Online Health Education's Influence on Productive-Age's Population Knowledge, Attitude and Practice Towards Hypertension

Salma Firdaus[1,2], Zefo Kiyosi Wibowo[1,2], Clara Alverina[1,3], Clonia Milla[1,2], Bendix Samarta Witarto[1,2], Reinaldi Yakobus[1,3], Abdurrahman Fadlilah Amanu[1,3], Muhammad Nuh Ihsan[1,2,] Muhamad Brahma Dwianandra[1,2], Maulana Bagus Adi Cahyono[1,2], Rimbun[4*], Sulistiawati[5]

[*]corresponding author email address: rimbun@fk.unair.ac.id
[1]Medical Program, Faculty of Medicine, Universitas Airlangga, Surabaya 60132, Indonesia
[2]*Division of Research and Academic, Asian Medical Students' Association, Universitas Airlangga, Surabaya 60132, Indonesia*
[3]*Division of Community Outreach, Asian Medical Students' Association, Universitas Airlangga, Surabaya 6013*2, Indonesia
[4]Department of Anatomy, Histology, and Pharmacology, Faculty of Medicine, Universitas Airlangga, Surabaya 60132, Indonesia
[5]Department of Public Health and Preventive Medicine, Faculty of Medicine, Universitas Airlangga, Surabaya 60132, Indonesia

Abstract

Introduction: Hypertension, the silent killer, affects around one billion people worldwide. Therefore, efforts are necessary to raise public awareness. **Objective:** This research aims to assess the interactive online health education's impact on hypertension public health domain in the productive-age population in Surabaya, East Java, Indonesia. **Method:** This non-randomized quasi-experimental study assessed the level of knowledge, attitudes, and practices regarding awareness of hypertension based on the comparison of pre-tests and post-test results after a virtual educational intervention. Recruitment of the participants was performed using a consecutive sampling method. Resident living in Ketabang and Pacar Keling sub-districts of Surabaya were recruited for this study. The study consisted of thirteen participants who took participated in a three-session educational intervention delivered virtually via Zoom Cloud Meetings. The study results were gathered using pre-test and post-test questionnaires via Google Forms. The knowledge domain was compared using a paired t-test, while the attitude and practice domains were analyzed using the Wilcoxon signed-rank test. **Results:** After the educational intervention, the research disclosed significant differences between the knowledge and practice domain's pre-test and post-test mean scores (57.69 vs. 66.92; $p = 0.046$; and 31 vs. 32; $p = 0.020$). However, an examination of the attitude domain revealed indifference (33 vs. 34; $p = 0.306$). The impact of intervention via interactive online learning was demonstrated in this study by considerable improvements in knowledge and practice. However, the result of participants' attitudes did not alter significantly in this study. **Conclusion:** This study implies that providing public health promotion and education through online platforms can be used to improve hypertension awareness. Further better-designed and wider-scaled studies with a control group are needed to confirm our findings.

Keywords: hypertension; knowledge; attitude; practice; pandemic; online education

1. Introduction

Hypertension is a disease that raises the risk of many other diseases. It is a non-communicable disease known as the "silent killer", most people with hypertension have neither symptoms nor warning signs [1]. Worldwide, hypertension affects an estimated 1.13 billion individuals. Men have a higher prevalence of hypertension than women, with one in every four men and one in every five women suffering from hypertension. [1]. According to the 2018 Baseline Health Research, the prevalence of hypertension in the population over 18 years old in Indonesia reached 34.1 percent. This figure was higher than the previous year's prevalence of 25.8 percent [2]. East Java Province has an estimated 12 million residents with hypertension aged 15 or older, with men accounting for 48 percent and women accounting for 52 percent [3].

Knowledge is considered to be one of the factors influencing the case of hypertension as it determines how a person's should manage lifestyle behaviors. Attitude, defined as the reaction to a certain stimulus, predisposes the actions or behavior and readiness and willingness to practice a lifestyle or certain behavior. To improve the community's knowledge and concern about hypertension, it is necessary to make efforts to encourage social awareness. Providing education through health promotion and education can be used to improve attitude and practice in preventing hypertension. Good knowledge will encourage patients to behave for a better lifestyle in controlling hypertension [4]. Some of the methods used for health promotion are direct face-to-face education session [5].

