

*Challenges in Nursing Education and Research*

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THE EFFECTIVENESS OF THEORY-BASED LOW- SODIUM DIET EDUCATION ON LOW-SODIUM DIET ADHERENCE AMONG ELDERLY WITH HYPERTENSION

# Asnil Adli Simamora1, Asniar2\* and Endang Mutiawati3

*lMaster Program of Nursing Science, Faculty of Nursing, Universitas Syiah Kuala 2Department of Community Health Nursing, Faculty of Nursing, Universitas Syiah Kuala 3Departement of Neurology, Faculty of Medicine, Universitas Syiah Kuala*

**Abstract:** Low sodium diet plays an important role in lowering blood pressure in hypertensive clients. However, to gain the most benefit of the diet, adherence to the diet is needed to be improved. A theory-based low-sodium diet education might improve the adherence of low sodium diet among hypertensive elderlies. This study aims to examine the effectiveness of theory-based low-sodium diet education on a low-sodium diet adherence in the elderly with hypertension. The study employed a quasi-experiment with design one group pre-test post-test design. A sample of 88 respondents who were recruited using purposive sampling participated in the study. The pre-test and post-test data were collected by Dietary Sodium Restriction Questionnaire (DRSQ). The data were analysed with paired t-test. The findings show that significant difference on mean of attitude, subjective norm and perceived behavioural between before and after the intervention (p-value 0.000 < 0.05). The study indicated that determinant of adherence, namely positive attitude, subjective norms and perceived control behaviour were increased significantly after receiving theory- based low-sodium diet education. Therefore, the findings contributed as an evidence of effectiveness and feasibility of theory-based low-sodium diet education to be performed among hypertensive elderlies in Indonesia.

***Keywords:*** Hypertension, Theory-Based Low-sodium Diet Education, Adherence, Elderly

## INTRODUCTION

Hypertension is a global health problem faced by many countries in the world, especially in the elderly. the prevalence of hypertension occurs diferences causes throughout the regions. The prevalence of hypertension as much as 27% in Africa

**Corresponding Author:**

Asniar. Department of Community Health Nursing, Faculty of Nursing, Universitas Syiah Kuala, Banda Aceh, Indonesia, 23111

Email: [asniar@unsyiah.ac.id](mailto:asniar@unsyiah.ac.id)

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and the prevalence of hypertension in American as much as 18% (WHO, 2016). The number of patients with hypertension in Korea as many as 8.9 million people in the year 2016 (Kim & Cho, 2018). Indonesia is one of the developing countries the number of elderly patients with hypertension in the age 55 – 64 years upto 55.2%, then at the age of 65–74 years total of 63.2% and at the age of ≤75 years total 69.8% (Indonesian Ministry of Health, 2018). The prevalence of hypertension in Indonesia by 25.8% 2013. Then, in the year 2016, it showed an increased prevalence of hypertension amounted to 32.4% of (Ministry of Health, 2013; 2016).

Most of the hypertension suffered by the elderly is systolic hypertension and isolated systolic hypertension (WHO, 2012). Because the effect of stiffness in the aorta as well as omition of the elasticity of the arteries that occurs with increasing age, the stiffness of the arteries lead to increased systolic blood pressure and further reduction of blood pressure diastolic so that the pulse pressure increases and finally produces isolated systolic hypertension (Avci et al., 2016; Benjamin et al., 2017) If hypertension is not controlled it can lead to increased risk of stroke, ischemic heart disease, heart failure, kidney disease (Rodriguez, 2017; Guwatudde, 2015)

Based on an epidemiological point of view, a person suffering from hypertension is estimated because there are some factors that influence it, one of them is consuming salt intake excess (Indonesia Ministry of Health, 2013). Management of hypertension in the elderly can be performed with the therapeutic action of non-pharmacological in the form of lifestyle modifications with a set pattern of foods by limiting the intake of salt (Black & Hawks, 2014). This is inline with a study that conducted by who mentioned that reduction of salt is 5–6 g/day would contribute a big effect on blood pressure reducing, less than 5.39 mmHg for systolic blood pressure and

-2.82 mmHg for diastolic blood pressure (Feng, et al., 2013). In addition, Yang, et

al. (2018) also found that salt reduction can lower hypertension significantly by

10.18 mmHg. Furthermor, Yulistina et al (2017) found that there was a significant relationship between hypertension with the intake of salt is characterized by the value of significance p = 0.000 < 0.05 It showed that the higher the intake of salt consumed, the higher the risk of hypertension.

