



The Effectiveness of Audiovisual Education on the Level of Pre-Elderly's Knowledge about Healthy Lifestyle and Hypertension Prevention

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ARTICLE INFO

Article Type:
Research

Article History:
Received: 19 February 2026
Accepted: 29 June 2026
Published: 30 June 2026

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ORIGINAL ARTICLE

ABSTRACT

As humans age, there are physiological changes that reduce the elasticity of blood vessel walls, which can cause increased blood pressure. In addition, unhealthy lifestyles can also cause high blood pressure. For example, lack of physical activity, stress, and poor eating habits are factors that increase the incidence of high blood pressure. Individuals aged 45-59 years (pre-elderly) need to prepare themselves to carry out self-care in order to face the emergence of hypertension. This study aims to analyze the effectiveness of audiovisual education on the level of knowledge of pre-elderly about healthy lifestyle to prevent hypertension. The research design One-group Pretest-posttest was conducted on 30 pre-elderly respondents in Samarinda City. Data collection on respondent characteristics and level of knowledge about lifestyle used a structured questionnaire. The results showed that the characteristics of pre-elderly respondents based on an average age of 52 years, while the average systolic blood pressure was 131.07 mmHg and diastolic was 84.07 mmHg. The results of statistical analysis showed that there was significant difference in the average knowledge score of respondents between before being given education (6.27) and after being given audiovisual education (7.60). The statistical test results using the Wilcoxon Signed Rank Test obtained a p-value of 0.001 (<0.05). This indicates that audiovisual education can effectively increase pre-elderly knowledge about healthy lifestyle to prevent hypertension.

Keywords: Audiovisual Education, Healthy Lifestyle Knowledge, Pre-elderly, Risk of Hypertension.

ABSTRAK

Seiring bertambahnya usia, terdapat perubahan fisiologis seperti berkurangnya elastisitas pada dinding pembuluh darah yang dapat menyebabkan peningkatan tekanan darah. Selain itu, gaya hidup yang tidak sehat dapat menyebabkan tekanan darah tinggi. Misalnya aktivitas fisik yang kurang, stres, dan kebiasaan makan yang buruk menjadi faktor yang meningkatkan tekanan darah tinggi. Individu yang berusia 45-59 tahun (pra lansia) perlu mempersiapkan diri untuk melakukan perawatan mandiri dalam rangka menghadapi munculnya hipertensi. Penelitian ini bertujuan untuk menganalisis efektivitas edukasi audiovisual terhadap tingkat pengetahuan pra lansia tentang gaya hidup sehat pencegahan hipertensi. Desain penelitian One-group Pretest-posttest dilakukan pada 30 responden pra lansia di Kota Samarinda. Pengumpulan data karakteristik responden dan tingkat pengetahuan tentang gaya hidup menggunakan kuesioner terstruktur. Hasil penelitian karakteristik responden pra lansia berdasarkan usia rata rata 52 tahun, untuk data rata rata tekanan darah sistolik sebesar 131,07 mmHg dan diastolik sebesar 84,07 mmHg. Hasil analisis statistik menunjukkan bahwa terdapat perbedaan yang bermakna dalam rata rata skor pengetahuan responden antara sebelum dilakukan edukasi audiovisual (6,27) dan setelah dilakukan edukasi (7,60). Hasil uji statistik menggunakan Wilcoxon Signed Rank Test diperoleh nilai p sebesar 0,001 (< 0,05). Hal ini menunjukkan bahwa edukasi audiovisual secara efektif dapat meningkatkan pengetahuan pra lansia tentang gaya hidup sehat pencegahan hipertensi.

Kata Kunci: Edukasi Audiovisual, Pengetahuan Gaya Hidup Sehat, Pra Lansia, Risiko Hipertensi.

