

# The effect of health education intervention through mobile phone on hypertension patients : A systematic review

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## ABSTRACT

**Introduction:** Hypertension is a silent killer disease that, if not handled properly, will lead to dangerous complications for the patient. Health education through mobile phones can be an intervention used to improve health services and the management of hypertension in the community. This study aims to synthesise research findings on the effect of mobile phone health education interventions on hypertensive patients.

**Materials and Methods:** A systematic review. Search strategy was conducted on international journal databases, namely Scopus, PubMed, ProQuest, Web of Science, and Science Direct with the keywords 'health education', 'mobile phone' and 'hypertension'. Inclusion criteria using PICOS, namely **Population:** hypertensive patients, **Intervention:** health education using a mobile phone, **Comparison:** ordinary health education, **Output:** knowledge, attitudes, behaviour, **Study design:** trial method. The publication year 2017-2021.

**Results:** There were 145 articles found in the search. Articles were identified and screened resulting in five complete articles that met the inclusion criteria. The results of this study found that health education interventions via mobile phones could increase patient knowledge about hypertension; improve self-management; monitor blood pressure; increase adherence to pharmacological treatment, a hypertensive diet, i.e., low salt intake, vegetable and fruit intake, and physical activity; decrease blood pressure; and improve quality of life. Health education via mobile phones can also provide the latest information quickly to patients about controlling hypertension, antihypertensive drugs, and health services that can be utilised.

**Conclusion:** Health education interventions via mobile phones have a significant positive effect in controlling hypertension in the community, but it is necessary to consider the patient's age, socioeconomic status, literacy conditions, and ability to use mobile phones to receive the health education that will be provided.

## KEYWORDS:

Health Education, Mobile Phone, Hypertension

## INTRODUCTION

Hypertension is a chronic non-communicable disease that still threatens the health and life of people worldwide.

Hypertension is one of the silent killer diseases that, if not handled properly, will lead to various dangerous complications for the sufferer. Hypertension is a major risk factor for stroke and cardiovascular disease in individuals.<sup>1</sup>

Non-compliance with treatment and care programs is a risk factor for hypertensive patients who are prone to complications. This condition can occur because patients do not get adequate information about antihypertensive drugs and cannot read information about treatment programs.<sup>2</sup> The self-efficacy of hypertensive patients is caused by various factors related to the success of controlling hypertension. Health promotion efforts must be developed and modified to overcome this situation.<sup>3</sup>

Hypertensive patients perceive nurses as key players in the management of hypertensive patients.<sup>4</sup> Controlling hypertension in the community is a challenge for nurses and requires an effective strategy to provide optimal service.<sup>5</sup> Health services for hypertensive patients should be focused on disease control and secondary prevention of cardiovascular complications. Low patient motivation in treatment programs requires new ways that nurses can use to educate hypertensive patients in efforts to control disease and prevent cardiovascular complications.<sup>6</sup> Adequate nursing monitoring and care are needed to assess patient adherence to the treatment program in reducing the risk of complications and developing weakness syndrome.<sup>7</sup>

Innovation in health and nursing services for hypertensive patients is currently very much needed along with the times and advances in information communication technology based on the internet and cellular telephones.<sup>8</sup> Health education through mobile phones can be one of the latest interventions in health education to improve service quality and disease management for hypertensive patients in the community. The purpose of this study was to determine the effect of mobile phone health education interventions on hypertensive patients.

## MATERIALS AND METHODS

### Study design

The design of this study is a systematic review conducted with a synthesis of relevant research articles on the effect of mobile phone health education interventions on hypertensive patients using a systematic review PRISMA. This study did not carry out a meta-analysis test process on quantitative data.

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### Search strategy

Search for articles was carried out on five international journal databases, namely Scopus, PubMed, ProQuest, Web of Science, and Science Direct. Article searches were conducted using the keywords 'health education', 'mobile phone', and 'hypertension'.