Compliance of low-sodium diet is the result that was formed through attitudes, subjective norms and control perceived behaviour (Ajzen, 1991). Alberta, et al. (2016) explicated that the compliance of low-sodium diet among elderly with hypertension was formed by attitude toward the behaviour, subjective norms, and control of perceived. Akhondzadeh, et al. (2017) also mentioned that compliance of low-sodium diet is influenced by attitude (P <0.001), subjective norms to dietary sodium is limited (P <0.001), and the control of perceived behaviour (P <0.001).

The most important strategy to increase active participation and improve adherence to the patient in the process of the management of the disease can be done with health education (Vasan, et al., 2001). One of the strategies that were proven to improve compliance with low-sodium diet is Theory-based Low Sodium Diet Education (Welsh et al., 2010). Akhondzadeh, et al. (2017) mentioned that there is significant differences between the intervention group and the control group in terms

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of sodium intake 6 weeks after the intervention (p=0.0023) and 12 weeks after the education program there is a significant difference between the intervention and control groups, respectively (p=0.036). Welsh et al (2013) obtain results that sodium intake of food is lower in the intervention group (F=7.3, df=1.29, p=0.01) and conclude that educational programs are designed carefully has the potential to produce compliance with a diet low in sodium.

Strategy Theory-based Low Sodium Diet Education can be implemented using the approach Health Promotion Model, where Kamran, et al. (2015) mentions that the components of the Health Promotion Model can affect the low-sodium diet compliance. In addition, research conducted by Fatmi, et al. (2017) also showed the result that there is a significant relationship of Health Promotion Model compliance and hypertension diet.

North Sumatra the number of suffering from hypertension reported as much as 50%, prevalence hypertension most suffered by the elderly with the amount of 22% (Provincial Health Office of North Sumatera, 2015). Furthermore, Public Health Centre of Bandar Khalipah, Percut Sei Tuan sub-district documented that, in 2017, the number of elderly suffering from hypertension as much as 845 people. Considering the prevalence, an education program to improve compliance with low-sodium diet in elderly people with hypertension is essentially needed. Therefore, this study is aimed to examine the effectiveness of theory-based low sodium diet education in the elderly with hypertension, particularly in Percut Sei Tuan sub-district.

## OBJECTIVES

The purpose of this study is to examine the effectiveness of theory-based low-sodium diet education towards increasing the determinant of a low-sodium diet compliance in the elderly with hypertension in sub-district of Percut Sei Tuan.

## METHODS

This study is a quasi-experimental one group pre-test-post-test design. The sample in this study of 88 elderly people above 60 years of age in sub-district of Percut Sei Tuan, recruited with purposive sampling technique. Data was collected using Dietary Sodium Restriction Questionnaire (DSRQ) developed by Wicaksana and Wang (2018). Instrument DSRQ there are 14 question items with 3 components in it namely the control of behaviour is based, attitude and subjective norm. with 5 alternative answers using the Likert scale, data collection on the intervention group started with pre-test, which gives the instrument Dietary Sodium Restriction Questionnaire to be filled. Then plan educational activities low-sodium diet in elderly hypertensive patients will be done by scheduling an appointment for a home visit and arrange time frames as agreed, the next post-test will be done at the time 1 day after the whole meeting on the activities of the health education done by giving back the instrument the determinant

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of a low-sodium diet compliance to be filled. Data analysis was done by using SPSS program, include descriptive analysis, the statistical test used is the test kolmogrov Smirnov, Wilcoxon and paired sample t test.