INTRODUCTION

Some people are still unaware of the risks associated with high blood pressure. As humans age, physiological changes occur, such as reduced elasticity in blood vessel walls, which can lead to increased blood pressure. Accurate knowledge about hypertension can impact hypertension prevention efforts for pre-elderly individuals. Data from the Framingham Heart Study shows that blood pressure tends to increase with age, with 90% of individuals aged 55 to 65 experiencing hypertension. Therefore, people aged 45-59 (pre-elderly) must be prepared to self-manage their hypertension to prevent further complications as they age (Luthfiani, 2021).

Human blood pressure is dynamic and fluctuates within a 24-hour cycle (circadian rhythm). Physiologically, blood pressure peaks in the morning after waking and after physical activity, then tends to remain stable throughout the day, and gradually decreases at night until reaching its lowest point during deep sleep. High blood pressure, often known as hypertension, is the most common medical condition worldwide. A person is diagnosed with hypertension when their diastolic blood pressure is greater than 90 mmHg, and their systolic blood pressure is 140 mmHg or higher. These two measurements are taken while the body is at rest, five minutes apart (Astillahwati et al., 2023).

According to WHO estimates, approximately 972 million people (26.4%) worldwide suffered from hypertension in 2018, and by 2021, this figure is predicted to increase to 29.2% (Casmuti & Fibriana, 2023). With a mortality rate of 5.61% in 2019, hypertension is the disease with the highest prevalence in Indonesia and the third leading cause of death. With approximately 45,235 cases in 2023, this disease is also the most common in Samarinda (BPS, 2024). The phenomenon of previously hypertensive individuals not aware that he was suffering from hypertension until a blood pressure measurement was carried out at health services, which negatively impacts their condition. Their low level of education makes it difficult for them to understand the health information provided, so they may not be aware that they have hypertension (Anwar & Masnina, 2019). Hypertension knowledge can be improved through health education. A person's behavior (overt behavior) is greatly influenced by their knowledge or cognitive domain. Behavior based on sound knowledge tends to be more consistent than behavior based on ignorance. Patients with hypertension may be influenced by this information to avoid problems (Dewi, 2022).

The government, through the Health Department, has socialized hypertension control and prevention efforts to the public so they can adopt CERDIK behaviors. CERDIK behaviors include regular health checks, avoiding cigarette smoke, diligently maintaining a balanced diet, adequate rest, stress management, and physical activity. Physical activity is included in the implementation of CERDIK. Regularly engaging in physical activity and adopting a healthy lifestyle will prevent hypertension. These activities can be done by people of all ages, including pre-elderly people who are susceptible to hypertension (Rahmanti et al., 2022).

Factors influencing the occurrence of hypertension include knowledge and education (Aba et al., 2023). Health education is crucial for increasing public awareness of chronic diseases, including the role of families in supporting sufferers (Suhat et al., 2022). One effective way is to provide education about hypertension. Education through videos or multimedia presentations (audiovisual aids) is an effective method because it combines images and sound to attract attention and facilitate understanding (Chrismilasari & Negara, 2022). According to research by Cabral et al. (2024), audiovisual media is more engaging and effective than media such as brochures or presentation slides because it can convey information quickly and clearly. This media can be used by people of all ages, from children to adults, and can help hypertension patients better understand their condition. Audiovisual media is more effective as a health promotion tool because it engages the senses of sight and hearing (Kafi et al., 2023). This study aims to analyze the effectiveness of audiovisual education on the level of knowledge of pre-elderly people regarding healthy lifestyle and hypertension prevention. This intervention is expected to significantly improve understanding among pre-elderly people in Samarinda City, enabling them to independently adopt promotive and preventive behaviors to improve their quality of life in old age.

RESEARCH METHODS

This study used a pre-experimental design with a single-group pretest-posttest approach. The study population was pre-elderly people at risk of hypertension in the working area of Baqa Samarinda Health Center with a sample of 30 respondents taken using purposive sampling. Respondents' knowledge about a healthy lifestyle to prevent hypertension was measured using a structured questionnaire adapted from research. Upoyo et al. (2021), Khotimah & Masnina (2020), Dewi (2022) and Appulembang et al. (2022). This instrument has been previously validated with the set *r* value greater than the table *r* value (0.361). This questionnaire is also reliable, with a value Kuder-Richardson 20 (KR-20) coefficient of 0.867.

