

Comparing the Effectiveness between mHealth and Face-to-Face Self-Management Programs for Thai Civil Servants with Uncontrolled Hypertension: A Quasi-Experimental Study

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Abstract: Uncontrolled hypertension increases the risk of complications and premature death, which is a significant global public health concern. Self-management is a concept that involves personal strategies to create self-awareness that leads to changes in self-management behavior. This quasi-experimental study compared self-awareness and self-management behaviors for controlling hypertension: restriction of sodium intake, alcohol consumption, smoking cessation, stress reduction, and increased exercise between the mHealth and the Face-to-Face self-management programs. The participants comprised 50 civil servants affiliated with the Secretariat of the House of Representatives, of whom 25 received the mHealth program and 25 received the Face-to-Face program. Group assignments conducted simple random sampling and matched the age, gender, and education level matching. Research tools included the two programs, the Self-Awareness Assessment and the Self-Management Behaviors Assessment instruments. Descriptive statistics, the chi-square test, the t-test, the Wilcoxon signed-rank test, and the Mann-Whitney U test were used to analyze the data.

The findings indicate that, after the experiment, the mHealth group showed a statistically significantly higher mean rank of self-awareness and self-management behaviors than the Face-to-Face group. This study supported the mHealth self-management program's effectiveness over the Face-to-Face Program in increasing self-awareness and self-management behaviors at 12 weeks. Nurses can integrate this program to promote health among Thai people who have access to LINE application communication tools to prevent new cases of hypertension and control hypertension. However, further testing in other population groups is required before it can be widely used nationally.

Keywords: Face-to-Face, mHealth, Self-Awareness, Self-Management Behaviors, Uncontrolled Hypertension

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Introduction

Hypertension is a significant global health issue, with more than 50% of worldwide deaths attributed to uncontrolled hypertension.¹ In Thailand, 15.67% of the population aged over 15 were patients with hypertension (PW-HT), with 1.24% new cases showing an increase from the previous year.² Data indicates that up to 40.00% of people with hypertension are uncontrolled for this serious health problem.³ Global and national data show the burden of the disease, which affects health costs, complications, and premature deaths. According to the health examination data of the Thai Parliament Medical Service Division (PMSD) in 2020–2022,⁴ the number of civil servants aged 35–59 with hypertension increases every year and many of them are unable to control their hypertension. This might be due to the lack of knowledge and motivation since many PW-HT are asymptomatic. Thus, they stop medications and or modify their behavior when symptoms disappear.⁵ In addition, management risk factors require modification behaviors and lifestyles, which might be difficult for these civil servants since they have heavy and stressful workloads, such as parliamentary organized and House of Representatives meetings that are rigorous and work long hours per day.

To help people to control hypertension, various studies have used self-management (SM) support programs traditionally with face-to-face interactions. Recently, with the rapid advancement in technology, mHealth has frequently been applied to people with chronic illness and other conditions that require continuity of care. However, mHealth interventions are expensive due to technological devices,⁶ but may be congruent with Thai civil servants' lifestyle with a high level of education and hypertension knowledge. The mHealth SM program allows for real-time monitoring of knowledge about hypertension and the progress of SM behaviors and health outcomes, which is expected to be more advantageous than traditional face-to-face SM programs. However, most studies usually compare the

mHealth SM with routine care without a face-to-face SM program. Thus, this study aimed to bridge this gap by comparing the effectiveness of mHealth and Face-to-Face SM Programs for Thai civil servants with uncontrolled hypertension. The findings might offer a choice to select the most effective program.

