



The Effect of Providing Nutrition Education Dietary Approaches To Stop Hypertension (DASH) with Android-Based Media on the Knowledge and Attitudes of Hypertension Sufferers

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Abstract

Background: A diet for hypertension does not only require low salt. DASH diet nutrition education using Android-based media as an effort to increase understanding of the importance of consuming vegetables, fruit, nuts, fish, foods low in saturated fat in controlling hypertension. Research is to determine the effect of nutrition education using Android-based media on knowledge and attitudes in hypertension sufferers.

Methods: Types of research true express with a plan pretest-posttest control group design. Selection of research subjects with simple random sampling. The number of research subjects was 18 in the intervention group and 18 in the control group. Nutrition education in the intervention group was provided with Android-based media which was carried out for 4 weeks with a duration of 20 minutes for each research subject. The control group was not given information regarding the DASH diet. The data collected includes data on knowledge and attitudes regarding the DASH diet. The statistical analysis used is independent t test.

Results: The average knowledge score was from 64.17 ± 9.27 to 77.17 ± 6.48 in the intervention group and 58.89 ± 6.76 to 66.72 ± 8.09 in the control group. The average attitude score was from 49.17 ± 5.45 to 49.00 ± 5.53 in the intervention group and 49.00 ± 5.53 to 52.67 ± 4.02 . There was a difference in the average score of knowledge ($p = 0.009$), attitude ($p = 0.001$), difference in knowledge ($p = 0.035$) and attitude ($p = 0.001$) between the intervention group and the control group.

Conclusion: Nutrition education using Android-based media can increase knowledge and attitudes about the DASH diet in hypertension sufferers

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INTRODUCTION

Hypertension is one of the main risk factors for coronary heart disease, stroke, chronic kidney disease, ischemia and hemorrhage. Where heart disease and stroke are the causes of death in the world (World Health Organization, 2013)

The number of hypertension sufferers increases every year. Based on data World Health Organization stated that in 2018 40% of adults over 25 years of age had been diagnosed with hypertension (World Health Organization, 2018). Basic Health Research (2018), the prevalence of hypertension in Indonesia in 2013 in the population aged ≥ 18 years was 25.80%, increasing by 8.31% in 2018 to 34.11% (Risksedas, 2018). The prevalence of hypertension in Boyolali Regency is 38.60%. (Risksedas, 2018). Data from the 2020 Boyolali District Health Service shows hypertension as the highest non-communicable disease. In 2020 at Boyolali 1 Community Health Center, the population aged ≥ 15 years was 10,983 cases. An increase in the number of hypertension cases occurred at Boyolali 1 Community Health Center, amounting to 1,384 cases from 2019 in residents aged ≥ 15 years (Boyolali Health Service, 2020).

The increase in the incidence of hypertension is caused by factors that cannot be controlled, including age, gender, and family history, while factors that can be controlled include smoking habits, stress, alcohol consumption, lack of physical activity, high sodium food consumption habits, high sodium consumption habits. fat, less consumption of fruit and vegetables (Widyartha et al., 2016). Most of the risk factors for hypertension are caused by wrong eating behavior (RI Ministry of Health, 2019). Diet Dietary Approach to Stop Hypertension (DASH) is a recommended diet high in vegetables, fruits, nuts, fish, low-fat milk, high in protein, low in saturated fat and cholesterol (Hernandez-Vila, 2015).

A preliminary study in the work area of Boyolali 1 Community Health Center in September 2021 showed that 80% had insufficient knowledge regarding the meaning, causes, impacts and regulation of diet in hypertension sufferers. As many as 90% of hypertension sufferers only know that they

are prohibited from consuming foods that are high in salt, but still consume foods that are high in sodium, high in fat and low in fruit and vegetables. Apart from that, all of the experienced hypertension sufferers who were interviewed said they had never received nutritional education related to hypertension. A person's level of knowledge influences attitudes and behavior in efforts to control hypertension. Weraman research (2013) states that there is a relationship between knowledge about hypertension and blood pressure control (Weraman & Ndun, 2022) Apart from that, the results of a preliminary study based on interviews and observations of health workers at Boyolali 1 Community Health Center showed that the education provided was limited to using the lecture method through the media. leaflet with information about hypertension without diet management. The weakness of the lecture method is that it is easy to forget and has the lowest influence on knowledge (Amanda & Martini, 2018). Education through media leaflet has a disadvantage, namely that it is easy to forget the information conveyed. Ambarwati stated that leaflet has less attractiveness so it is not significant in increasing knowledge (Mutiawati & Mallisa, 2024).

