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Telegram Chatbot as DASH Diet Education Media for Employees

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ABSTRACT

Hypertension and prehypertension are a unity of diseases caused by various risk factors that employees can experience. A diet known for patients who have high blood pressure is the DASH diet, and one of the efforts to prevent the incidence of hypertension is through education. Research objectives: Determine the effectof nutrition education through the Telegram Chatbot on increasing knowledge of the DASH diet in employees with hypertension. Methods: This type of research is Quasi-Experimental research. Pre-test and post-test research design with control group design. Results: In this study, the number of male respondents was higher, namely 18 people (58%), compared to female respondents, who were as many as 13 (42%). The average post-test scorewas greater at 92.12, while the pre-test was 70.61. The difference between the average pre-test and post-test was 21.51. The results of the t-test analysis obtained a p-value of 0.000 (<0.05). Conclusions: Telegram Chatbot media has an influence on changes in DASH dietary knowledge among employees with hypertension in Padukuhan Purbosari.

Keywords : Chatbot; DASH Diet; Nutrition Education; Hypertension; Employee; Telegram

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INTRODUCTION

Indonesia is currently facing a shift in the pattern of Communicable Diseases (CDs) to Non-Communicable Diseases (NCDs). The increasing prevalence of NCDs occurs due to unhealthy lifestyles and is spurred by urbanization, modernization, and globalization.(1) One of the NCDs that remains a major challenge in Indonesia is hypertension.(2)

High blood pressure is caused by various risk factors, including genetics, age, race/ethnicity, urban/rural, geography, gender, diet, obesity, stress, lifestyle, and hormonal contraceptive use.[3] Based on the Basic Health Research,(4) the prevalence of hypertension in the population aged >18 years in the Special Region of Yogyakarta was 32.86 % and increased compared to 2013, which was 25.8%.

High blood pressure can be experienced by workers in all professions, one of which is employees. A worker must not only complete their main duties and functions but also complete other tasks. This situation can demand energy, time, and thoughts so that employees can have high blood pressure.(5)

A diet that is known to be effective for hypertensive patients is the DASH diet – *Dietary Approach to Stop Hypertension* or a diet of vegetables and fruits containing dietary fiber (30 grams/day) and certain minerals (potassium, magnesium, calcium). At the same time, salt intake is limited.(6) The problem of hypertension can be prevented by controlling risky behaviors such as smoking, unhealthy diet (less consumption of vegetables and fruits, excessive salt consumption), obesity, lack of physical activity, alcohol consumption, and stress. A person's behavior about health is determined by their knowledge, attitudes, beliefs, traditions, and so on. In this case, determining attitudes, knowledge, thoughts, beliefs, and emotions plays an important role.(7)

Based on the 2018 Riskesdas data, the prevalence of hypertension in Gunung kidul Regency was 39,25%. This figure is the highest when compared to other districts in the Special Region of Yogyakarta Province, and it is also above the national prevalence of hypertension (34,11%).

The media used will affect the outcome of the nutrition education process.The existence of media in the educational process is very helpful for learners to understand what they are learning better. The selection and use of media must be appropriate so that the objectives can be achieved easily.(8)

The rapid advancement of technology can be used as an opportunity and method for the educational process. Technological advances in smartphones continue to be developed to access a larger number of web-based applications. One of the nutrition education media that can be used in today's digital era is telegram. Telegram is currently used in almost all parts of the world. New technology in telegram can be used to develop bot-based applications. Telegram messenger is a messaging application that is in great demand because of the bot technology offered.(9)

Bots, also known as robots, help humans facilitate activities automatically. Telegram bots qualify as learning media because they can help create a teaching and learning process. The interaction process can take place in real time, and this allows for distance learning to take place more effectively and efficiently.(10) Therefore, it is possible that telegram can be an effective form of educational media.