Conceptual Framework and Review of Literature

This study used Browder and Shapiro's SM concept⁷ to guide the intervention development integrated with mHealth. SM refers to the realistic assessment of one's knowledge, skills, and abilities by setting realistic goals, monitoring progress toward goals, and creating motivation to reach set goals, including self-regulation and responding to feedback. SM is a comprehensive process that involves individual strategies of monitoring, evaluating, recording, or reinforcing to change their behavior.⁷ These processes lead to the creation of self-awareness, which in turn leads to changes in SM behavior. Previous studies have shown the effectiveness of the intervention based on the concept of SM in controlling hypertension through face-to-face interactions.^{8,9} A systematic review that applied the SM concept through mHealth found positive outcomes in reducing blood pressure, improving blood pressure control, enhancing medication adherence motivation, and promoting better SM compared to standard care. Most interventions were delivered through mobile phones, patient monitoring devices, and wireless devices. Additionally, two-way communication between healthcare providers and patients was more effective than one-way communication.¹⁰

Self-awareness is the use of self-understanding and conscious awareness to guide true and correct behaviors and create an interpersonal environment for healing.¹¹ This SM concept does not directly address self-awareness but rather comes from the motivation to understand oneself. However, controlled hypertension

requires sufficient time and continuity. PW-HT must self-regulate and monitor SM behaviors regularly, together with health care professionals, who must follow up on their behaviors and practices.

SM behaviors about hypertension control to prevent complications from uncontrolled hypertension involve self-assessments and self-reports of actions taken: (1) adherence to the DASH (Dietary Approaches to Stop Hypertension) diet, (2) regular aerobic exercise or physical activity, (3) consistent intake of antihypertensive medication, (4) stress management, (5) reduction or cessation of alcohol consumption, and (6) smoking cessation.¹²

Previous studies have shown that the use of mHealth is effective in SM in terms of creating motivation leading to self-awareness and performing SM behaviors, despite different platforms, such as Intelligent Hypertension Management System (IHMS),¹³ Hospital-linked digital health app (WellCheck),¹⁴ LINE Application (TeleHealth),¹⁵ Telemedicine,¹⁶ Mobile-based application (One Health),¹⁷ Telemonitoring,¹⁸ Mobile “blood pressure management application,”¹⁹ Mobile Application,^{20,21} WeChat,²² and Chatbot.²³ A systematic review and systematic selection study on the effective use of mHealth for SM behavior of PW-HT,^{10,24} found most of these studies use mobile application platforms that are easily accessible by users of the public in each country, including Thailand, where Thai civil servants refer to use the LINE application to communicate with each other. Therefore, this study chose to use the LINE application on mobile phones as a platform to create SM for Thai civil servants who cannot control their hypertension.

To prevent bias from confounding variables, some variables that have evidence from previous studies are related to or influence hypertension control behaviour, such as age, gender,²⁵ education level,²⁶ and others. This study, therefore, controlled for the potentially confounding variables of gender, age, and education level by using matching.

Hypothesis

The study’s hypothesis was that at 12 weeks after the program’s completion, the mHealth SM group had significantly higher self-awareness and SM behavior scores than the baseline and higher than those in the Face-to-Face SM group.

Methods

Design: This study employed a quasi-experimental with a two-group pretest-posttest design. The Transparent Reporting of Evaluations with Non-Randomized Designs (TREND) checklist was used to guide reporting this study and ensure its transparency and accuracy.²⁷

Setting and Sample: The research was conducted at the Secretariat of the House of Representatives, an independent agency equivalent to a department with authority over the general administrative affairs of the House of Representatives. The Secretary-General of the House of Representatives is the commanding officer overseeing government officials who are responsible for performing official duties under the House of Representatives. The population consisted of government officials affiliated with the Secretariat of the House of Representatives who had been diagnosed by a physician with uncontrolled hypertension of unknown cause and were unable to control their blood pressure to below 140/90 mmHg for at least three months, based on the results of annual health check-ups conducted by the Secretariat of the House of Representatives. The total number of ordinary parliamentarians under the Office of the Secretariat of the House of Representatives who had hypertension in 2021 was 198.⁴

The sample size was calculated a priori using the G*Power program by setting the test family as a t-test and the statistical test as means: Difference between two independent means (two groups). According to Cohen, the input parameters were set for a one-tailed test with an effect size *d* of 0.80, which is considered large.²⁸ This decision was made as an adaptation of the findings from a previous study,²⁹ in

which the effect size was determined to be 2.43 because the current study had different research contexts. With an α error probabilities set at 0.05, a power ($1 - \beta$ err prop) of 0.80, and an allocation ratio $N1/N2$ of 1, the required sample size was 42 (21 per group). The sample size was increased by 20%³⁰ to prevent possible attrition at 12 weeks, as the sample's work schedule could change at any time from the meeting of the House of Representatives. There was a total sample of 50 participants (25/group).