Data collection involved two stages: a pre-test to assess prior knowledge, followed by the provision of audiovisual education, and a subsequent post-test. For data analysis, the Shapiro-Wilk test was initially conducted to assess data normality. The results indicated that the data were not normally distributed, as evidenced by a *p*-value of 0.013 for the pre-test and 0.000 for the post-test (*p*-value <0.05). Therefore, a non-parametric alternative, the Wilcoxon Signed-Rank Test, used for bivariate analysis to determine the effectiveness of the intervention with a significance level of alpha 0.05.

This research was conducted in accordance with ethical research principles. Prior to data collection, all respondents were provided with an explanation of the study's objectives, procedures, and data confidentiality, and voluntarily signed an informed consent form. This research has also been officially declared ethically sound by the Medical Ethics Commission of Mulawarman University Samarinda, with official letter number 284/KEPK-FK/XI/2024.

RESULTS

Table 1. Respondents' characteristics based on gender, education and occupation (n=30).

Variable	Frequency	Percentage (%)
Gender		
Woman	24	80.0
Man	6	20.0
Education		
Elementary School	9	30.0
Junior High School	16	53.3
Senior High School	5	16.7
Work		
Private	3	10.0
Self-employed	9	30.0
Doesn't work	18	60.0

Based on the characteristics of the respondents presented in Table 1, the results of the study show that the majority of respondents were women, namely 24 people (80%), with the highest level of education being junior high school graduates, namely 16 people (53.3%), and the majority of 18 respondents reported being unemployed (60%).

Table 2. Respondent characteristics based on age and blood pressure.

Variables	Mean	Min	Max	SD
Pre-elderly age (45-59 years)	52.00	45	59	4.071
Systolic Blood Pressure (mmHg)	131.07	122	139	4.91

Based on the data in Table 2, the average age of respondents was 52 years (SD= 4.071), with the youngest being 45 years old and the oldest being 59 years old. Data on respondents' blood pressure values, the average systolic blood pressure value was 131.07 mmHg (SD= 4.91), with a range of 122-139 mmHg, while the average diastolic blood pressure value was 84.07 mmHg (SD=2.82), with a range of 80-89 mmHg.

Table 3. Results of the analysis of the test of differences in respondents' knowledge between the pretest and posttest.

Variables	n	Mean	SD	p-value
Level of Knowledge				

Variables	n	Mean	SD	p-value
Pre-Test	30	6.27	1.258	0.000
Post Test	30	7.60	0.498	

Based on the analysis in Table 3, it shows an increase in the average knowledge score from 6.27 before the intervention to 7.60 after the intervention. Considering that the data were not normally distributed (p -value <0.05), the Wilcoxon Signed-Rank test was used. The statistical test results obtained a p -value of 0.001, which is significantly lower than the significance level ($p <0.05$). This indicates a significant increase in knowledge levels after the provision of audiovisual education.

DISCUSSION

The research results show that the majority of respondents were women (80%). This aligns with research conducted by Ariyani (2020), which found that post-menopause, women are at higher risk of developing hypertension due to hormonal changes. Physiologically, women have a higher risk of post-menopause hypertension due to decreased estrogen levels, which play a role in protecting blood vessels (Purnama Puteri & Nugraheni, 2023). Meanwhile, hypertension in men is more often influenced by unhealthy lifestyles. The incidence of hypertension in men is more often associated with lifestyle factors that trigger increased blood pressure (Siregar et al., 2022). Because women experience menopause and have lower estrogen levels, researchers assume that women are more susceptible to hypertension than men, while men's hypertension is more often caused by unhealthy lifestyles.

