



“Health Belief Model” in the Prevention of Chronic Disease in the Elderly

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Abstract

Chronic disease is a non-communicable disease categorized as a long-term disease due to physiological changes in the body in the elderly. Chronic disease can be prevented with a healthy lifestyle and education through the Health Belief Model with the belief that someone takes a series of actions to overcome disease and reduce side effects. This study aims to determine how the effect of the application of the “Health Belief Model” in the Prevention and Health Care of Chronic Disease in the Elderly, which was carried out with a total sample of 100 respondents. The research design used Quasi Experiment with a pre-test and post-test approach with a control group design, a knowledge questionnaire about chronic disease, disease prevention, and health care including pre-test and post-test, used Paired T-Test with knowledge result $p\text{-value } 0.000 < \alpha$ ($\alpha = 0.05$) and health prevention and maintenance $p\text{-value } 0.000 < \alpha$ ($\alpha = 0.05$) so it can be concluded that there is an effect of implementing the “Health Belief Model” in the prevention and maintenance of chronic disease health in the elderly.

Introduction

Chronic disease is a non-communicable disease and is categorized as a long-term disease because it undergoes physiological changes in the body (Ribeiro et al., 2014). Chronic illness can cause job loss, experience physical dependence, and require treatment assistance (Gonzalez, Maria, Roth, Gelehrter, & Lopes, n.d.). Indonesia has 20.24 million people in the elderly category, equivalent to 8.03% of the total population (Yuliati, Baroya, & Ririanty, 2014). The number has not been matched by good health. The elderly morbidity rate in Indonesia is calculated at 25.05%, meaning that out of every 100, there are 25 sick elderly. The morbidity rate of the elderly is moderate due to chronic diseases in the highest order, such as hypertension, arthritis, stroke, COPD, DM, cancer, coronary heart disease, kidney stones, heart failure, and kidney failure (Sudarmaja, Swastika, & Ariwati, 2020).

Chronic diseases generally attack the elderly, and this condition requires treatment

until the end of life (Periyakoil, Neri, & Kraemer, 2016). The increasing population of chronic diseases affecting the elderly poses challenges for social care and health care. They experience the aging process, so they have a health burden. The decline in health functions prevents the elderly from being independent and participating in social activities (Perdamaian, Manus, Periska, & Steffiasih, 2020). The incidence of elderly people with chronic diseases requires long-term care and increases the cost of health care. In addition, chronic conditions cause the elderly to experience an inability to perform activities independently due to aging, disease conditions, and cognitive abilities that can make them dependent on care providers and require health services (Ondiege & Clarke, 2017).

The elderly with chronic diseases require long-term treatment. Treatment compliance is vital for them. Compliance is affected by several factors. Like medication, patient, physician, system-based factors, etc. Low medication compliance usually leads to poor

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clinical outcomes, drug-related side effects, and increased social health care costs. In addition, it has been established that the use of appropriate medication is a vital key factor for self-management in the management of chronic disease. Therefore, it is required to improve medication compliance in patients with chronic diseases, to minimize premature death and social burden (Van Der Laan et al., 2017).

The results of previous studies also showed that the elderly with chronic diseases had a low level of knowledge about treatment regimens. Knowledge and compliance to treatment in the elderly with chronic diseases revealed that more than half of people with chronic diseases (55.9%) reported low knowledge levels and compliance to treatment. Compliance is a person's behavior in carrying out the treatment, agreed by recommendations from health care providers (Nieuwenhuis, Jaarsma, van Veldhuisen, & van der Wal, 2012). The elderly's non-compliance with their lifestyle, ranging from changes in eating habits and medication compliance, shows behavior that affects their health conditions. The results show that several theory-based educational programs apply a cognitive framework that positively affects behavior change. One of them is the Health Belief Model (Jeihooni, Hidarnia, Kaveh, Hajizadeh, & Askari, 2016)

Health Belief Model (HBM) is one of the interpersonal health education models (derived from behavioral science theories) widely used for preventive behavior (Salama, 2018). HBM is a method developed to explain how a person's behavior in preventing and overcoming his disease condition. Parts of the HBM include perceived severity, perceived vulnerability, perceived usefulness, perceived inhibition, disease modification, cues for action, and self-efficacy (Hosseini et al., 2017).