However, since the COVID-19 pandemic, the number of direct interactions is decreasing. Control measures have been widely implemented in countries, from quarantine to social isolation [6]. These policies also have an impact on one-on-one educational and counseling activities. As a result, online educational platforms are becoming more popular [7,8]. Many online platforms have also been used to tackle health promotion activities during the pandemic, such as the use of websites [9], social media and telemedicine [10]. Sabarudin et al. [11] discovered that enhancing public awareness using distant online learning trough videos and pamphlets is beneficial, in which was different from a study conducted by [12]. Another study on online peer-group study had shown an increase knowledge and understanding for a case study in health promotion, which implies that similar approach can be proposed for other health issues [13]. As a result, we aim to evaluate the impact of distanced learning towards hypertension knowledge, attitude, and practice in the productive-age participants in an educational public health volunteering program located in Surabaya, East Java, Indonesia.

2. Method

This research has the approval given by the Research Ethics Committee in Faculty of Medicine, Universitas Airlangga (48/EC/KEPK/FKUA/2021) and was performed according to the relevant guidelines and regulations. This study is a part of a bigger project ("Impact of interactive virtual education on knowledge, attitude, and practice regarding metabolic syndrome of productive age population in Surabaya") conducted by the Research in Collaboration with Community Outreach (RADIALIS) team.

2.1 Study design, site, sampling, and populations

This study was using a quasi-experimental design involving pre-tests and post-tests without a control group in Surabaya in East Java, Indonesia. Recruitment of the sample was performed using non-randomized sampling techniques, referred as consecutive sampling. Residents living in the sub-district of Ketabang and Pacar Keling in Surabaya City were selected as participants for the purpose of this study. The inclusion criteria of this study participants were as follows: (1) people aging 15 to 64 years old (productive age) with consent; and (2) having access to the Zoom Cloud Meetings platform, whereas the exclusion criteria were as

follows: (1) those who did not attend nor complete the program; or (2) did not complete the pre-test and post-test assignments.

2.2 Measurement tool and data collection

Using Google Forms (docs.google.com/forms), we created pre and post-test questionnaires about hypertension consist of socio-demographic, knowledge, attitude, and practice items. The questionnaire was created as a self-reported survey questionnaire in Bahasa Indonesia, being the native language used in the population. Prior to data collection, the whole study methods were explained in a concise manual supplied to all participants. One day before starting an educational intervention. To acquire the pre-test data, respondents were contacted. On 25 April 2021, Through the Zoom Cloud Meetings, a three-session educational intervention was conducted virtually online (Zoom Video Communications, Inc., San Jose, CA, USA). Using a one-way teaching method and interactive videos, study participants were educated about hypertension knowledge, attitude, and lifestyle practice over the first 20 minutes. The second 30-minutes session involved a focus group discussion where several groups of participants were formed. In this session, Participants were given several hypertension scenarios to discuss with the teachers. Then, the participants were given an open 15-minutes of question-and-answer session to discuss the provided education. All of the seminars were led by professionals in the relevant field. The prior questionnaire was then used to conduct a post-test that lasted until May 9, 2021.

2.3 *Establishment of participants' level of knowledge, a*ttitude, and practice

The participants' level of knowledge regarding hypertension was assessed using ten questions representing different topics of knowledge, such as definition, causes, risk factor, symptom, prevention, etc. Each correct answer received ten points, while incorrect answers received zero score, hence, making the possible maximum total score 100 points. The knowledge domain's results were further classified based on the following: "good (70 and above)," "moderate" (50—70), and "poor" (<50). In assessing attitude and practice domains, ten items regarding lifestyle behavior, consumption and routines were used for each. The data collection in these domains were presented using the four-point Likert scales, starting from "strong disagree", "strongly agree", "never or rarely", to "always". These results were converted into scores ranging from 1 to 4 depending on the statement (positive or negative). Therefore, the maximum score for these domains that could be reached was 40 points – further classified into "good" (30 and above), "moderate" (20—29), and "poor" (<20).