Purposive sampling was used based on the following inclusion criteria: (1) diagnosed by a physician as unable to control blood pressure below 140/90 mmHg for at least three months, (2) aged between 35 and 59 years, (3) a smartphone capable of LINE application access, and (4) willing to participate in and cooperate with all activities throughout the 12-week research program. Exclusion criteria included (1) severe complications from hypertension requiring hospitalization during the study period and (2) voluntary withdrawal from the study. Seventy-seven participants met the selection criteria. Subsequently, fifty participants were randomly selected using simple random sampling. To reduce selection bias in allocating participants to each group, the matched pair method was used to control for potential confounders, including age, gender, and education level. A total of 25 pairs were formed. Then, a lottery drawing was conducted to assign individuals to the mHealth and Face-to-Face groups.

Ethical Considerations: The Huachiew Chalermprakiat University Institutional Review Board in Thailand approved the study (IRB No. 1220/2022). The PI provided an overview of the research project and apprised the participants of their freedom to decline participation at any moment. The information gathered would be kept private. The participants completed informed permission forms before the study if they were willing to participate, and the study results would be given as a group rather than as individual data.

Research Instruments: Research instruments are divided into two categories: data collection instruments

and the Face-to-Face and mHealth (Mho Sapa) SM programs.

The Personal Information Questionnaire sought the following personal details: gender, age, education level, marital status, duration of hypertension, other medical conditions, and medications received. The questions are designed in multiple checkboxes and a fill-in-the-blank format.

The Self-Awareness Assessment Tool was developed by the researchers based on the Thai Hypertension Society: Guidelines in the Treatment of Hypertension 2019,¹² covering six areas: (1) adherence to the DASH Diet, (2) regular aerobic exercise or physical activity, (3) consistent intake of antihypertensive medication, (4) stress management, (5) reduction or cessation of alcohol consumption, and (6) smoking cessation. There are 15 items in a rating scale with three options: disagree (0 points), somewhat agree (1 point), and strongly agree (2 points). The maximum score is 30 points. The interpretation of the mean score range is as follows: 1.60–2.00 (high awareness), 1.20–1.59 (moderate awareness), and 0.00–1.19 (low awareness). An item example is: "Reducing or limiting the consumption of vessel hardening contributes to controlling hypertension effectively."

The Self-Management Behaviors Assessment Tool was developed by the researchers based on the Thai Hypertension Society: Guidelines in the Treatment of Hypertension 2019,¹² covering six areas: 1) adherence to the DASH diet, 2) regular aerobic exercise or physical activity, 3) consistent intake of antihypertensive medication, 4) stress management, 5) reduction or cessation of alcohol consumption, and 6) smoking cessation. There are 18 items in the form of a rating scale with three options: never (0 points), sometimes (1 point), often (2 points), and always (3 points). The maximum score is 54 points. The interpretation of the mean score range is as follows: 2.40–3.00 (good practice level), 1.80–2.39 (moderate practice level), and 0.00–1.79 (poor practice level). For example, "You rest and sleep for at least 6–8 hours per day."

Three assessment tools were examined for content validity by five experts: one internal medicine physician, three lecturers in community nursing, and one lecturer in adult nursing, with an index of item-objective congruence (IOC) of at least 0.50 (0.60–1.00) for each tool. The Self-Awareness Assessment Tool and the Self-Management Behaviors Assessment Tool were tested for reliability among 30 parliamentary officials in the Office of the Senate Secretariat with characteristics similar to the study sample, yielding a Cronbach's alpha of 0.887 and 0.955, respectively.