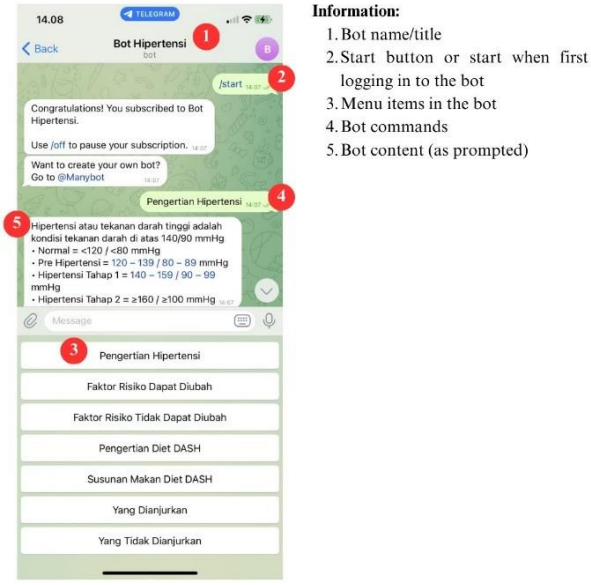

Figure 1. The Layout of Hypertension Telegram Chatbot

METHOD

A quasi-experimental design was applied to understand the effectiveness of bot telegram. In this study, the experimental and control groups were first given a pretest to determine the extent of employees' initial knowledge before being given DASH Diet education. The employees then were given treatment, namely DASH diet education using Telegram Chatbot for the experimental group and the Ministry of Health E-Leaflet for the control group. Furthermore, the experimental and control groups were given a post-test to know the effect of the DASH diet education.

The population in this study were residents of Purbosari Village, Wonosari, Gunung Kidul, who work as employees, with a total of 81 people with hypertension. The research sample was determinedby purposive sampling technique.

The bivariate analysis test used was a paired sample t-test to determine the effectiveness of nutrition education methods about the DASH diet through Telegram Chatbot and the Ministry of Health's E- Leaflet was analyzed using each group's average increase in knowledge score.

RESULT

The characteristics of respondents are based on the identity of respondents of the same groups. The characteristics of respondents used in this study are presented in the form of tabulations, the results of data processing of respondent characteristics can be seen in Table 1.

Respondents in this study were categorized into two groups: the experimental and the control group. These respondents are residents employed with high blood pressure levels ranging from ≥120/80 mmHg. Each group comprised 31 respondents. The findings revealed that most respondents were male, aged between 20 and 32 years.

Table 1. Characteristics of the Respondents

	Experiment Group		Control Group	
	(n)	(%)	(n)	(%)
Sex				
Male	18	58.06	15	48.39
Female	13	41.94	16	51.61
Age (Years)				
20 – 32	22	70.97	5	16.13
33 – 40	8	25.81	8	25.81
41 – 48	0	0	7	22.58
49 – 56	1	3.23	8	25.81
57 – 64	0	0	5	8.06
Education				
Basic Education (Elementary-Junior High)	0	0	3	9.68
Secondary Education (High School)	16	51.61	19	61.29
Higher Education (Diploma, Bachelor, and Master's Degree)	15	48.39	9	29.03

As per the study results, it is evident that individuals with above-normal blood pressure levels are predominantly male. This finding aligns with prior research,[11] which indicates that men are 1.18 times more likely to develop hypertension compared to women.

The respondents in this study are citizens employed in various capacities, where job roles entail not only fulfilling primary duties but also completing additional tasks delegated by superiors. Such circumstances can demand significant energy, time, and cognitive effort, potentially leading to hypertension or high blood pressure in some employees.[5] Additionally, psychosocial stress emerges as a risk factor for hypertension.[12]

Based on the study outcomes, it is observed that hypertension or high blood pressure predominantly affects individuals in their productive years. This corresponds with existing research,[13] which underscores the correlation between lifestyle choices and hypertension incidence among individuals of productive age. Key influencing factors include salt intake, smoking, and insufficient physical activity.

Based on Figure 2, it can be seen that there was an accumulation of additional correct points for each question item before and after the intervention. The questions most frequently answered correctly during the pre-test were number 6 and number 7 regarding recommended (physical activity) and non-recommended lifestyle patterns (fat consumption), with 30 respondents who answered correctly.

Meanwhile, the question that was answered most incorrectly during the pre-test was number 8 regarding lifestyle patterns that are not recommended (consumption of preserved foods), with a total of 12 respondents who answered correctly. Meanwhile, in the post-test, the questions with the correct answers were numbers 1, 2, 3, 6, and 7, namely regarding the meaning of hypertension, risk factors for hypertension, the DASH diet, recommended (physical activity), and not recommended (fat consumption) lifestyles.

Meanwhile, the questions most often answered incorrectly during the post-testwere numbers 8 and 9 regarding lifestyle patterns that are not recommended (consumption of preserved foods and caffeine).

The distribution of respondents' knowledge responses in the experimental group is illustrated in Figure 2.