2.4 Data management and analysis

Data processing, cleaning, and coding was conducted using the Microsoft Excel 2019 (Microsoft Corporation, Redmond, WA, USA). Thereafter, SPSS was used for analysing the results (SPSS Inc., Chicago, IL, USA): depending on the normality, either mean and standard deviation (SD) or median and interquartile range (IQR) was used to present continuous data, whereas dichotomous data was presented using frequencies and proportions.

First, in order to define the normality of the data, Shapiro-Wilk test was applied. Depending on the data assumptions, the paired t-test or Wilcoxon signed-rank test was the choice to compare the before and after scores on each domain. Then, using simple logistic regression analysis, authors looked at demographic factors associated with an increase in the scores for each domain. All statistical analyses were set at p below 0.05 to define significance.

3. Results and Discussion

3.1 Characteristics of study

Table 1 lists the characteristics of the participants. This study included a total of 13 participants. The subjects' median age ranged from 34.0 to 54.0 years. Two participants (15.4 percent) were male, and seven (53.8 percent) held a college diploma.

Table 1. Demographical characteristics of the participants

		Participants (N = 13)
Age (years)		51.0 (34.0–54.0)
Gender		
	Male	2 (15.4)
	Female	11 (84.6)
Education		
	College Degree	7 (53.8)
	High School	6 (46.2)

Data are presented as median (interquartile range [IQR]) or Σ (%).

3.2 Comparison of after pre-test and post-test scores

Ten questions each for knowledge, attitude and practice domain on hypertension were measured before and after a week of online health education intervention (as shown in **Table 2)**. The results showed that the participants had "moderate" basic knowledge about hypertension and "good" basic attitude and practice. After the online peer-group activity, an increase in all domains (knowledge, attitude and practice) from respondents was observed. The knowledge domain scores were compared using the paired t-test, while the attitude and practice domain scores were compared using the Wilcoxon signed-rank test. The mean scores between pre-test and post-test results were significantly different for the knowledge domain ($p = 0.046$). The post-test results showed an improvement in scores from the pre-tests for the knowledge domain after an online health education intervention (57.69 vs. 66.92). No substantial difference in the median scores was found in the attitude domain ($p = 0.306$). However, there was an improvement of post-test scores for attitude domain (median 33 vs. 34). Nevertheless, there was one observed significant difference and improvement of scores in the practice domain (31 vs. 32; $p = 0.020$). Although there were improvement of scores after the health education intervention, post-test results showed that the participants still had the same categories of "moderate" basic knowledge about hypertension and "good" basic attitude and practice. **Tables 3, 4, and 5** show the breakdowns for each item in each domain.

Table 2. Comparison of pre-test and post-test scores in all domains

Domain	**Pre-Test (N = 13)**	**Post-Test (N = 13)**	**p-value**
Knowledge			
Mean	57.69	66.92	p = 0.046*
Median	60	70	
Good	1 (7.7)	3 (23.1)	
Moderate	9 (69.2)	9 (69.2)	
Poor	3 (23.1)	1 (7.7)	
Attitude			
Mean	33.38	34.54	
Median	33	34	p = 0.306
Good	11 (84.6)	11 (84.6)	
Moderate	2 (15.4)	2 (15.4)	
Poor	0	0	

Practice				
	Mean	31.23	33.46	
	Median	31	32	p = 0.020*
	Good	8 (61.5)	9 (69.2)	
	Moderate	5 (38.5)	4 (30.8)	
	Poor	0	0	