Intervention

The interventions examined in this study were mHealth SM and Face-to-Face SM programs. Both interventions followed Browder and Shapiro's SM concept,⁷ which consists of four components: (1) setting achievable goals, (2) monitoring progress towards set goals, (3) generating motivation to achieve set goals, and (4) self-regulation and responsiveness to feedback. In this study, four components of SM were divided: (1) setting feasible goals; (2) monitoring progress in practice towards goals; (3) creating motivation to reach the set goals; and (4) self-control and responding to feedback, which five experts examined in the program feasibility examination process. These four components will build self-awareness in the participants and ultimately lead to the emergence of SM behaviors. The content about hypertension knowledge was the same in both interventions. However, the formats for the meeting and counseling sessions differed. In the mHealth intervention, the knowledge content about hypertension was available only on the online platform, and the meeting and counseling session took place on LINE OA meeting or individual LINE. On the other hand, in the Face-to-Face intervention, the knowledge content was provided in a printed manual, and the meeting and counseling session had to be scheduled in a private room in the Parliament.

The mHealth Self-Management Program (Mho Sapa)

The primary investigator (PI) developed a 12-week mHealth SM program (Mho Sapa) for the experimental group (**Appendix Table A 1**). The program operates through the LINE OA platform, focused on learning continuously through online meetings, virtual classrooms, video media, infographics, and e-books. Participants in the mHealth SM group acquire SM knowledge and skills on blood pressure levels and appropriate behaviors promoted: the DASH diet adherence, regular physical activity, medication adherence, stress management, reduction or cessation of alcohol consumption, and smoking cessation.

The process of the mHealth SM program is as follows: **Registration:** Participants register via <https://liff.line.me/1657040139-qpARPbWW> or scan the provided QR code, which prompts the registration page. Registration requires a national ID card number. **Confirmation:** After successful registration, a confirmation screen will appear where participants must type their name, surname, nickname, affiliation, date of birth, gender, and height. Once identity verification is completed, participants receive a welcome message via LINE OA, and the screen displays three menu options: Health Record, Record History, and Health Knowledge. **Health Record Menu:** A screen displays the specified date and time of record of body weight, upper (systolic) and lower (diastolic) blood pressure levels, and heart rate. When recorded, a screen shows the interpretation of blood pressure levels, and a body mass index appears. **Record History Menu:** a screen shows personal health history and includes personal information, a history of blood pressure and body mass index, and a report button. Press the report button to display a graph of blood pressure levels. **Health Knowledge Menu:** A screen displays a set of information related to hypertension, methods for preventing complications from uncontrolled hypertension, and other important information. Participants can access this information for review at any time (**Figure 1**).

The Face-to-Face Self-Management Program

The Face-to-Face SM program for the comparison group (**Appendix Table A 2**) was conducted in a private meeting room at the Office of the Secretary of the House of Representatives. The PI provided hypertension knowledge through lectures and videos and focused on the dangers of complications, causes, symptoms, and SM techniques to hypertensive control and prevent complications. The program included steps for SM behaviors, such as DASH diet adherence, regular physical activity, medication adherence, stress management, reduction or cessation of alcohol consumption, and smoking cessation. Participants learned from the hypertension guide handbook. The PI acts as a peer learner, exchanges experiences, tracks progress, assesses outcomes, facilitates convenience, and provides support to address SM problems continuously.

The mHealth and Face-to-Face SM programs underwent content validity of processes, steps, activities, and evaluations by five experts: one lecturer in behavioral science research, one expert in medicine and public health at the Parliament, one lecturer in community nursing, one lecturer in adult nursing, and one expert in information and digital systems.

Data Collection: The study was conducted from July 2022 to January 2023. Upon receipt of ethics approval, the PI met with the Secretary of the House of Representatives to request permission to conduct the experiment and gather data. Upon approval from the Secretary of the House of Representatives, the PI met with both groups at different times and dates in private meeting rooms, explaining the objectives and detailed activities of the research process. They also clarified participation requirements throughout the project. The PI provided detailed information about participant rights, encouraged questions, and solicited feedback on program participation. In this session, participants were asked to sign an informed consent form.