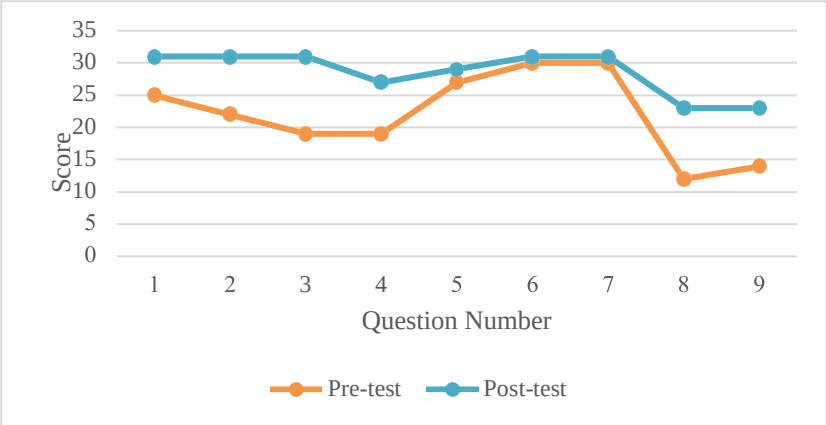

Figure 2. Pre-test and Post-test Score among Respondents of Experimental Group

Table 2 below shows the average knowledge in the experimental group before and after the intervention using the Telegram Chatbot platform.

Table 2. Analysis of the Average Knowledge Score of the Experimental Group

	Mean	**SD**	**Minimum**	**Maximum**	***p-value***	**n**
Pre-test	70.61	15.06	33.33	100.00	0.000	31
Post-test	92.12	6.54	77.78	100.00		

Based on the data presented in Table 2, a significance value in the form of a p-value (0.00) < α (0.05) indicates a notable difference in the average values between the pre-test and post-test phases. Furthermore, an increase in the average knowledge score within the experimental group was observed before and after the intervention. Prior to the intervention, the average score was 70.61, with a standard deviation of 15.06. Respondents achieved a minimum score of 33.33 and a maximum score of 100.00. Conversely, following the intervention, there was an elevation in the average score to 92.12, with a standard deviation of 6.54. The minimum score obtained by respondents was 77.78, while the maximum remained at 100.00.

Table 3**.** Analysis of Average Knowledge Score of Control Group

	Mean	**SD**	**Minimum**	**Maximum**	***p-value***	**n**
Pre-test	73.48	10.61	44.44	100.00	0.000	31
Post-test	84.78	10.74	66.67	100.00		

Based on Table 3, there was an observed increase in the average knowledge score of the control group before and after the intervention. Before the intervention, the average score was 73.48, with a standard deviation of 10.61. Respondents attained a minimum score of 44.44 and a maximum score of

100.00. Conversely, following the intervention, there was an elevation in the average score to 84.78 with a standard deviation of 10.74. The minimum score achieved by respondents was 66.67, while the maximum remained at 100.00.

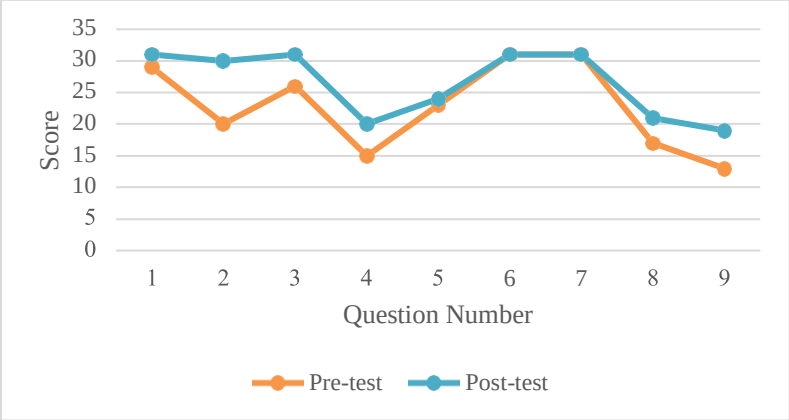

Figure 3. Distribution of Pre-Test and Post-Test Knowledge Questionnaire Answers in the Control Group

Based on Figure 3, it is evident that there is an accumulation of correct point additions to each question item both before and after the educational intervention. The questions most frequentlyanswered correctly during the pre-test were numbers 6 and 7, of recommended lifestyle (physical activity) and not recommended practices (fat consumption), with a total of 31 respondents answering correctly. Conversely, the questions most frequently answered incorrectly during the pre-test were found at number 9 concerning lifestyle practices that are not recommended (caffeine consumption), with a total of 13 respondents providing correct responses. In the post-test, the questions most frequently answered correctly were numbers 1, 3, 6, and 7, addressing understanding of hypertension, the DASH diet, recommended lifestyle (physical activity), and not recommended practices (fat consumption). Conversely, the question most frequently answered incorrectly during the post-test was number 9, regarding lifestyle practices that are not recommended (caffeine consumption).

Table 3 shows the results of the average knowledge analysis in the control group before and after the intervention utilizing the Ministry of Health's E-Leaflet media.

Hypothetical Test

The hypothetical test utilized in this study is the Parametric Test using the Paired Sample t-test (Table 4). This test was employed to ascertain the impact of nutrition education on knowledge within both the experimental and control groups, specifically among employees with hypertension in Village Purbosari.