Therefore, it is needed to educate the elderly to be more sensitive to adherence to their treatment program so that there is a need for an intervention that will change their mindset and knowledge. Considering the importance of chronic disease problems in the elderly this study aims to see the effect of the "Health Belief Model" application in Chronic Disease Prevention and Health Maintenance

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Method

This study uses a quasi-experimental pretest-posttest control group design with one type of treatment and a purposive sampling approach. The number of samples consisted of the experimental group and the control group. The intervention was given for eight months and three times the intervention of the HBM cognitive model. The research took place in the working area of Medan Sunggal Health Center. The population in this study were elderly with chronic diseases as patients seeking treatment at the Medan Sunggal Health Center. A sample of 100 people, consisting of 50 in the intervention group and 50 in the control group. The instrument used in this study consisted of three types instruments. Demographic data questionnaire (age, gender, education, income, length of illness). Knowledge questionnaire about chronic disease, disease prevention. Health care behavior includes pre-test and post-test. Data analysis was carried out in two ways, namely: univariate analysis which was carried out to analyze the characteristics of respondents, and pre-test and post-test questionnaires of knowledge about chronic disease, disease prevention, health care behavior and then analyzed with frequency distribution tables and proportions. Bivariate analysis on the independent variable and the dependent variable used the statistical Paired t-test to determine the effect of the implementation of HBM on knowledge about chronic disease, disease prevention, health care behavior. Data analysis used a data processing program. This research has obtained an Ethical Approval permit from the Health Research Ethics Commission, Faculty of Nursing, the University of North Sumatra with Number: 2162/VI/SP/2020.

Results and Discussions

The results showed that the demographic data of the respondents in the intervention group in this study were the majority female as many as 35 people (70%) for the control group and 36 people (72%) for the intervention group, the average age of the respondents ranged between the ages of 46-65, namely 39 people (78%) for the control group and 37 people (74%) for the intervention group, income <2 million as many as 28 (56%) for the control group and 23 people (46%) for the intervention group, the most education is SMA 16 people (32%) for the control group and 20 people (40%) for the intervention, the most religion is Islam, both from the intervention and control groups, namely 40 people (80%), Javanese ethnicity is the largest ethnic group with a total of 18 people (36%) for the control group and 21 people (42%) for the intervention, and the average respondent status was married as many as 33 people (66%) in the control group and 29 people (58%) in the control group. The disease suffered by the majority was hypertension 24 (48%) for the intervention group and 17 people (34%) in the intervention group, the duration of illness was around 1-10 years as many as 31 people (62%) for the control group and 25 people (50%) for the control group, the most sources of health-related information were obtained from the family of 26 people (52%) for the intervention group, and for the control group the most by health workers 26 people (52%), and 18 people who participated in elderly activities (36 %) for the intervention group and 37 people (74%) for the control group.

The results showed that the p -value = 0.000 <0.05. It means that there is an effect of implementing the Health Belief Model on knowledge of chronic diseases in the elderly before and after being given the intervention. In line with the results of other studies showing that perceptions of vulnerability and seriousness of health outcomes are related to individual characteristics (i.e. gender, age), and those might influence the utilization of preventive

services among those with health care coverage ((Luquis & Kensinger, 2019).