Both mHealth and Face-to-Face SM programs were conducted at the same time. To prevent contamination of both groups of participants, the mHealth group was on the LINE Application online platform, which was restricted to access by a national ID, which required approval to use the mHealth program from the administrator as the PI. The data collection steps are as follows:

Recruitment: The PI compiled a list of 198 civil servants with hypertension from the Office of Medical Services, Parliament data, and 77 met the inclusion criteria. Simple random sampling was performed for a sample of 50. The groups were organized into groups with the same gender and education level, with an age difference of no more than three years. Then, simple random sampling was performed to assign the sample to the experimental and the comparison groups until 25 pairs were completed.

Baseline assessment: The PI contacted the sample to invite them to participate in the study, explained the research project, and obtained their consent. The participants only knew they were in the group they were allocated to. An appointment was made once consent was received to participate in the research. The mHealth SM group was given the right to join the LINE OA group to participate in the program activities and complete the general information, health information, self-awareness, and SM behavior assessments before the mHealth program activities start via Google Form. For the Face-to-Face SM group, an appointment was made at the private parliament meeting room to complete the assessments and start the program.

Intervention delivery (12 weeks): The mHealth SM group received the program via LINE OA (Mho Sapa). The PI explained the usage method. After the participants signed in with their Thai national ID cards, the PI explained activities from weeks 1–12. Group activities were conducted in the LINE OA

Meeting, but individual counseling activities were conducted via personal LINE OA. Participants who need to consult must first inform the LINE OA group of their intention to make an appointment. Activities are shown in **Appendix Table A**.

The Face-to-Face SM group received the program according to the appointment schedule. The PI explained the program activities to the participants' group in the Parliament's private meeting room. Participants receive a hypertension guide handbook and a blood pressure record book for individual counseling, which is conducted in the meeting room of the Office of Medical Services of the Parliament. Activities are shown in **Appendix Table B**.

Posttest evaluation: In the last week, both programs were evaluated after they were completed. The PI noticed that mHealth SM group participants in the LINE Meeting evaluate self-awareness and SM behavior through the Google form. In the Face-to-Face SM group, an appointment was made to be evaluated in a private meeting room.

Data Analysis: Descriptive statistics, such as frequency, percentage, mean, and standard deviation, were used to examine the personal data. The differences in average scores of self-awareness and SM behaviors before and after receiving the mHealth and Face-to-Face SM programs were compared. As the outcome

data were measured at ordinal-scale levels and the summed, average scores were not normally distributed, non-parametric tests using a Wilcoxon signed-rank test for within-group comparisons (pretest-posttest) and a Mann-Whitney U test for between-group comparisons (experimental and comparison groups) were utilized. A one-tailed test with a significance level of 0.05 was conducted.

Results

Characteristics of participants and medical data

Participants were divided into a mHealth SM group of 25 and a Face-to-Face SM group of 25, who remained until the study was completed. Most participants were female, with an average age of 45.36 years. Most had a body mass index of 25.00–25.99 kg/m,² indicating obesity. They had completed a master's degree and had been diagnosed with hypertension for 1–3 years, or 4–6 years in a slightly similar proportion. Other comorbidities included diabetes and high cholesterol levels, in addition to hypertension. A comparison of important personal data between the two groups, including gender, age, waist circumference, body mass index (BMI), education level, hypertension time, other underlying diseases, and medical follow-up, found no differences. Details of the participants' characteristics are presented in **Table 1**.

Table 1. Participants' characteristics

Characteristics	Total (N = 50)	mHealth (n = 25)	Face-to-Face (n = 25)	Statistic value	p-value
Gender, Frequency (%)				0 ^a	1.000
Female	26 (52.00)	13 (52.00)	13 (52.00)		
Male	24 (48.00)	12 (48.00)	12 (48.00)		
Age (years), mean (SD)	45.36 (6.09)	46.14 (5.52)	44.59 (6.65)	-0.838 ^t	0.407
Waist circumference (cm), mean (SD)	85.61 (8.40)	85.73 (7.24)	85.50 (9.60)	-0.089 ^t	0.930
Body mass index (kg/m ²), mean (SD)	26.91 (3.71)	26.71 (2.64)	27.12 (4.61)	0.363 ^t	0.719
Education level, Frequency (%)				0 ^a	1.000
Bachelor degree	18 (36.00)	9 (18.00)	9 (18.00)		
Master's degree	32 (64.00)	16 (64.00)	16 (64.00)		

Table 1. Participants' characteristics (Cont.)

