lead to conditions such as diabetic retinopathy, neuropathy, and nephropathy, as well as contributing to the development of cardiovascular diseases. The higher blood glucose levels found in this study align with the notion that aging is associated with a decline in insulin sensitivity, which can contribute to insulin resistance and dysglycemia (Gao et al., 2017; Y. Wu et al., 2021).

In this study, a significant portion of participants had blood glucose levels in the higher range, which further supports the need for regular screening of glucose levels in elderly populations. Previous studies have shown that routine screening can help in the early detection of impaired fasting glucose (IFG) or diabetes, which are conditions that often go undiagnosed until they cause severe complications. Implementing preventive measures, including lifestyle interventions such as physical activity and dietary modification, effectively reduces the incidence of diabetes in older adults. Additionally, the role of medication adherence cannot be overlooked. Elderly individuals with higher blood glucose levels often require pharmacological intervention to manage their condition. Insulin therapy or oral glucose-lowering medications, such as metformin, are commonly prescribed to improve glycemic control in diabetic and prediabetic individuals. However, studies have demonstrated that elderly patients often struggle with medication adherence, which can result in poor glycemic control and increased risk of complications. This highlights the importance of community-based health programs, such as Integrated Health Services for the elderly, which can provide consistent monitoring, education, and support to ensure adherence to

medication regimens and improve long-term health outcomes (Kim et al., 2024; Lee et al., 2022).

Furthermore, blood glucose levels in the elderly should be monitored alongside other risk factors, such as blood pressure, lipid profiles, and weight, to provide a comprehensive approach to managing metabolic health. Programs integrating screening for multiple chronic conditions can offer a holistic approach to health promotion and disease prevention, improving individual and public health outcomes. In conclusion, the results of this study underline the importance of monitoring blood glucose levels in elderly populations, as elevated levels can significantly increase the risk of developing severe health conditions. Regular screening, lifestyle modifications, and medication adherence are key factors in managing blood glucose levels effectively and reducing the risk of complications in elderly individuals.

## CONCLUSIONS

This study provides a descriptive overview of triglyceride and blood glucose levels among elderly individuals attending the Integrated Health Services in Tebel Village. The findings reveal that many participants exhibited elevated triglyceride and blood glucose levels, underscoring the metabolic vulnerabilities commonly observed in aging populations. These results highlight the critical role of routine screening, lifestyle interventions, and community-based health services such as Integrated Health Services for the elderly in the early detection and management of metabolic risk factors. Strengthening preventive health programs targeting elderly individuals, particularly in rural and semi-urban areas, is essential to improve their long-term cardiovascular and metabolic health outcomes.

## REFERENCES

de la Torre Hernandez, J. M., Palop, R. L., Mazuecos, J. J. M., Sáez, P. C., Gutierez-Barrios, A., Pinar, E., Cid, B., Fernandez, L., Camarero, T. G., Urbano-Carrillo, C., Dominguez, J. F. O., Diaz, V. A. J., Menchero, A. E. G., Fernández, E. G., Soriano, J. G. C., Ocaranza, R., Úcar, E. A., Roman, K. G. S., Leal, S., … de Prado, A. P. (2022). Prospective application of a bleeding and ischemic risk-adjusted antithrombotic protocol in elderly patients revascularized with everolimus-eluting stents: EPIC05-Sierra75 study. *Journal of Geriatric Cardiology*, *19*(5), 354–366. https://doi.org/10.11909/j.issn.1671-5411.2022.05.009

Gao, Y. X., Man, Q., Jia, S., Li, Y., Li, L., & Zhang, J. (2017). The fasting serum triglyceride levels of elderly population with different progression stages of diabetes mellitus in China. *Journal of Diabetes and Its Complications*, *31*(12), 1641–1647. https://doi.org/10.1016/j.jdiacomp.2017.08.011

Kaur, P., Kannapiran, P., Ng, S. H. X., Chu, J., Low, Z. J., Ding, Y. Y., Tan, W. S., & Hum, A. (2023). Predicting mortality in patients diagnosed with advanced dementia presenting at an acute care hospital: the PROgnostic Model for Advanced DEmentia (PRO-MADE). *BMC Geriatrics*, *23*(1), 1–13. https://doi.org/10.1186/s12877-023-03945-8