### Eligibility criteria

The inclusion criteria in this study included all articles describing the effect of health education conducted using mobile phones on hypertensive patients. The inclusion criteria using PICOS, namely Population: hypertensive patients, Intervention: health education using a mobile phone, Comparison: ordinary health education, Output: knowledge, attitudes, behaviour, Study Design: trial method. The publication year: 2017-2021. The exclusion criteria for articles in this study: research not related to health education by mobile phone, non-hypertensive patients, non-hypertensive education topics, non-trial research types, articles published before 2017, and articles not published in peer-reviewed journals.

### Study selection

Article selection is done by collecting articles obtained in a search on the database, eliminating duplicate articles, identifying article titles and abstracts that are PICOS appropriate, and reading the full text of the relevant articles manually. There were 145 articles found in the database search. Researchers identified and screened articles and obtained five complete articles that met the inclusion criteria (Figure 1).

### Data extraction

The articles that have been read are then extracted in a structured manner and explored including the researchers in the article, year of publication, country, the way health education is carried out using mobile phones, research design, number of treatment samples and control samples, the control group intervention, and the effect of health education using mobile phones on hypertensive patients. Paper writing is done independently by reviewing and explaining the selected articles. The author reviews and explains the details of the article such as research objectives, methodology, findings and recommendations. Five articles were found in the full text which were subsequently designated as discussed articles because they met all the research criteria set out (Table 1).

### Risk of bias

Assessment of study quality and risk of bias was performed using the Joanna Briggs Institute (JBI) critical assessment tool for this type of randomised control trial. JBI critical assessment checklist for the randomised controlled trial had 13 assessment items on the selected articles.<sup>9</sup>

## RESULTS

The five articles analysed showed that the total number of hypertensive patients was 1,129. Hypertension patients were divided into two groups, namely the intervention group of 550 patients and the control group of 579 patients. Health education through mobile phones is carried out by sending

SMS text messages, discussing in group chats, and installing special applications on the patient's mobile phone. A summary of the research results is shown in Table I.

## DISCUSSION

The results showed that there was a significant positive effect of health education interventions via mobile phones on the management of hypertension in the community. Health education via mobile phones can increase patient knowledge about hypertension, improve self-management and improve the patient's ability to monitor blood pressure.<sup>11,8</sup> Health education interventions via mobile phones increased adherence to a low-salt diet, increased recommended physical activity, increased intake of vegetables and fruit, decreased systolic and diastolic blood pressure, and improved quality of life.<sup>10</sup> Health education via mobile phones can also provide patients with the latest information about controlling hypertension, antihypertensive drugs, and health services that can be utilized.<sup>12</sup>

Health education through mobile phones is one of the technology-based health education interventions that nurses effectively carry out in promoting health to hypertensive patients. Health education is very important to do so that patients have better knowledge about hypertension and make appropriate control efforts to avoid the risk of complications. The application of cellular-based technology in health education can increase the role of nurses to monitor the health of hypertensive patients at home, increase patient compliance with care programs, increase patient satisfaction with services, and reduce the workload of nurses as health service providers.<sup>15</sup> The use of mobile phones by sending SMS text messages can be a patient reminder and motivation booster for hypertensive patients to comply with the planned treatment program.<sup>1</sup> Health education via SMS is also effective in increasing knowledge about hypertension and healthy lifestyles in hypertensive patients who have a hearing impairment.<sup>16</sup> Health education using SMS is effective in promoting medication adherence to hypertensive patients.<sup>17</sup>

Health education using mobile phones through discussion in group chats can be an economical and efficient model for handling future hypertensive patients for the community.<sup>8</sup> Health education using mobile phones through discussion in the group chat or WeChat can increase patient knowledge about hypertension and self-management, and can increase the patient's ability to monitor blood pressure.<sup>13</sup> The use of mobile device technology or mobile phones can support self-care for hypertensive patients, especially in adherence to programmed anti-hypertensive drugs.<sup>18</sup> Knowledge is one of the factors that influence the health behaviour of patients with chronic diseases including hypertension in increasing adherence to disease control programs, preventing complications, and improving the quality of life.<sup>19</sup>

Health education through a special application installed on the patient's mobile phone is very helpful in the management of hypertension sufferers. Health education using special applications as reminders and health education on mobile phones has increased patient knowledge about