Table 4. Paired Sample T-Test Result

Group	Mean	Std. Deviasi	*p-value*	n
Experiment	-21.50	13.44	0.000	31
Control	-11.83	10.71	0.000	31

According to the results of parametric testing utilizing the Paired Sample t-test, a p-value of 0.000 ($p<0.05$) was obtained in both the experimental and control groups. This indicates a significant influence of nutrition education on respondents' knowledge about hypertension and the DASH diet in both the experimental and control groups (Table 5).

Table 5. Comparison Test Score Results of Experimental and Control Group

	Experiment		**Control**	
	Pre-test	***Post-test***	***Pre-test***	***Post-test***
Minimun	33.33	77.78	44.44	66.67
Maximum	100.00	100.00	100.00	100.00
Average	70.61	92.11	73.48	85.30
Average Difference	**21.51**		**11.83**	

Based on Table 5 above, it is evident that the average pre-test and post-test scores of the experimental group increased subsequent to the intervention, with an average score difference of 21.51. Similarly, the pre-test and post-test scores of the control group also witnessed an increase, showing an average score difference of 11.83. Notably, the average disparity in scores between the experimental and control groups favored the former, suggesting that the utilization of intervention media (Telegram Chatbot) within the experimental group proves to be more efficacious compared to the intervention media employed within the control group (Ministry of Health E-Leaflet).

DISCUSSION

The Effect of Nutrition Education on Increasing Respondents' Knowledge Regarding Hypertension and the DASH Diet

Education is a fundamental factor significantly influencing an individual's knowledge (14). It constitutes a dynamic interaction process between individuals and their environment, fostering—advancements in knowledge, skills, and attitudes. Through the educational journey, individuals acquire insights previously unknown to them.[15]

The findings reveal a notable variance in the average level of nutritional knowledge pre- and post-nutritional education across the experimental and control groups. Statistical analysis using the T-test demonstrates a significant impact, with a p-value of 0.000 ($\alpha<0.05$) observed in both the experimental and control groups.

The findings of this study align with prior research concerning the impact of educational interventions on enhancing public knowledge, demonstrating an increase of 14.4%.[16] Furthermore, another study concluded that educational interventions utilizing WhatsApp effectively disseminate information and enhance knowledge among Moslem-Based High School students.[17] Additionally, other investigations have indicated that nutrition education influences dietary behaviors and nutritional knowledge among elementary school-aged children participating in programs based on Social Cognitive

Theory.[18]

Regarding the assessment of changes in scores post-intervention, both pre-test and post-test evaluations were administered with a 15-day interval. This practice is consistent with Notoatmodjo's theory, which advocates for a gap of ideally 15-30 days between pre-test and post-test assessments. A shorter interval risks respondents recalling initial test questions, while a longer interval may lead to changes in the variables under scrutiny.[19]

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The effectiveness of utilizing Telegram chatbot media and the Ministry of Health e-leaflet

The discrepancy in average knowledge levels before and after the intervention among the experimental and control groups was assessed by examining the delta (Δ) or comparing the disparity in average pre-test and post-test scores within the experimental and control groups. Based on the findings of the conducted data analysis, the pre-test to post-test score transition in the experimental group was from 70.61 to 92.12 (Δ=21.51), whereas in the control group, the score shifted from 73.48 to 85.31 (Δ=11.83).

The increase in knowledge scores within the experimental group surpassed that of the control group. This discrepancy can be attributed to the experimental group's utilization of Telegram Chatbot media, which disseminates information in a point-based format. Conversely, the control group relied on the Ministry of Health's E-Leaflet media, which delivered numerous messages pertaining to hypertension. This observation aligns with the findings of Sumartono's research, which suggest that an excess of messages may impede comprehension and retention due to the constraints of reading time.[21] Furthermore, this outcome finds reinforcement in the testimony of a key informant, who posits that excessive textual content in print media, such as posters, diminishes attractiveness and comprehension.[21]

CONCLUSIONS AND RECOMMENDATIONS

It can be inferred that there exists an influence resulting from the provision of nutrition education via Telegram Chatbot or through the Ministry of Health's E-Leaflet on the alteration of hypertension knowledge and adherence to the DASH diet among employees in Padukuhan Purbosari. The method of nutrition education through the Telegram Chatbot exhibits greater effectiveness compared to that delivered via the Ministry of Health's E-Leaflet for employees in Padukuhan Purbosari. Drawing from these conclusions, it is recommended that Telegram Chatbot be utilized as an educational platform for targeted employees. Furthermore, future investigations may consider incorporating additional inquiries pertaining to the DASH diet within this study.

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