One way to convey information about diet Dietary Approach to Stop Hypertension (DASH) can be done through nutrition education. Nutrition education is an educational approach that is useful for increasing knowledge and attitudes towards diet Dietary Approach to Stop Hypertension (DASH) for people with hypertension. Factors that influence the nutrition education process are methods, materials, officers who carry it out, and media to facilitate the delivery of information (Haryani et al., 2016).

User smartphone in Indonesia is very widespread. Use smartphone Apart from being a communication and information medium, it is also an alternative Android-based nutrition education medium (Novianto et al., 2019). Android based application via smartphone can be used as a media for nutrition education to increase knowledge with efficient, quality and accesscost effective (Sunjaya, 2019). In 2020, 90.75% of households in Indonesia will own and control at least one cell phone (BPS,

2020). According to Edgar Dale's theory, visual education is more effective in absorbing material so that it can improve knowledge and attitudes (Kamsiah et al., 2023). User smartphone with version android 1.3 amounted to 98% in Indonesia, so I took the initiative to create Android-based DASH diet nutrition education media without being connected to the internet, user friendly, It doesn't take long to operate. Based on the description above, researchers are interested in conducting research on Android application-based DASH diet nutrition education on knowledge and attitudes for hypertension sufferers.

METHODS

This research was conducted in the working area of Boyolali Community Health Center 1. Boyolali Community Health Center 1, Siswodipuran Village as the intervention area and Pulisen Village as the control area. Treatment is given once a week for 4 weeks by discussion. Meanwhile, the control group was only given standard minimum service interventions at the Community Health Center through leaflets without diet principles Dietary Approach to Stop Hypertension (DASH) with a frequency of one time pretest. Then the value is measured pre-test and post-test in both groups. This research is true experiment with the research randomized control trial design.

The research subject criteria are have and can use an Android cellphone, blood pressure $\geq 130/80$ mmHg, do not have comorbid kidney disease, willing to be a research subject, willing to take part in a series of research, aged 30-59 years, able to communicate well, minimum elementary school/equivalent education, no in a state of pregnancy.

Variable independent in this research is nutrition education Dietary Approach to Stop Hypertension (DASH) is Android based, while variable depend is knowledge and attitude towards Dietary Approach to Stop Hypertension (DASH). The research instrument for assessing knowledge and attitudes consists of structured questionnaires. The knowledge parameter is evaluated using a 20-item questionnaire containing questions about the definition of hypertension, the DASH diet, food selection based on DASH diet principles, and the impacts

of hypertension. Each question provides "True" and "False" answer options. Meanwhile, the attitude parameter is assessed through a 20-item questionnaire focused on DASH diet management in hypertension management. The response options for each item are "Strongly Agree," "Agree," "Disagree," and "Strongly Disagree," allowing respondents to select the option that best reflects their personal views. Bivariate analysis was carried out to analyze differences in knowledge and attitudes before the intervention, after the intervention and differences in knowledge and attitudes between the control and treatment groups. Differences in knowledge and attitudes before, after and differences in knowledge and attitude scores were tested using the Independent Sample T-test. In addition, an analysis of differences in knowledge and attitudes was carried out before and after the intervention in the treatment group uji Paired Sample T-test. This research has received research ethical approval from the Health Research Ethics Committee (Health Research Ethics Committee) Semarang Ministry of Health Polytechnic No.060/EA/KEPK/2020 which is valid from 31 January 2022 to 31 January 2023.

RESULTS AND DISCUSSIONS

Table 1 showed that most of the research subjects in the intervention group were aged 30 – 39 years (33.3%) and the control group were aged 40 – 49 years (50.0%). The age group between the intervention group and the control group did not differ with a p value = 0.135. Meanwhile, the incidence of hypertension according to the characteristics of Central Java province is highest among those aged 75 years and over (71.31%). The incidence of hypertension has shifted across groups middle age, However, age remains one of the factors causing hypertension that cannot be changed. As age increases, organ function and the body's hemodynamic function decrease. One of the decreases in organ function is a decrease in the elasticity of blood vessels, resulting in an increase in blood capillary resistance which lasts for a long time, causing hypertension.

The education of research subjects in the intervention group and control group was mostly high school/equivalent (66.7%).

Education between the intervention group and the control group did not differ with a p value = 0.917. Meanwhile, the incidence of hypertension according to the characteristics of Central Java province was highest with no education/never been to school (59.06%). Even though the research subjects have higher

education, they still experience hypertension, which is the reason why there are still research subjects who actually know the risk factors for hypertension, but do not maintain a healthy lifestyle, such as still consuming foods high in sodium and foods high in fat.