Table 1: Summary of results

Researcher, Year	Country	Research Design and Number of Subjects	Actions on Patients as the Intervention Group	Action on Patients as the Control Group	Intervention Results and Their Effect on Hypertensive Patients
Jahan Y, et al. <sup>10</sup> (2020)	Bangladesh	Randomised controlled trial 420 hypertensive patients; 209 patients as the intervention group, 211 patients as the control group	Health education via SMS text messages	only receive direct health education without receiving health education via SMS text message	Increased adherence to a low-salt diet, increased recommended physical activity, increased intake of vegetables and fruit, decreased systolic and diastolic blood pressure, and improved quality of life.
Abu-El-Noor Ni, et al. <sup>11</sup> (2020)	Gaza Strip, Palestine	Randomised controlled trial 191 hypertensive patients; 97 patients as the intervention group, 94 patients as the control group	Health education using reminders and education applications on the mobile phone	received no intervention from the research team and they continued with their daily routine	Increased knowledge, increased adherence to hypertension treatment
Tahkola A, et al. <sup>12</sup> (2020)	Finland	Randomised controlled trial 111 hypertensive patients; 57 patients as the intervention group, 54 patients as the control group	Health education via SMS text messages	was managed by the treating physician without intervention in the study	Patients get new information about hypertension control, antihypertensive drugs, and health services that can be utilised
Li X, et al. <sup>13</sup> (2019)	Guangzhou, China	Randomised controlled trial 253 hypertensive patients; 110 patients as the intervention group, 143 patients as the control group	Health education through group chat (WeChat)	only received the usual health care service such as direct counselling	Increased knowledge about hypertension, improved self-management, and increased ability to monitor blood pressure
Márquez Contreras E, et al. <sup>14</sup> (2019)	Huelva, Spain	Randomised controlled trial 154 hypertensive patients; 77 patients as the intervention group, 77 patients as the control group	Health education through applications installed on mobile phones; AlerHTA	received the usual intervention	Improvement of pharmacological medication adherence and increased adherence to blood pressure control