The results of the study showed that the majority of respondents had a junior high school education (SMP) of 16 respondents (53.3%). This finding integrates existing knowledge and is in line with the research of Kafi et al. (2023), where the majority of respondents also had a junior high school education background with a percentage of 54.5%. According to Murtiningsih & Sulistiyorini (2024), individuals with lower education tend to have limitations in understanding medical instructions and usually only accept available health services without higher demands or expectations). Conversely, a higher level of education is positively correlated with a person's ability to absorb and have better health knowledge (Maulidina, 2019).

Researchers assume that education level is a key variable influencing the effectiveness of education provided. Individuals with higher education have greater cognitive capacity to receive, process, and apply new health information in their daily lives. Conversely, respondents with lower education levels face obstacles in understanding complex health terminology, which can ultimately limit their knowledge about disease prevention.

Respondent characteristics based on employment status: The majority of 18 respondents reported being unemployed (60%). Clinically, individuals who are unemployed or work from home tend to have a higher risk of hypertension. This is often associated with low levels of physical activity and a lack of regular exercise routines, which are major risk factors for the development of cardiovascular disease (Purnama Puteri & Nugraheni, 2023; Sihotang & Elon, 2020). Exercise has significant benefits for heart, lung, and blood vessel health. This physical activity can improve the function of the heart, lungs, and blood vessels, characterized by a decrease in resting heart rate, reduction in lactic acid buildup, increase in HDL cholesterol, and a decrease in the risk of atherosclerosis. In addition, exercise also plays a role in preventing weight gain and significantly helps with long-term weight loss, as well as reducing the health risks associated with chronic diseases (Syarli & Arini, 2021).

Researchers assume that employment status indirectly reflects a person's daily physical activity level. Work often involves dynamic movements that promote blood circulation, burn body fat, and prevent weight gain, which can trigger hypertension. Conversely, a lack of physical activity in the unemployed group leads to fat accumulation and blood vessel stiffness.

The findings of the study based on the average age of respondents were 52 years (SD = 4.071) with an average blood pressure profile of 131.07 mmHg (SD = 4.91) systolic blood pressure, while the average diastolic blood pressure was 84.07 mmHg (SD = 2.82). This indicates that the pre-elderly group in Baqa Village is clinically in the pre-hypertension category. These results integrate previous findings by Febtrina et al. (2024) which showed that the age range of 45–59 years is a group with a high prevalence of hypertension.

In line with the statement by Syarli and Arini (2021) that the factor most often associated with the occurrence of hypertension is age. As age increases, blood pressure also rises because the arterial walls thicken due to the accumulation of collagen in the muscle layer, so that blood vessels will gradually narrow and become stiff, it is clear that age is one of the risk factors for hypertension (Puspita et al., 2014, in Syarli & Arini, 2021). Based on the theory and previous research statements, the researcher assumes that physiologically, the aging process reduces the elasticity of blood vessels, which in turn increases peripheral resistance and blood pressure.

The results of the bivariate analysis showed a significant increase in the level of knowledge after providing audiovisual education, where the average knowledge score increased from 6.27 before the intervention to 7.60 after the intervention. Lubis (2023) stated that providing audiovisual materials had an effect on self-care practices and knowledge of adult hypertensive patients. Research findings showed that adult hypertensive patients in Jati Village gained more knowledge after being provided with video materials. Research conducted by Novrianti et al. (2022), shows that there is a significant influence between before and after being given education using audiovisual methods. This study suggests that use audiovisual media in education is considered more interesting and efficient because it involves both senses, namely sight and hearing, which support understanding information in more optimal. In addition, the media audiovisual can increase stimulation knowledge from five senses to the brain, with contributions around 75% to 85% through the sense of sight, temporarily 13% to 25% of human knowledge is acquired and continued through senses other.

In line with research by Rianti et al. (2020), in the intervention group, knowledge levels increased by 5.22% with leaflets, 5.78% with audiovisual media, and 4.56% with leaflets and audiovisual media. These results indicate that audiovisual media significantly increased knowledge compared to other media. The researchers' assumption, based on the research results presented above, is that education through audiovisual media has a significant impact on increasing knowledge, particularly in the context of hypertension and disease prevention. This education is more effective than other media, such as leaflets, because audiovisual media can utilize both senses (sight and hearing) simultaneously, which improves information retention and comprehension.