The results showed (Ng et al., 2014) that most health care behaviors were good, namely 44 people (58.7%). Health care behavior is vital in supporting the quality of life of the elderly in dealing with chronic diseases. Regarding symptom intensity and characteristics of chronic disease progression, participants with lower levels of schooling in the study (multiple and secondary education) showed more concern with possible symptoms. Because the representation of their perceived severity was higher than those at other school levels that would affect health care (Costa, 2020)

The results of other studies show that the quality of life associated with health maintenance in old age declines due to various causes, including physical inactivity and high blood pressure. In this regard, chronic diseases such as hypertension have affected 1.8 billion people worldwide. 50% of them are not aware of this condition. Only 25% of patients are aware of it. As a result, many elderly suffer from more severe chronic diseases. Unfortunately, they lack the necessary information and knowledge regarding health care and disease prevention and control. This problem has put 75% of the population with chronic diseases at risk for cardiovascular disease, heart failure or stroke, kidney failure, liver failure, and even sudden death (Onoruoiza, Musa, Umar, & Kunle, 2015).

A study on the elderly in Iran also showed that 48.1% of patients suffering from chronic diseases such as high blood pressure were undergoing treatment, and only 21.3% were under control. However, another opinion says about half of the patients who receive hypertension treatment do not continue their treatment for one year. Due to a lack of knowledge related to the problems that will arise due to the chronic disease. It will affect the prevention behavior of these chronic diseases (Mostafavi, Najimi, Sharifrad, & Golshiri, 2016)

Table 1. Distribution of Demographic Data Frequency

Demographic Data	Intervention Group		Control Group	
	f	%	f	%
Gender				
- Male	14	28	15	30
- Female	36	72	35	70
Age				
- 46-55 years	9	18	15	30
- 56-65 years	28	56	24	48
- 66-75 years	10	20	8	16
- 76-85 years	3	6	3	6
Education				
- Elementary	12	24	8	16
- Junior High School	8	16	12	24
- Senior High School	20	40	16	32
- Graduate	8	16	10	20
- No education	2	4	4	8
Religion				
- Islam	40	80	40	80
- Christian	7	14	3	6
- Catholic	3	6	5	10
- Hindu	0	0	2	4
Ethnic				
- Karo	5	10	4	8
- Java	21	42	18	36
- Malay	2	4	5	10
- Batak	19	38	17	34
- Aceh	0	0	3	6
- Others	3	6	3	6
Diseases:				
- Hipertension	17	34	24	48
- Diabetes	9	18	8	16
- Gout	8	16	11	22
- Rheumatism	9	18	4	8
- Others	7	14	3	6
Period of sickness				
- 1-5 years	14	28	14	28
- 6-10 years	11	22	17	34
- > 10 years	25	50	19	38
Health Related Information Source				
- Family	20	40	26	52
- Health Attendant	26	52	21	42
- Friend/Relative	3	6	2	4
- Self sourcing	1	2	1	2
Elderly Activity				
- No	37	74	32	64
- Yes	13	26	18	36

Source = Primary Data, 2020

Table 2. Distribution of Respondent's Knowledge Frequency

Respondent	Pretest		Posttest	
	F	%	F	%
Intervention Group				
- Good	29	58	50	100
- Enough	16	32	0	0
- Poor	5	10	0	0
Control Group				
- Good	29	58	29	58
- Enough	16	32	16	32
- Poor	5	10	5	5

Source = Primary Data, 2020

Table 3. Distribution of Frekuensi Respondent's Prevention and Care

Respondent	Pretest		Posttest	
	F	%	F	%
Intervention Group				
- Good care	20	60	50	100
- Enough care	30	40	0	0
- Poor care	0	0	0	0
Control Group				
- Good care	20	60	20	60
- Enough care	30	40	30	40
- Poor care	0	0	0	0