Table 1. Characteristics of Research Subjects

Characteristics	Intervention		Control	
	n (18)	%	n (18)	%
Age Group				
30 – 39 years old	7	38,9%	4	22,2%
40 – 49 years old	6	33,3%	9	50,0%
50 – 59 years old	5	27,8%	5	27,8%
Education				
Elementary School/Equivalent	2	11,1%	3	16,7%
Middle School/Equivalent	3	16,7%	2	11,1%
High School/Equivalent	10	55,6%	12	66,7%
College	3	16,7%	1	5,6%
Work				
Doesn't work	8	44,4%	9	50,0%
Private	4	22,2%	5	27,8%
Police	6	33,3%	4	22,2%
Nutritional status				
Normal	6	33,3%	3	16,7%
<i>Overweight</i>	5	27,8%	6	33,3%
Obesity 1	6	33,3%	5	27,8%
Obesity 2	1	5,6%	4	22,2%
Hypertension Category				
Stage 1 hypertension	7	38,9%	6	33,3%
Stage 2 hypertension	11	61,1%	12	66,7%

Most of the research subjects in the intervention group and control group did not work (50.0%). The work between the intervention group and the control group did not differ with a p value = 0.632. Meanwhile, the incidence of hypertension according to the characteristics of Central Java province is highest with non-working (44.40%). Categories do not work closely related to sedentary life style So a lack of physical activity will affect the working mechanism of muscles in regulating blood pressure. The type of work influences physical activity patterns which influence blood pressure.

The nutritional status of research subjects in the intervention group was mostly normal (33.3%) and 1 (33.30%) obese, while in the control group most of the nutritional status overweight (33.30%). The nutritional status

between the intervention group and the control group did not differ with a p value = 0.328. Meanwhile, the incidence of overnutrition in adults according to the characteristics of Central Java province is overnutrition (14.30%) and obesity (27.50%). Nutritional status according to BMI (Body Mass Index) in overweight research subjects. This nutritional status is closely related to the accumulation of fat in the abdomen which will affect the narrowing of blood vessels which will cause an increase in blood pressure. Apart from that, blood volume will affect blood pressure, increasing body weight will increase blood volume, resulting in increased blood pressure.

Most of the hypertension category was stage 2 in the intervention group (61.1%) and control group (66.7%). The hypertension category between the intervention group and

the control group did not differ with a p value = 0.351. Meanwhile, the incidence of hypertension according to the characteristics of Central Java province has increased in cases from 26.4% in 2013 to 34.1% in 2018. Meanwhile, most of the control respondents were aged 42-45 years, had

obesity II nutritional status (45.5%), deficit level energy intake (54.5%), deficit level fat intake (54.5%), deficit level sodium intake. (63.6%), deficit level potassium intake (100.0%), and light level physical activity (90.9%).

Table 2. Average Age, Body Mass Index, Diastolic and Systolic Research Subjects

Characteristics	Intervention	Control	<i>p</i> value
	Mean ± SD	Mean ± SD	
Age Group	(43,00 ± 8,31)	(44,94 ± 6,20)	0,135
Nutritional status	(24,74 ± 2,89)	(26,11 ± 3,82)	0,328
Systolic	(142,72 ± 8,44)	(144,94 ± 10,15)	0,351
Diastolic	(90,67± 6,22)	(88,06 ± 5,41)	0,679

Table 3. Differences in Knowledge and Attitudes Before and After Nutrition Education with Android-Based Media between the Intervention Group and the Control Group

Variable	Intervention Group	Control Group	<i>p</i> value
	Mean ± SD	Mean ± SD	
Nutrition Knowledge			
Before	64,17 ± 9,28	58,89 ± 6,76	0,059^a
After	77,17 ± 6,48	66,72 ± 8,09	0,009^a
ΔKnowledge	13,00 ± 7,34	7,83 ± 5,75	0,035^b
Nutritional Attitude			
Before	49,17 ± 5,46	49,00 ± 5,53	0,928^a
After	60,39 ± 4,25	52,67 ± 4,03	0,001^a
ΔEffort	11,22 ± 3,74	3,67 ± 2,95	0,001^b

^aindependent *t* test ^bpaired *t* test

Results independent *t* test showed that there was a difference in knowledge between the intervention group and the control group before receiving nutrition education (p value = 0.059). Meanwhile, the results of statistical tests showed that there were differences between the intervention group and the control group after receiving DASH diet nutrition education (p value = 0,059) and the average knowledge difference score (p value = 0.035), so it can be concluded that nutrition education is provided Dietary Approaches to Stop Hypertension (DASH) with Android-based media can increase knowledge in the intervention group, compared to the control group who were not given nutrition education with Android-based media. The increase in knowledge scores in the intervention group included the hypertension category, the DASH diet as a dietary pattern to reduce blood pressure, risk factors for hypertension that cannot be controlled, foods

that need to be limited according to the DASH diet principles, recommendations for using spices in cooking according to the principles DASH diet, and limiting drinks consumed according to DASH diet recommendations. In the control group, there was an increase in knowledge with a difference value of 7.83 ± 5.752 because hypertension-related diseases are diseases that are commonly known to the public, supported by the Covid-19 pandemic situation which has made people pay more attention to their health.