CONCLUSION

This study demonstrates that audiovisual-based health education is an effective approach for improving pre-elderly adults' knowledge of healthy lifestyles to prevent hypertension. The intervention successfully enhanced participants' understanding by presenting health information in an engaging and accessible format, making it easier to comprehend and retain. These findings highlight the importance of early health education in promoting hypertension prevention and encouraging self-care practices before the onset of disease. The results support the integration of audiovisual media into community-based health promotion programs, particularly in primary health care settings, to improve the effectiveness of health education among pre-elderly populations. Healthcare providers are encouraged to adopt interactive digital learning methods to strengthen public awareness and promote healthier lifestyle behaviors. Future studies should employ more rigorous designs, such as randomized controlled trials with comparison groups and longer follow-up periods, to evaluate whether improvements in knowledge lead to sustained behavioral changes and better long-term health outcomes.

REFERENCES

- Aba, M., Mahendika, D., Erlinawati, N. D., Faizah, A., & Hidayat, E. (2023). Pengaruh edukasi "CERDIK" terhadap pengetahuan pra lansia tentang hipertensi [The Effect of the "CERDIK" education program on pre-elderly adults' knowledge of hypertension]. *Holistik Jurnal Kesehatan*, 17(2), 125–133. <https://doi.org/10.33024/hjk.v17i2.9898>
- Anwar, K., & Masnina, R. (2019). Hubungan kepatuhan minum obat antihipertensi dengan tekanan darah pada lansia penderita hipertensi di wilayah kerja Puskesmas Air Putih Samarinda [The relationship between adherence to antihypertensive medication and blood pressure in older adults with hypertension in the service area of the Air Putih Community Health Center in Samarinda]. *Borneo Studies and Research*, 1(1), 494–501.
- Appulembang, I., Musaidah, M., Wahyuni Bahrum, S., & Riani, J. (2022). The effect of health