Source = Primary Data, 2020

The results of previous studies also show that the elderly with chronic diseases have low health behavior in treatment. So it will have an impact on maintaining their health. In this case, Lo et al. (2016), conducted a study on knowledge and health care for chronic hypertension in the elderly with high blood pressure in Hong Kong. The results revealed that more than half of these people (55.9%) reported low levels of knowledge and adherence to treatment. In this case, influenced by seniority, living alone, and perceptions of independent treatment control accompanied by greater adherence to treatment. This study proves that the unmarried elderly in China are more likely to adhere to treatment which can determine the influence of cultural factors on adherence level. So the elderly's health can be maintained properly (Lo, Chau, Woo, Thompson, & Choi, 2016)

Other studies explain that health maintenance efforts are not solely related to the disease. Psychological problems will also affect health care. Others researches show that when old, most people live alone and have small social networks and low participation in social activities (Cornwell & Waite, 2009), making them more vulnerable to feelings of loneliness. Loneliness is a common, painful, emotional experience, and it is a significant public health problem, especially among the elderly (Gerst-Emerson & Jayawardhana, 2015). There is increasing evidence documenting that loneliness in old age appears to be a vital risk factor for inactivity (Shankar, McMunn, Banks, & Steptoe, 2011), and poorer health, including morbidity and mortality (Holt-Lunstad, Smith, Baker, Harris, & Stephenson, 2015), depression (Bodner & Bergman, 2016), lower levels of self-assessment of physical health

((Cornwell & Waite, 2009)), and hypertension (Christiansen, Larsen, & Lasgaard, 2016), as well as cardiovascular disease, diabetes, and migraine (Momtaz et al., 2012).

Another study observed that people's knowledge and perception of disease, their understanding of the disease burden, and their beliefs on treatment could be vital in predicting health care. Therefore, the higher the knowledge about the threat of disease, the higher the level of one's health care the prevention. Proper understanding and knowledge can also contribute to future interventions, which will affect the economy, such as high hospital costs (Rajpura J, Nayak R. 2014).

Other studies have shown that negative age beliefs harm health care (Gonzalez et al., n.d.) and emotional responses to stress (Bellintier & Neupert, 2018) from those around them. In addition, age, which includes negative age stereotypes, can have a detrimental effect at the community level. For example, in terms of health care costs, age can incur high costs for countries, which can exacerbate economic pressures (Levy, Slade, Chang, Kanno, & Wang, 2020)

In other studies related to health care behavior in the European countries as well as in the US, more than 60% of health care spending is for people who have chronic diseases. The findings suggest that the problem of various chronic conditions is not limited to older adults. But also in men and women under 65 years of age, possibly due to the increasing epidemic of chronic diseases associated with overweight and obesity due to excessive caloric intake, an unhealthy diet, and a lack of physical activity. Health care behavior is the main thing that must exist and must be applied to these problems.

Until efforts to prevent chronic diseases in the elderly can be maintained (Atella et al., 2015; Fontana & Hu, 2014 & Heymsfield & Wadden, 2017).

Another related study was conducted on 86 percent of Italian adults over the age of 65 now living with at least one chronic condition and 56.7 percent with more than one. They contribute a relevant share of the annual public health care budget (about 23 billion euros and 20% of the total budget). Without integrated strategic preventive interventions, the number is likely to increase and become unsustainable as the total Italian population aged over 65 is projected to increase sharply over the next 15 years, which is alarming. Thus patients' earlier exposure to chronic disease combined with a longer life expectancy extends the period of living in poor health. Moreover, obesity is the main problem in many other developed countries and developing countries worldwide because individuals with obesity are more likely to develop various chronic diseases, which have a high economic cost in direct and indirect health care costs (Atella et al., 2015; Fontana & Hu, 2014; Heymsfield & Wadden, 2017).