Nutrition education Dietary Approaches to Stop Hypertension (DASH) with Android-based media given 1 time a week 4 times personally with a duration of 20 minutes accompanied by discussion at each meeting can increase the research subject's knowledge about Dietary Approaches to Stop Hypertension. The increase in knowledge is likely due to Android-based media having the advantage

that research subjects can learn independently, practically, informatively so that they are easy to understand and receive information well. Apart from that, education through Android applications is more interesting and applicable because it involves many senses and provides variety which will affect long-term memory and can absorb information more quickly, so it can increase interest in learning which can indirectly increase knowledge (Torkian et al., 2020).

Another factor that causes increased knowledge is education that can personally provide support to research subjects so that they are more focused and ready to receive the information that will be provided and there is the possibility of subjects accessing information more than 4 times. Ningtyas's (2018) research states that health education using personal methods can increase knowledge (Ningtyas et al., 2018). Repeated exposure to information with the same material will increase familiarity with the stimulus received so that it will influence a person's knowledge (Anggraeni et al., 2020). Knowledge is a factor that plays a role in someone taking an action. Actions based on health knowledge will mean understanding how to take appropriate action to prevent hypertension and efforts to apply this knowledge in life (Yuliani et al., 2024).

The Android-based media used is designed with quizzes on Android-based media accompanied by scores, in accordance with one of the laws of learning according to Suprijanto which states that success in nutrition education for adults is by knowing where they succeed and fail, supported by solid information delivery. and clear. Apart from that, Android applications with visual displays of images and writing will involve many of the five senses. According to Notoatmodjo, humans are able to absorb 70% of information from what they do, 50% from what they see, 30% from audiovisuals, and 10% from what they read. This Android-based media combines the use of the five senses of sight, hearing and touch. So the increase in knowledge on research subjects is caused by more five senses being involved in the learning process. In line with research conducted by Firdaus (2024) which stated that there was a significant increase in

the average knowledge score with a p value of 0.001 through educational media that involved the senses of sight, hearing and touch (Firdaus & Laksana, 2024).

Other factors that influence knowledge include education. Education influences a person's mindset in the learning process, the hope is that the higher a person's education, the easier it will be to receive information. Thus, education is closely related to knowledge, a person with higher education has broader knowledge, making it easier to develop attitudes towards new values. The majority of research subjects had a high school/equivalent level of education, proving that the research subjects were able to understand educational information well. In line with Kilic (2016) who states that a person's level of education will influence a person's knowledge, the more information received will influence a person's knowledge which will then influence the person's behavior in accordance with the knowledge they have (Kilic et al., 2016). The higher the education, the easier it will be for someone to receive information so that the knowledge received is less than optimal (Mboi et al., 2022).

The independent t test showed that there were significant differences in attitudes between the intervention group and the control group before and after receiving nutrition education Dietary Approaches to Stop Hypertension (DASH) with Android-based media with p value = 0.001. The average attitude difference score shows a difference with a p value = 0.001, so it can be concluded that there is a change in attitude that supports the DASH diet. DASH diet nutrition education using Android-based media is an appropriate method for changing nutritional attitudes from less supportive to supportive. There is a change in attitude that supports the research subjects, namely support for limiting consumption of packaged foods, sausages, canned beans, fast food, sugar consumption of more than 4 tablespoons every day. Apart from that, support doing exercise every day, not drinking alcoholic drinks and smoking. Changes in attitudes are influenced by increased knowledge, where the more frequently the same information is received, the more it will influence a person's knowledge,

which will result in a person's awareness which will ultimately take an attitude in accordance with the knowledge they have (Yulanda & Rika, 2017). Attitude is a person's response after receiving stimulus from the environment (Natawirarindry et al., 2023). Knowledge has a role in shaping a person's attitude, knowledge influences a person to have confidence in deciding something (Sihombing et al., 2023). In line with Joshua West's research in the US (2017) which states that Android-based education regarding diet has succeeded in facilitating increased knowledge in forming attitudes to maintain user motivation (West et al., 2017).

CONCLUSION

The characteristics of the research subjects including age group, education, occupation, nutritional status, blood pressure category in the intervention group and control group were not different with a p value > 0.05. Android-based DASH diet nutrition education media can increase knowledge of hypertension sufferers. Android-based DASH diet nutrition education media can improve the attitudes of hypertension sufferers. It is recommended that further research control the sources of information received by research subjects.

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