Kim, I., An, H., Yun, S., & Park, H. Y. (2024). Effectiveness of community-based interventions for older adults living alone: a systematic review and meta-analysis. *Epidemiology and Health*, *46*, 1–10. https://doi.org/10.4178/epih.e2024013

Lee, S. H., Park, S. Y., & Choi, C. S. (2022). Insulin Resistance: From Mechanisms to Therapeutic Strategies. *Diabetes and Metabolism Journal*, *46*(1), 15–37. https://doi.org/10.4093/DMJ.2021.0280

Liu, Z., Burgess, S., Wang, Z., Deng, W., Chu, X., Cai, J., Zhu, Y., Shi, J., Xie, X., Wang, Y., Jin, L., & Wang, X. (2017). Associations of triglyceride levels with longevity and frailty: A Mendelian randomization analysis. *Scientific Reports*, *7*, 1–8. https://doi.org/10.1038/srep41579

National Institute for Clinical Excellence. (2023). Cardiovascular disease: risk assessment and reduction, including lipid modification. *NICE Guidance CG238*, *July 2023*. https://www.ncbi.nlm.nih.gov/books/NBK554923/

Sawitri, H., & Maulina, N. (2022). Gambaran Kadar Profil Lipid pada Lansia di Panti Jompo Kota Lhokseumawe Tahun 2021. *GALENICAL : Jurnal Kedokteran Dan Kesehatan Mahasiswa Malikussaleh*, *1*(2), 53. https://doi.org/10.29103/jkkmm.v1i2.8220

Su, Y., Wang, S., Sun, J., Zhang, Y., Ma, S., Li, M., Zhang, A., Cheng, B., Cai, S., Bao, Q., & Zhu, P. (2021). Triglyceride Glucose Index Associated With Arterial Stiffness in Chinese Community-Dwelling Elderly. *Frontiers in Cardiovascular Medicine*, *8*(September), 1–9. https://doi.org/10.3389/fcvm.2021.737899

Tao, L. C., Xu, J. ni, Wang, T. ting, Hua, F., & Li, J. J. (2022). Triglyceride-glucose index as a marker in cardiovascular diseases: landscape and limitations. *Cardiovascular Diabetology*, *21*(1), 1–17. https://doi.org/10.1186/s12933-022-01511-x

Wang, R., Yu, X., Wang, Z., Liu, Y., Chen, H., Liu, S., Xu, C., Chen, Y., Ge, X., Xia, D., Chang, R., Xu, G., Xiang, M., Wang, Y., Shen, T., Hu, F., & Cai, Y. (2022). Blood lipid levels and all-cause

mortality in older adults: the Chinese Longitudinal Healthy Longevity Survey 2008-2018. *Epidemiology and Health*, *44*, 1–10. https://doi.org/10.4178/epih.e2022054

World Health Organization. (2020). Decade of Healthy Ageing Decade of Healthy Ageing Functional Ability Intrinsic Capacity. In *World Health Organization* (Vol. 20, Issue February). https://www.who.int/publications/i/item/9789240017900

Wu, Y., Hu, H., Cai, J., Chen, R., Zuo, X., Cheng, H., & Yan, D. (2021). Applying latent class analysis to risk stratification of incident diabetes among Chinese adults. *Diabetes Research and Clinical Practice*, *174*, 108742. https://doi.org/10.1016/j.diabres.2021.108742

Wu, Z., Gao, J., Chen, S., Wang, G., Liu, H., Wang, X., Sun, P., Yu, X., Yang, Q., Wu, S., & Zhou, X. (2024). Triglyceride levels and risk of cardiovascular disease and all-cause mortality in Chinese adults younger than 40 years old: a prospective cohort study. *Cardiovascular Diagnosis and Therapy*, *14*(2), 240–250. https://doi.org/10.21037/cdt-23-412

Ye, X., Kong, W., Zafar, M. I., & Chen, L. L. (2019). Serum triglycerides as a risk factor for cardiovascular diseases in type 2 diabetes mellitus: A systematic review and meta-analysis of prospective studies. *Cardiovascular Diabetology*, *18*(1), 1–10. https://doi.org/10.1186/s12933-019-0851-z