It should be noted that health care, especially in patients with chronic diseases, is of the utmost importance because these conditions have a progressive tendency, and low prevention rates lead to progression, decreased quality of life, and ultimately treatment failure. So they will experience health threats to the elderly and patients with chronic diseases (Rajpura & Nayak, 2014). In the study, many efforts by health attendants to prevent and keep the elderly away from chronic diseases. Such as approaching, promoting health, and providing support to the elderly and their families. In addition, social support such as promoting health because it facilitates healthier behavior and adherence will influence better behavior towards treatment and health care (Uchino, 2006). As getting older, the elderly are easier to experience physical complaints. Whether due to physiological changes or disease conditions. The aging process that occurs in the elderly will usually cause a decrease in the quality of life (Mulyawati, 2015), when older adults who perceive to have good social support are more

likely to have better health outcomes and care. Previous studies revealed that adequate social support has a positive correlation with the physical and mental quality of life in older adults with chronic diseases (Yue, Li, Weilin, & Bin, 2015). As getting older, the elderly are easier to experience physical complaints. Whether due to physiological changes or disease conditions. The aging process that occurs in the elderly will usually cause a decrease in the quality of life (Sutikno, 2011).

Although changing disease risk factors reduces overall chronic disease risk, modifiable risk factors such as sedentary behavior are associated with increased risk for chronic disease. Non-modifiable risk factors are traits that cannot be changed, such as age, ethnicity, and genetics. However, although not changed directly, genes are strongly influenced by the environment and lifestyle that affect gene expression. Modifiable risk factors are positively affected by lifestyles, such as daily physical activity, regular exercise, healthy diet, social involvement, spirituality, and stress management. However, other modifiable risk factors are not directly related to lifestyles, such as education level, socioeconomic status, and occupation (Kirwan, Sacks, & Nieuwoudt, 2017).

The health improvements seen with activity are not limited to the cardiovascular system. Once physically active, elderly with chronic diseases such as type 2 diabetes improve their overall insulin sensitivity and positively alter skeletal muscle proteins and enzymes associated with glucose metabolism and insulin signaling. As a result, structured exercise programs are becoming a vital part of prevention and treatment management (Kirwan et al., 2017),

The same factors that make individuals more vulnerable are also related to a reduced ability to access and understand health information, make well-informed decisions, and take actions that promote optimal health skill set, commonly referred to as "health literacy". It is especially true if the health information itself is not timely, reliable, consistent, or actionable. Health literacy has emerged over the past three decades as one of the strongest psychological

Table 4. Effect of Implementation to Health Prevention and Care

Variable	Mean	SD	T	p-value
Intervention Group				
Pre-post test Health Prevention and Care	7.800	0.788	9.901	0,000
Control Group				
Pre-post test Health Prevention and Care				

(There is effect with p-value = 0,000 <0,05)

The study found an effect of providing intervention with the health belief model application on the prevention and control of chronic diseases in the elderly. The study revealed that the implementation of HBM-based educational interventions can improve patient adherence to the treatment of chronic diseases in the elderly such as hypertension (Yue et al., 2015). Therefore, medication compliance in older adults, attention to the prevention, control of different complications and diseases is critical. Based on the results of previous investigations, the most common self-care problems experienced by the elderly are associated with inadequate education for this population (Ghasemi, Moonaghi, Mohajer, Mazlom, & Shoeibi, 2018).

Appropriate educational interventions seem to be able to improve medication adherence in the elderly and patients in terms of prevention and control of chronic diseases in the elderly. The statistics provided have also emphasized greater attention to cardiovascular risk factors. As well as the importance of primary prevention more than ever. Therefore HBM-based education program for the control and prevention of hypertension in elderly patients has a significant effect. The results of other studies also show that the implementation of this model-based education program in the elderly can increase the rate of medication adherence by approximately 59%. Therefore, in the post-intervention phase, the mean score for prevention and maintenance of chronic disease in the elderly in the intervention group was significantly higher than in the control group. In addition, in the comparison of the average score of prevention and health maintenance by doing treatment by the elderly, the intervention group has increased significantly after being given the HBM cognitive model intervention,

compared to before. However, there was no significant difference in the control group. Therefore, this study shows the positive effect of the HBM-based education program on medication adherence and disease control and prevention in the elderly with hypertension (Yazdanpanah, Moghadam, Mazlom, Beigloo, & Mohajer, 2019).