- education in prevention hypertension of patient knowledge in tolo' public health center jeneponto district. *International Journal of Health and Pharmaceutical (IJHP)*, 2(4), 387–390. <https://doi.org/10.51601/ijhp.v2i4.134>
- Ariyani, A. R. (2020). Kejadian hipertensi pada usia 45-65 tahun [Incidence of hypertension among people aged 45–65]. *Higeia Journal of Public Health Research and Development*, 1(2), 141–150. <https://doi.org/10.15294/higeia.v4iSpecial%203/40392>
- Astillawati, A., Purwanto, E., & Nulhakim, L. (2023). The correlation between body mass index, physical activity and blood pressure with quality of life in elderly hypertension. *Formosa Journal of Science and Technology*, 2(5), 1191–1214. <https://doi.org/10.55927/fjst.v2i5.4021>
- BPS. (2024). *Badan Pusat Statistik Kota Samarinda 2024 [Samarinda City Central Statistics Agency 2024]*. Retrieved from <https://samarindakota.bps.go.id/id/statistics-table?subject=519&sortBy=date%2Ctitle&sortOrder=desc%2Casc#subjekviewtab3>
- Cabral, G., Soesanto, E., Ernawati, E., & Aisah, S. (2024). Penerapan edukasi metode audio visual terhadap self management pada lansia penderita hipertensi [The application of audiovisual education on self-management for older adults with hypertension]. *Ners Muda*, 5(1), 117–125. <https://doi.org/10.26714/nm.v5i1.11841>
- Casmuti, C., & Fibriana, A. I. (2023). Kejadian hipertensi di wilayah kerja puskesmas kedungmundu kota semarang [Incidence of hypertension in the service area of the Kedungmundu Community Health Center, Semarang City]. *HIGEIA (Journal of Public Health Research and Development)*, 7(1), 123–134. <https://doi.org/10.15294/higeia.v7i1.64213>
- Chrismilasari, L. A., & Negara, C. K. (2022). The effectiveness of health education on increasing family knowledge about hypertension. *Journal of Educations*, 1(1), 18-24. <https://banuainstitute.org/JOED/article/view/26>
- Dewi, N. (2022). Hubungan tingkat pengetahuan dan gaya hidup dengan kejadian hipertensi di RW 08 Wilayah Kerja Puskesmas Kampungtengah Kramat Jati [The relationship between knowledge level and lifestyle and the incidence of hypertension in RW 08, the Service Area of the Kampungtengah Kramat Jati Community Health Center]. *Jurnal Kesehatan Masyarakat Perkotaan*, 2(2), 10–22. <https://doi.org/10.37012/jkmp.v2i2.1316>
- Febtrina, R., Saharudin, S., Wardah, W., & Sari, I. I. (2024). Video edukasi efektif meningkatkan motivasi perubahan gaya hidup pasien hipertensi [Educational videos effectively boost patients' motivation to change their lifestyles]. *Science: Indonesian Journal of Science*, 1(2), 106–113. <https://doi.org/10.31004/11qg4874>
- Kafi, I. A., Prihatin, S., & Jaelani, M. (2023). Pengaruh pemberian edukasi gizi diet dash dengan media audiovisual terhadap pengetahuan, sikap, dan perilaku gizi pada pasien hipertensi. *Jurnal Riset Gizi*, 11(1), 76–84. <https://doi.org/10.31983/jrg.v11i1.10772>
- Khotimah, & Masnina. (2020). Hubungan dukungan keluarga dengan tekanan darah pada lasia penderita hipertensi di wilayah kerja Puskesmas Air Putih Samarinda [The relationship between family support and blood pressure in women with hypertension in the service area of the Air Putih Community Health Center in Samarinda]. *Borneo Student Research*, 1(3), 1693–1704. <https://journals.umkt.ac.id/index.php/bsr/article/view/997>
- Lubis, S. M. S., AM, A. I., & Musta'in, M. (2023). Pengaruh edukasi audio visual self-care behaviour terhadap peningkatan pengetahuan penderita hipertensi pada usia dewasa [The effect of audiovisual education on self-care behavior in improving knowledge among adults with hypertension]. *Journal of Nursing Practice and Education*, 4(1), 37–42. <https://doi.org/10.34305/jnpe.v4i1.829>
- Luthfiani, L. M. (2021). Pengaruh penyuluhan dengan menggunakan media video terhadap pengetahuan pra lansia mengenai hipertensi (Studi di Posbindu Melati IV Dusun Pasir Peuteuy Desa Pawindan Kecamatan Ciamis Kabupaten Ciamis Tahun 2020) [The effect of health education using video media on pre-elderly individuals' knowledge of hypertension (A Study at the Melati IV Health Post in Pasir Peuteuy Hamlet, Pawindan Village, Ciamis Subdistrict, Ciamis Regency, in 2020)]. *Jurnal Kesehatan Komunitas Indonesia*, 17(2), 329–338. <https://doi.org/10.37058/jkki.v17i2.3891>
- Maulidina, F. (2019). Faktor-faktor yang berhubungan dengan kejadian hipertensi di wilayah kerja Puskesmas Jati Luhur Bekasi tahun 2018 [Factors associated with the prevalence of