Data are presented as Σ (%).
*p < 0.05

Table 3. Comparison of knowledge before-and-after scores

	Items	Scores	Pre-Test (N = 13)	Post-Test (N = 13)
1.	Definition of hypertension	Correct answer	4 (30.8)	4 (30.8)
		Mean	3.08	3.08
		Median	0	0
2.	Causes of high blood pressure	Correct answer	9 (69.2)	8 (61.5)
		Mean	6.92	6.15
		Median	10	10
3.	Blood pressure to determine hypertension	Correct answer	7 (53.8)	7 (53.8)
		Mean	5.38	5.38
		Median	10	10
4.	Risk factors of hypertension	Correct answer	11 (84.6)	10 (76.9)
		Mean	8.46	7,69
		Median	10	10
5.	Symptoms of hypertension	Correct answer	5 (38.5)	8 (61.5)
		Mean	3.85	6.15
		Median	0	10
6.	Recommended food for hypertensive patients	Correct answer	9 (69.2)	13 (100.0)
		Mean	6.92	10.00
		Median	10	10
7.	Food restriction in hypertension	Correct answer	12 (92.3)	10 (76.9)
		Mean	9.23	7.69
		Median	10	10
8.	Complications of hypertension	Correct answer	0 (0.0)	6 (46.2)
		Mean	0	4.62
		Median	0	0
9.	Behaviour and management for hypertensive patients	Correct answer	12 (92.3)	10 (76.9)
		Mean	9.23	7.69
		Median	10	10
10.	Lifestyle changes to control blood pressure	Correct answer	6 (46.2)	11 (84.6)
		Mean	4.62	8.46
		Median	0	10

Data are presented as Σ (%).

Table 4. Comparison of attitude before-and-after scores

	Items	Scores	Pre-Test (N = 13)	Post-Test (N = 13)
1.	Salt consumption does not affect blood pressure	Total	33	43
		Mean	2.54	3.31
		Median	3	3
2.	Reducing fried and coconut milk-based food is recommended for hypertensive patients	Total	45	43
		Mean	3.46	3.31
		Median	3	3
3.	Consumption of high-fat and -cholesterol food will not elevate blood pressure	Total	43	46
		Mean	3.31	3.54
		Median	3	4
4.	Hypertensive patients may do low-intensity exercises (e.g., jogging, cycling, and swimming)	Total	38	45
		Mean	2.92	3.46
		Median	3	4

5.	Continuous consumption of caffeine and fried foods can cause hypertension	Total Mean Median	46 3.54 4	44 3.38 3
6.	Family support plays an important role in the success of hypertension patients in carrying out a healthy lifestyle	Total Mean Median	45 3.46 4	46 3.54 4
7.	Stress and coffee-drinking habit can alter blood pressure	Total Mean Median	46 3.54 4	44 3.38 3
8.	Obesity can cause further complications in hypertensive patients	Total Mean Median	45 3.46 3	44 3.38 3
9.	Hypertensive patients don't have to check their blood pressure regularly and control their dietary habit	Total Mean Median	44 3.38 4	46 3.54 4
10.	When you feel dizzy and your neck feels heavy that doesn't improve for a long time, you should check yourself to the nearest health services	Total Mean Median	49 3.77 4	48 3.69 4

Table 5. Comparison of practice before-and-after scores

	Items	Scores	Pre-Test (N = 13)	Post-Test (N = 13)
1.	I consume more than 2 tablespoons of sugar daily	Total Mean Median	37 2.85 3	42 3.23 3
2.	I consume high-cholesterol foods (e.g., red meats, fried foods, and innards)	Total Mean Median	41 3.15 3	44 3.38 3
3.	I consume fiber-rich foods such as fruits and fresh vegetables	Total Mean Median	43 3.31 4	42 3.23 3
4.	I consume alcohols (e.g., wines and beers)	Total Mean Median	51 3.92 4	52 4.00 4
5.	I often stay up late at night more than 3 times a week	Total Mean Median	46 3.54 4	47 3.62 4
6.	I take time to rest when I am tired or stressed	Total Mean Median	43 3.31 3	47 3.62 4
7.	I consume at least 1 pack of cigarettes in a day	Total Mean Median	50 3.85 4	52 4.00 4
8.	I regularly check my blood pressure to the health services	Total Mean Median	28 2.15 2	34 2.62 3
9.	I am able to control my emotions or anger when faced with problems	Total Mean Median	38 2.92 3	40 3.08 3
10.	I exercise regularly two to three times a week	Total Mean Median	29 2.23 2	35 2.69 3

3.3 The relationship between increasing of post-test score and demographic factors

All domains (age, male to female, and college educational level to high school educational level) were not linked with an improvement in post-test scores ($p > 0.05$).