The results of this study indicate that the HBM can predict 48.8% of behavior changes with an accuracy of 82.8%. After moderating risk factors, HBM can also estimate a 50.5% change in medication adherence with an accuracy of 86.2%, which means that HBM can significantly affect control and prevention behavior in hypertensive patients (Yue et al., 2015). Perceptions and attitudes may determine how people practice and behave under certain conditions. HBM is widely used in health promotion and health education situations. Found to predict various health behaviors such as performing prognostic tests, choosing to use any treatment type or medication, or taking precautions regarding any disease (Albashtawy et al., 2016).

Conclusions

The cognitive models (HBM) application can change health-related behavior in preventive efforts. It is based on the expectancy-value theory. Assuming that individuals value disease avoidance or recovery and people expect certain health actions can prevent or improve disease. Based on the results of this study, HBM is effective in preventing chronic diseases and changing health care behavior in the elderly. Health attendants are expected to be the primary source of education for the elderly in providing health services and prevention efforts to maintain the health of the elderly in the community continuously.

References

- Albashtawy, M., Gharaibeh, H., Alhalaiqa, F., Batiha, A. M., Freij, M., Saifan, A., Al-Awamreh, K., Hamadneh, S., Al-Kloub, M., & Khamaiseh, A., 2016. The Health Belief Model's Impacts on the Use of Complementary and Alternative Medicine by Parents or Guardians of Children with Cancer. *Iranian Journal of Public Health*, 45(5), pp.708–709.
- Atella, V., Kopinska, J., Medea, G., Belotti, F., Tosti, V., Mortari, A.P., Cricelli, C., & Fontana, L., 2015. Excess Body Weight Increases the Burden of Age-associated Chronic Diseases and Their Associated Health Care Expenditures. *Aging*, 7(10), pp.882–892.
- Bellingtier, J.A., & Neupert, S.D., 2018. Negative Aging Attitudes Predict Greater Reactivity to Daily Stressors in Older Adults. *Journals of Gerontology - Series B Psychological Sciences and Social Sciences*, 73(7), pp.1155–1159.
- Bodner, E., & Bergman, Y.S., 2016. Loneliness and Depressive Symptoms Among Older Adults: The Moderating Role of Subjective Life Expectancy. *Psychiatry Research*, 237, pp.78–82.
- Christiansen, J., Larsen, F.B., & Lasgaard, M., 2016. Do Stress, Health Behavior, and Sleep Mediate the Association Between Loneliness and Adverse Health Conditions Among Older People? *Social Science and Medicine*, 152, pp.80–86.
- Cornwell, E.Y., & Waite, L.J., 2009. Social Disconnectedness, Perceived Isolation, and Health Among Older Adults. *Journal of Health and Social Behavior*, 50(1), pp.31–48.
- Costa, M.F., 2020. Health Belief Model for Coronavirus Infection Risk Determinants. *Revista de Saude Publica*, 54, pp.1–11.