## RESULTS AND DISCUSSION Demographic Characteristics

Demographic of characteristics can be seen from table below. The table below is a description of the characteristic differences based on age, gender, ethnicity, religion, education, occupation, income, marital status, number of children, duration of hypertension and a history of taking the drug.

**Table 7.1** Demographic Data of Study Respondents.

|  |  |  |
| --- | --- | --- |
| *Demographic Characteristics* | *F* | *%* |
| **Age** |  |  |
| 60 Years – 74 Years | 62 | 70.5 |
| 75 Years – 90 Years | 25 | 28.4 |
| Above 90 Years | 1 | 1.1 |
| **Gender** |  |  |
| Men | 36 | 40.9 |
| Women | 52 | 59.1 |
| **Rates** |  |  |
| Melayu | 12 | 13.6 |
| Karo | 4 | 4.5 |
| Simalungun | 4 | 4.5 |
| Pakpak | 3 | 3.4 |
| Mandailing | 28 | 31.8 |
| Jawa | 32 | 36.4 |
| Toba | 3 | 3.4 |
| Nias | 2 | 2.3 |
| **Religion** |  |  |
| Islam | 57 | 64.8 |
| Christian protestant | 23 | 26.1 |
| Catholic | 8 | 9.1 |
| **Education** |  |  |
| No School | 1 | 1.1 |
| SD | 2 | 2.3 |
| JUNIOR | 3 | 3.4 |
| High school | 61 | 69.3 |
| Academy | 9 | 10.2 |
| College | 12 | 13.6 |

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|  |  |  |
| --- | --- | --- |
| **Job** |  |  |
| Work | 45 | 51.1 |
| Does Not Work | 43 | 48.9 |
| **Income** |  |  |
| Above Rs. 2.000.000, - | 37 | 42.0 |
| Under Rs. 2.000.000, - | 51 | 58.0 |
| **Marriage** |  |  |
| Mating | 49 | 55.7 |
| No Married/Widow/Widower | 39 | 44.3 |
| **The Number of Children** |  |  |
| > 2 Children | 58 | 65.9 |
| < 2 Children | 26 | 29.5 |
| Do Not Have Children | 4 | 4.5 |
| **Old Suffer from Hypertension** |  |  |
| ≤ (Below) 1 Year | 16 | 18.2 |
| > (More than) 1 Year | 72 | 81.8 |
| **History Drinking Drug** |  |  |
| ≤ (Below) 1 Year | 14 | 15.9 |
| > (Greater than) 1 Year | 74 | 84.1 |

Illustrates the age of the elderly patients with hypertension in the working Area Puskesmas Bandar Khalipah sub-district of Percut Sei Tuan as many as 62 people (70.5%) aged 60 to 67 years and most of the sex female that is 52 people (59.1%) and 32 elderly (36.4%) of monosyllabic java and as many as 57 of the elderly (64.8 percent) adheres to the religion of Islam by level of education seniors that graduated from high school as many as 61 people (by 69.3%). Most of the elderly that 45 people (51.1% of) still work. Then, as many as 51 people (58%) have an income of < Rp. 2,000,000. as many as 53 people (of 60.2%) of the elderly are married and 58 people (to 65.9%) have children more than 2 people. as many as 72 people (81.8%) suffer from hypertension more than 1 year with a history of drink drugs 74 people (84.1%) more than 1 year.

## The Influence of the Intervention Theory-Based Low-Sodium Diet Education Attitude, Subjective Norm and Behavioural Control Perceived in Elderly with Hypertension

The results of the distribution of attitudes, subjective norms and behavioural control perceived before and after intervention Theory-based Low Sodium Diet Education for one week have obtained results in the test then use paired t test and Kolmogorov

- Smirnov to see the difference in the value pre-test and post-test in elderly people with hypertension, data the pre-test and post-test the normal distribution against the determinants of compliance low-sodium diet elderly will be outlined in table form

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below. The results obtained from the answers of the elderly on the instrument Dietary Sodium Restriction Questionnaire.