3.4 Discussion

Our study provided the level of knowledge, attitude, and practice regarding hypertension in the productive-age population. The post-test results were significantly different from the pre-tests for the knowledge and practice domain. However, no significant difference was found in the attitude domain after intervention. These findings are supported by a study whose result showed that distance online educational learning is an appropriate method to implement, for it is more efficient and lower in cost [14]. Nevertheless, there are other factors, for example, public interests that may have an impact on the efficacy of an educational intervention [15]. The unstable internet connectivity also became the main barrier for distance learning [16,17].

Education regarding hypertension could improve self-management, including self-monitoring, lifestyle advice, and behavioural support [18]. Our result is also consistent with previous studies which showed an improvement in knowledge after receiving an education [19,20]. In a short amount of time, distance learning might also bring about lifestyle changes. In the practice domain, our findings are consistent with past research that has shown that education has a major impact on a person's self-care and practices [21]. However, Aghakhani et al. [22] found that a mix of online and face-to-face education is a more effective way to promote improved practice improvement. Focus group discussions also have a part in improving knowledge and practices by sharing certain perspectives and habits [23]. Despite an increase in the mean and median post-test scores, there was no substantial difference in the attitude domain scores. Kurnia et al. [24] used a face-to-face technique to establish a cogent influence of education on attitudes concerning hypertension in Indonesia. According to a Chinese study, employing a video to perform distant learning on attitude is the best technique [25]. Follow up services and proactive attitude towards treatment and monitoring of health status are positively associated an improvement of control blood pressure, especially in hypertensive patients [26].

If analyses were performed for each item, the results showed several significant differences. The items with significant differences in the knowledge domain were the “Recommendation food for hypertensive patients” and “Complications of hypertension”. Therefore, one of the best targets of education regarding hypertension is nutrition, considering the lack of knowledge and confidence hindering the management of the disease [27]. Furthermore, an understanding of hypertension complications could further improve public knowledge [28]. In the attitude domain, the item of "Salt consumption does not affect blood pressure" was shown to have a significant difference. Poor attitude in salt intake could lower the awareness regarding hypertension; hence, preventive measures through massive widespread training is necessary [29]. The significant difference in the practice domain was found in the item of “I take time to rest when I am tired or stressed”. This finding is relatively important as controlling blood pressure can be done by enough resting, reducing stress as one of its major factors [30].

According to our findings, demographic factors had no effect on aftermath results after receiving the intervention. It is contradictory to previous studies in which gender and age were found to influence acceptance and behavior [31,32]. However, a study conducted by Anyanti et al. [28] had similar results to ours, finding no significant effect of age and gender on participants' knowledge, which is consistent with our study's findings. There are some limitations to our current research, however. First, due to a lack of a control arm, the highest possible rating in this study could not be achieved. The other limitation was the small sample size due to the limitation target of population conducted in the public health program, which caused indifferences in a number of items. However, despite all of those mentioned before, researches on distanced

educational model in Indonesia are still limited; making our findings more relevant in knowing the effect of online learning towards public health domains regarding hypertension.

However, this study shows that health information can be done through an online health education intervention. Since promoting health is not only the responsibility of the government but also all of humanity, health promotion should not be stopped even during the COVID-19 pandemic. An online platform is an effective method to perform health promotion during the COVID-19 pandemic especially in a metropolitan area like Surabaya. Moreover, a similar approach, online health education, might be useful for other health issues and can be delivered to similar population group. Further studies with wider scales and different approach or design are needed to compensate the limitation of our study.

4. Conclusion

In conclusion, our study found that distance learning improved the hypertension knowledge and practice domains in the productive-age population. The results, however, did not show a consequential difference in the attitude domain. Given the limitations of our study, further better-designed and wider-scaled studies with a control group are needed to confirm our findings.

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These and the Reference headings are in bold but have no numbers. Text below continues as normal. The authors would like to thank members from Asian Medical Students' Association Universitas Airlangga (AMSA-Unair) in Community Outreach Division for collecting the data; the Research and Academic Division for providing reinforcement throughout whole process; and Atika, S.Si., M.Si. for her assistance in conducting proof-readings and statistical analyses. The Universitas Airlangga Student Executive Board's Annual Funding Plan provided funds for this study. The authors declare no competing of interests were involved in the making of this work.

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