- Fontana, L., & Hu, F.B., 2014. Optimal Body Weight for Health and Longevity: Bridging Basic, Clinical, and Population Research. *Aging Cell*, 13(3), pp.391–400.
- Gerst-Emerson, K., & Jayawardhana, J., 2015. Loneliness as a Public Health Issue: The Impact of Loneliness on Health Care Utilization Among Older Adults. *American Journal of Public Health*, 105(5), pp.1013–1019.
- Ghasemi, A., Moonaghi, H.K., Mohajer, S., Mazlom, S.R., & Shoeibi, N., 2018. Effect of Self-Management Educational Program on Vision-related Quality of Life Among Elderly with Visual Impairment. *Evidence Based Care Journal*, 8(1), pp.35–44.
- Gonzalez, M.E., Maria, M., Roth, C., Gelehrter, R., & Lopes, C., 2018. Convivendo Com A Doença Renal: Entre Ditos E Não Ditos. *Researchgate*, 2018, pp.108–114.
- Heymsfield, S. B., & Wadden, T.A., 2017. Mechanisms, Pathophysiology, and Management of Obesity. *New England Journal of Medicine*, 376(3), pp.254–266.
- Holt-Lunstad, J., Smith, T.B., Baker, M., Harris, T., & Stephenson, D., 2015. Loneliness and Social Isolation as Risk Factors for Mortality: A Meta-Analytic Review. *Perspectives on Psychological Science*, 10(2), pp.227–237.
- Hosseini, Z., Karimi, Z., Mohebi, S., Sharifirad, G.R., Rahbar, A., & Gharlipour, Z., 2017. Nutritional Preventive Behavior of Osteoporosis in Female Students: Applying Health Belief Model (HBM). *International Journal of Pediatrics*, 5(1), pp.4137–4144.
- Jeihooni, A., Hidarnia, A., Kaveh, M., Hajizadeh, E., & Askari, A., 2016. Application of the Health Belief Model and Social Cognitive Theory for Osteoporosis Preventive Nutritional Behaviors in a Sample of Iranian Women. *Iranian Journal of Nursing and Midwifery Research*, 21(2), pp.131.
- Kirwan, J.P., Sacks, J., & Nieuwoudt, S., 2017. The Essential Role of Exercise in the Management of Type 2 Diabetes. *Cleveland Clinic Journal of Medicine*, 84(7), pp.S15–S21.
- Levy, B.R., Slade, M.D., Chang, E.S., Kanno, S., & Wang, S.Y., 2020. Ageism Amplifies Cost and Prevalence of Health Conditions. *Gerontologist*, 60(1), pp.174–181.
- Lo, S.H.S., Chau, J.P.C., Woo, J., Thompson, D.R., & Choi, K.C., 2016. Adherence to Antihypertensive Medication in Older Adults with Hypertension. *Journal of Cardiovascular Nursing*, 31(4), pp.296–303.
- Luquis, R.R., & Kensinger, W.S., 2019. Applying the Health Belief Model to Assess Prevention Services Among Young Adults. *International Journal of Health Promotion and Education*, 57(1), pp.37–47.
- Momtaz, Y.A., Hamid, T.A., Yusoff, S., Ibrahim, R., Chai, S.T., Yahaya, N., & Abdullah, S.S., 2012. Loneliness as a Risk Factor for Hypertension in Later Life. *Journal of Aging and Health*, 24(4), pp.696–710.
- Mostafavi, F., Najimi, A., Sharifirad, G., & Golshiri, P., 2016. Beliefs About Medicines in Patients with Hypertension: the Instrument Validity and Reliability in Iran. *Materia Socio Medica*, 28(4), pp.298.
- Mulyawati, I., 2015. Jurnal Kesehatan Masyarakat Andalas. *Obesitas Sentral Dan Kadar Kolesterol Darah Total*, 11(1), pp.87–95.
- Ng, M., Fleming, T., Robinson, M., Thomson,