- hypertension in the service area of the Jati Luhur Community Health Center in Bekasi in 2018]. *ARKESMAS (Arsip Kesehatan Masyarakat)*, 4(1), 149–155. <https://doi.org/10.22236/arkesmas.v4i1.3141>
- Murtiningsih, M., & Sulistiyorini, A. O. (2024). Pengembangan dan uji validitas kuesioner self efficacy pola hidup sehat spiritual islam [Development and validity testing of a questionnaire on self-efficacy in islamic spiritual healthy living]. *MAHESA: Malahayati Health Student Journal*, 4(9), 3749–3765. <https://doi.org/10.33024/mahesa.v4i9.14910>
- Novrianti, E., Ikhsan, I., & Rahmawati, S. (2022). Pengaruh edukasi melalui media audio visual terhadap pengetahuan pasien hipertensi di Puskesmas Sambirejo [The effect of education through audiovisual media on the knowledge of hypertensive patients at the Sambirejo Community Health Center]. *Mitra Raflesia (Journal of Health Science)*, 14(2), 59. <https://doi.org/10.51712/mitraraflesia.v14i2.151>
- Purnama Puteri, A. M., & Nugraheni, A. Y. (2023). Faktor yang mempengaruhi tingkat kepatuhan pengobatan pasien hipertensi di Puskesmas Kotagede II Yogyakarta [Factors affecting treatment adherence among patients with hypertension at the Kotagede II Community Health Center in Yogyakarta]. *Jurnal Ilmiah Farmasi*, 19(2), 126–142. <https://doi.org/10.20885/jif.vol19.iss2.art11>
- Rahmanti, A., Wulan, N., D, A. F., Safitri, I., L, M. I., W, S. A., & N, T. A. (2022). Sosialisasi Deteksi Dini Penyakit Tidak Menular (DD-PTM) dalam pencegahan komplikasi diabetes mellitus di Kelurahan Bulustalan Kecamatan Semarang Selatan [Outreach on Early Detection of Noncommunicable Diseases (DD-PTM) for the prevention of diabetes mellitus complications in Bulustalan Village, South Semarang District]. *Jurnal Pengabdian Kepada Masyarakat Sisthana*, 3(2), 11–15. <https://doi.org/10.55606/pkmsisthana.v3i2.8>
- Rianti, R., Apriliawati, A., & Sulaiman, S. (2020). Pengaruh edukasi menggunakan leaflet, audio visual, leaflet dan audio visual terhadap pengetahuan, sikap dan perilaku orangtua dalam pencegahan diare di Puskesmas Rawat Inap Manis Jaya Tangerang [The effect of educational interventions using leaflets and audiovisual materials on parents' knowledge, attitudes, and behaviors regarding diarrhea prevention at the Manis Jaya Inpatient Community Health Center in Tangerang]. *Journal of Islamic Nursing*, 5(1), 60. <https://doi.org/10.24252/join.v5i1.10396>
- Sihotang, M., & Elon, Y. (2020). The Relationship of Physical Activities With Blood Pressure among Adults. *Chmk Nursing Scientific Journal*, 4(2), 199–204. <https://cyber-chmk.net/ojs/index.php/ners/article/view/787>
- Siregar, M. A., Dedi, D., Sinaga, S. W., & Adawiyah, Y. (2022). Hubungan tingkat pengetahuan & kepatuhan diet pada pasien hipertensi di klinik pratama millenium Medan [The relationship between knowledge level and dietary compliance in hypertensive patients at the millenium primary care clinic in Medan]. *JINTAN: Jurnal Ilmu Keperawatan*, 2(2), 99–109. <https://doi.org/10.51771/jintan.v2i2.303>
- Suhat, S., Suwandono, A., Adi, M. S., & Nugroho, K. H. H. S. (2022). The Influence of a Health Education Intervention on Hypertension-related Knowledge, Attitude and Family Support in Cimahi City: A Quasi Experimental Study. *Malaysian Journal of Medicine and Health Sciences*, 18(5), 31–38.
- Syarli, S., & Arini, L. (2021). Faktor penyebab hipertensi pada lansia: literatur review [Causes of hypertension in older adults: a literature review]. *Ahmar Metastasis Health Journal*, 1(3), 112–117. <https://doi.org/10.53770/amhj.v1i3.11>
- Upoyo, A. S., Taufik, A., Anam, A., Nuriya, N., Saryono, S., Setyopranoto, I., & Pangastuti, H. S. (2021). Translation and Validation of the Indonesian Version of the Hypertension Self-care Profile. *Open Access Macedonian Journal of Medical Sciences*, 9(E), 980–984. <https://doi.org/10.3889/oamjms.2021.7119>