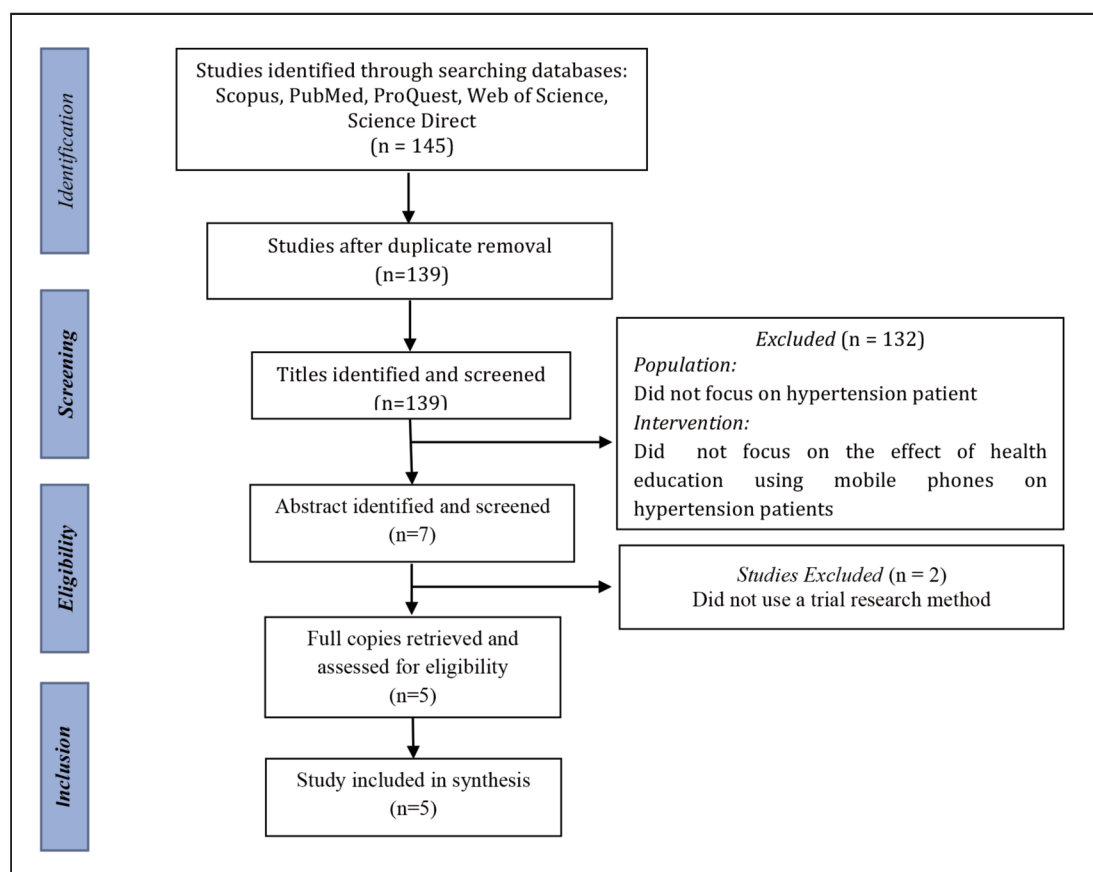


Fig. 1: PRISMA flow diagram of article selection process.

hypertension and increased adherence to treatment.<sup>11</sup> Health education through applications on mobile phones; AlerHTA has been able to increase patient compliance in pharmacological treatment programs and improve patient compliance in controlling blood pressure.<sup>14</sup> Various special applications can be installed on mobile phones for hypertensive patients to help manage nursing care. The breathing meditation exercise application via mobile phone (Tension Tamer, TT) can facilitate patients in doing breathing meditation exercises and recording the patient's heart rate or heart rate during the training session, in uncontrolled patients with stage 1 hypertension. The TT application is a promising health education choice to provide training and education to hypertensive patients at the same time.<sup>1</sup> Digital health and fitness applications developed in cardiovascular health promotion (mHealth) with a community participation approach have also been shown to influence the lifestyle of patients who are more culturally engaged in addressing disparities in cardiovascular health problems.<sup>20</sup>

Although the use of mobile phones and health education applications has many benefits, nurses need to consider the patient's age to use health education via mobile phones and pay attention to the patient's socioeconomic status, literacy conditions, and ability to use mobile phones in receiving health education that will be given.<sup>21</sup> Hypertension patient care management can also be done comprehensively with health education, direct nursing consultation, telephone contact, home visits, and referrals. This action supports

increased patient compliance in taking antihypertensive drugs that lower blood pressure and also supports a decrease in body mass index and waist circumference in hypertensive patients who are overweight.<sup>22</sup> Health education with the 5A model self-management program is effective in increasing the self-efficacy of hypertensive patients. One of the components in the 5A model of self-management health education is to regulate and assess the progress of self-care for hypertensive patients at home using the telephone.<sup>23</sup> Health education interventions by direct face-to-face individual teaching can also be a convenient option to improve hypertension patient medication adherence in a group of hypertensive patients with low socioeconomic status.<sup>17</sup>

#### STUDY LIMITATIONS

This systematic review has several limitations. One of the drawbacks is that it does not perform statistical meta-analysis of the data so that research results cannot be presented accurately in the form of statistical data. As a result, there is a possible bias towards the results of this study. We also acknowledge that the data presented are only a limited collection of data on the effects of health education through cell phones. However, this study really helped us to obtain research evidence on the magnitude of the effect of health education on hypertensive patients via mobile phones.

**CONCLUSION**

Health education via mobile phones has a significant positive effect on hypertensive patients. The effect of health education through mobile phones is that it can increase patient knowledge about hypertension, improve self-management, and ability to monitor blood pressure. Health education via mobile phones can improve hypertension patient compliance in pharmacological treatment programs, adherence to a hypertensive diet such as low salt, increased intake of vegetables and fruit, increased recommended physical activity, decreased systolic and diastolic blood pressure, and improved quality of life. Health education via mobile phones can also provide patients with the latest information quickly about controlling hypertension, antihypertensive drugs, and health services that can be utilised.

**CONFLICT OF INTEREST**

The authors declare that there no conflict of interest regarding the publication of this paper.

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