- B., Graetz, N., Margono, C., & Gakidou, E., 2014. Global, Regional, and National Prevalence of Overweight and Obesity in Children and Adults During 1980-2013: A Systematic Analysis for the Global Burden of Disease Study 2013. *The Lancet*, 384(9945), pp.766-781.
- Nieuwenhuis, M.M.W., Jaarsma, T., van Veldhuisen, D.J., & van der Wal, M.H.L., 2012. Self-Reported Versus 'True' Adherence in Heart Failure Patients: A Study Using the Medication Event Monitoring System. *Netherlands Heart Journal*, 20(7-8), pp.313-319.
- Ondiege, B., & Clarke, M., 2017. Investigating User Identification in Remote Patient Monitoring Devices. *Bioengineering*, 4(3), pp.1-26.
- Onoruoiza, S.I., Musa, A., Umar, B.D., & Kunle, Y.S., 2015. Using Health Belief Model as an Intervention to Non Compliance with Hypertension Information among Hypertensive Patient. International Organization of Scientific Research. *Journal of Humanities and Social Science*, 20(9), pp.11-16.
- Perdamaian, T.K., Manus, W.C., Periska, S.D., & Steffiasih, N.N.P.A., 2020. The Impact of Bina Keluarga Lansia Program on the Quality of Life of Elderly in Sleman, Yogyakarta. *Jurnal Kesehatan Masyarakat*, 15(3), pp.324-330.
- Periyakoil, V.S., Neri, E., & Kraemer, H., 2016. Patient-Reported Barriers to High-Quality, End-of-Life Care: A Multiethnic, Multilingual, Mixed-Methods Study. *Journal of Palliative Medicine*, 19(4), pp.373-379.
- Rajpura, J., & Nayak, R., 2014. Medication Adherence in a Sample of Elderly Suffering from Hypertension: Evaluating the Influence of Illness Perceptions, Treatment Beliefs, and Illness Burden. *Journal of Managed Care Pharmacy*, 20(1), pp.58-65.
- Ribeiro, F., Gallego-Urrea, J.A., Jurkschat, K., Crossley, A., Hassellöv, M., Taylor, C., Soares, A.M.V.M., & Loureiro, S., 2014. Silver Nanoparticles and Silver Nitrate Induce High Toxicity to *Pseudokirchneriella subcapitata*, *Daphnia magna* and *Danio rerio*. *Science of the Total Environment*, 466-467, pp.232-241.
- Salama, A.M., 2018. Utilizing Health Belief Model to Enhance the Preventive Behavior againts Iron-Deficiency Anemia among Pregnant Women. *IOSR Journal of Nursing and Health Science*, 7(2), pp.59-69.
- Shankar, A., McMunn, A., Banks, J., & Steptoe, A., 2011. Loneliness, Social Isolation, and Behavioral and Biological Health Indicators in Older Adults. *Health Psychology*, 30(4), pp.377-385.
- Sudarmaja, I.M., Swastika, I.K., & Ariwati, N.L., 2020. Peningkatan Kualitas Hidup Lansia Melalui Pelayanan Kesehatan Dan Edukasi Kesehatan Secara Personal Pada Lansia Di Desa Melinggih Payangan Gianyar Bali. *Udayana*, 19(4), pp.490-494.
- Uchino, B.N., 2006. Social Support and Health: A Review of Physiological Processes Potentially Underlying Links to Disease Outcomes. *Journal of Behavioral Medicine*, 29(4), pp.377-387.
- Van Der Laan, D.M., Elders, P.J.M., Boons, C.C.L.M., Beckeringh, J.J., Nijpels, G., & Hugtenburg, J.G., 2017. Factors Associated with Antihypertensive Medication Non-Adherence: A Systematic Review. *Journal of Human Hypertension*, 31(11), pp.687-694.
- Yazdanpanah, Y., Moghadam, A.R.S., Mazlom, S.R., Beigloo, R.H.A., & Mohajer, S., 2019. Effect of an Educational Program based on Health Belief Model on Medication Adherence in Elderly Patients with Hypertension. *Evidence Based Care Journal*, 9(1), pp.52-62.
- Yue, Z., Li, C., Weilin, Q., & Bin, W., 2015. Application of the Health Belief Model to Improve the Understanding of Antihypertensive Medication Adherence Among Chinese patients. *Patient Education and Counseling*, 98(5), pp.669-673.
- Yuliati, A., Baroya, N., & Ririanty, M., 2014. Perbedaan Kualitas Hidup Lansia yang Tinggal di Komunitas dengan di Pelayanan Sosial Lanjut Usia. *Jurnal Pustaka Kesehatan*, 2(1), pp.87-94.