The results of the test paired t-test the obtained value of sig. (2-tailed) which indicates that there is a significant increase between the value of the mean attitude, Norma subjective and behavioural control perceived before and after the intervention Theory-based Low-sodium Diet Education in elderly hypertensive patients by 0.000 < 0.05.

**Table 7.2** The Value of the Pre- and Post-Test Attitude, Subjective Norm And Behavioural Control Perceived

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| *Variable*  *(N = 88)* | *Pre-test* | | *Post-Test* | | *P Value* |
| *Mean* | *SD* | *Mean* | *SD* |
| Attitude | 18.41 | 1.945 | 27.20 | 1.306 | 0.000 |
| Norm  Subjective | 9.03 | 2.437 | 12.65 | 2.107 | 0.000 |
| Behavior Perceived Control | 17.57 | 1.993 | 27.15 | 1.255 | 0.000 |

The results of the research show that the influence of Theory-based Low-sodium Diet Education towards the improvement of the attitude of the elderly in carrying out low-sodium diet compliance in the elderly with hypertension. After the intervention Theory-based Low-sodium Diet Education the value of the attitude of the elderly patients with hypertension increased. The improvement can be achieved with how to build good attitudes to low-sodium diet with interventions that are regular for 1 week where researchers and patients interact as much as 3 times. The elderly gain confidence that he can and is able to change the daily eating habits with a diet low in salt.

The results of this study in line with research on the education of low-sodium diet based on the theory against the 104 respondents in Chǎh Bahǎr, Iran which revealed that education based on the theory is very effective in improving the attitude of positive compliance low-sodium diet (Rahimdel et al., 2019), a meta-analysis of intervention education low-sodium diet compliance-based theory gives a positive impact to the attitudes in increasing compliance with low-sodium diet (Redrigues et al., 2017). Another study about the improvement of the behaviour of the low-sodium diet theory- based on 32 elderly patients with hypertension in Surabaya shows that the influence between the attitude towards the improvement of compliance carry out low-sodium diet in elderly hypertensive patients (Alberta et al., 2016).

Intervention Theory-based Low-sodium Diet Education using the approach Health Promotion Model in this study proven to increase the attitude constructed by the benefits perceived of an action and the barriers that are perceived to act to carry out low-sodium diet compliance. Theory-based Low-sodium Diet Education presentation that the elderly has confidence in the compliance of low-sodium diet is something that must be implemented to maintain their health (Benefit perceived), and belief with obedient in carrying out the low-sodium diet can guarantee to keep his blood pressure

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remains normal (Barriers perceived). This is supported by a study in Iran reported that someone who have belief that positive of the benefits of follow a diet low in salt it will generate a positive attitude towards compliance (Welsh et al., 2010). So, any recommendations of health successfully, it is necessary to overcome the barriers to change diet in order to produce a positive attitude on the compliance of the diet (William et al., 2012).

Statistically intervention Theory-based Low-sodium Diet Education shown to affect subjective norms in the elderly with hypertension, visible differences increase significant value in the elderly with hypertension before and after the intervention for 1 week. Intervention Theory-based Low-sodium Diet Education proven to cause a good perception on social pressure or several people that are considered important in advocating to implement a low-sodium diet. Improvement can be achieved by the interaction of as much as 3 times with elderly family for 1 week.

The results of this study correspond with the results of research on the education of low-sodium diet based on the theory which asserts that education which is designed based on the theory of effective in the improvement of subjective norms positively to the low-sodium diet compliance (Rahimdel et al., 2019). Another study about the increase of low-sodium diet compliance-based theory show the influence of subjective norms to the intention to carry out a low-sodium diet in elderly hypertensive patients, subjective norms are assumed as a function of beliefs that specific a person agrees or does not agree to display a behaviour (Alberta et al, 2014). A meta-analysis of intervention education low-sodium diet compliance-based theory gives a significant positive effect on subjective norms in the improvement of low-sodium diet compliance in the short-term and long-term (Rodrigues et al, 2017).

Intervention Theory-based Low-sodium Diet Education based on by the approach Health promotion Model in this study can improve the subjective norm which is built by interpersonal influence and the influence of situational, intervention Theory- based Low-sodium Diet Education explained to the elderly and to the family that the people around (family) plays a role as a giver of feedback, motivation, support, or even become supervisors in order to ensure the compliance of the elderly in carrying out low-sodium diet (interpersonal influence), while the elderly themselves should also have the motivation to believe that what was done by the family solely for the sake of the healing of the elderly itself, in other words the sufferer have to have the confidence to trust and comply with what is recommended by the family (the influence of situational). It is the same with the results of a study conducted in Nepal with 180 hypertensive patients who show that family support as well as social can improve compliance with low-sodium diet to encourage optimism, self-belief and motivation that influence health behaviour change are negative (Ghimire et al., 2018).

The results of this study shows that the intervention Theory-based Low-sodium Diet Education has a significant effect in improving the control behaviour perceived elderly people with hypertension, the intervention Theory-based Low-sodium Diet Education help elderly people with hypertension in the raises the positive perception

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about easy or not to implement a low-sodium diet. The increase in the value of

significant is to look after the meeting as much as 3 times for 1 week.

This research is supported by the study of the educational low-sodium diet based on the theory which asserts that the educational low-sodium diet has a positive effect in improving the control behaviour perceived compliance low-sodium diet (Rahimdel et al., 2019). The results of another study conducted in Iran with 215 hypertensive patients a positive impact in improving the control behaviour perceived compliance implement a diet low in salt (Hatefnia et al., 2018).

Intervention Theory-based Low-sodium Diet Education that is done by using the approach Health Promotion Model in this study increase the value of the control behaviour which is perceived in the elderly with hypertension, which is formed from the affect that affect the activity and the perception of the self- ability. Theory-based low-sodium diet education presentation that the belief in the higher. The confidence of the elderly regarding the factors supporting the control of behaviours that are perceived will lead to a more positive (affect that affect activity). In addition, the elderly also has confidence in organizing and perform a behaviour, where self-belief was able to throw out the perception of factors that hinder the to display an expected behaviour, (perception of ability). This is in accordance with studies low-sodium diet compliance in Brazil with 108 respondents who indicated that someone with the perception of their ability is high usually consider the difficulty as a problem that must be experienced and not as obstacles that must be avoided. On the other hand, someone who is in doubt about their own capacity, consider difficult tasks as an obstacle. Thus, the greater a person’s confidence in their ability to follow a low-sodium diet, the more likely they are to follow these recommendations (Cornelio et al, 2009). Another study of the same is made in Nepal with 180 patients with hypertension showed the results that self - esteem, social acceptance, the reminder to act, family support is a significant determinant of overcoming obstacles in a low-sodium diet compliance among hypertensive patients (Ghimire et al., 2018).

## LIMITATION

This study experienced several limitation, such as difficulties in finding records of cases in Public Health Centre which documented the degree of hypertension, as well as the comorbid diseases. Therefore, it was difficult to control the degree of hypertension and comorbid disease among the study sample. However, in selecting the sample, the respondent who reported that they were suffered from one or more comorbid diseases were excluded.

## CONCLUSIONS

In this study, the effectiveness of theory-based low sodium diet education shows a

significant effectiveness in increasing the value of positive attitude, subjective norms

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and control behaviour compliance low-sodium diet in elderly people with hypertension in sub-district of Percut Sei Tuan. The community health nurse working in public health centres may implement theory-based low sodium diet education in improving adherence of low-sodium diet among elderly with hypertension. Community health nurses need to integrate the results of this study through more innovative method of diet education which tailor the needs of the elderly, and involve their families and community in planning and implementing the low-sodium diet education.

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