Characteristics	Total (N = 50)	mHealth (n = 25)	Face-to-Face (n = 25)	Statistic value	p-value
Hypertension period (years), Frequency (%)				0.608 ^b	0.895
1-3	22 (44.00)	12 (48.00)	10 (40.00)		
4-6	21 (42.00)	10 (40.00)	11 (44.00)		
7-9	4 (8.00)	2 (8.00)	2 (8.00)		
Over 10 years	3 (6.00)	1 (4.00)	2 (8.00)		
Other underlying disease, Frequency (%)				2.095 ^a	0.244
No	2 (8.00)	2 (8.00)	0 (0.00)		
Yes	48 (92.00)	23 (92.00)	25 (100.00)		
Medical follow-up, Frequency (%)				0.101 ^a	0.500
Regular	15 (30.00)	8 (32.00)	7 (28.00)		
Loss follow-up ≥ 1 time	35 (70.00)	17 (68.00)	18 (72.00)		

Note. t = t-test, ^a = Chi-square test, ^b = Fisher's exact test

The effectiveness of the mHealth SM (Mho Sapa) and the Face-to-Face SM

To test the within-subject effects, the scores of self-awareness and SM behaviors of the mHealth SM group before (T1) and after the intervention (T2) were compared. It was found that the differences in mean rank scores of self-awareness and SM behaviors

after 12 weeks were significantly higher than before ($p < 0.05$). In the Face-to-Face SM group, it was found that the differences in mean rank scores of self-awareness and SM behaviors after 12 weeks were also significantly higher than before ($p < 0.05$). Details of the effectiveness of both interventions are presented in **Table 2**.

Table 2. A comparison of the mean rank on self-awareness and SM behaviors within groups before (T1) and after the completion program (12 weeks, T2)

Variables	mHealth (n = 25)		Face-to-Face (n = 25)	
	Mean rank (Sum of rank)	Median (IQR)	Mean rank (Sum of rank)	Median (IQR)
Self-awareness	6.00 (66.00)		11.50 (253.00)	
T1		1.73 (0.13)		1.93 (0.22)
T2		2.00 (0.00)		2.00 (0.07)
	Test statistics	-2.961	Test statistics	-4.124
	p-value	0.003	p-value	< 0.001
Self-management behaviors	8.00 (120.00)		11.00 (231.00)	
T1		2.17 (0.09)		2.11 (0.12)
T2		2.72 (0.17)		2.20 (0.17)
	Test statistics	-3.425	Test statistics	-4.028
	p-value	0.001	p-value	< 0.001

Note. T1 = Before the program was received, T2 = 12 weeks of implementation the program

The scores of self-awareness and SM behaviors post-12 weeks between the mHealth SM group and the Face-to-Face SM group were compared to test the between-group effects. The scores of self-awareness and SM behaviors between both groups at baseline (T1) were not different ($p > 0.05$). At post-12 weeks (T2),

it was found that the differences in mean rank scores of self-awareness and SM behaviors of the mHealth SM group were significantly higher than those of the Face-to-Face SM group ($p < 0.05$). Details are presented in **Table 3**.

Table 3. A comparison of the mean rank on self-awareness and SM behaviors between groups at each time point, before (T1) and after the completion program (12 weeks, T2)

Variables	mHealth (n = 25)		Face-to-Face (n = 25)		Statistic value	p-value
	MR (SR)	Median (IQR)	MR (SR)	Median (IQR)		
Self-awareness						
T1	26.05 (573.00)	1.73 (0.13)	18.95 (417.00)	1.93 (0.22)	-1.893	0.058
T2	26.00 (572.00)	2.00 (0.00)	19.00 (418.00)	2.00 (0.07)	-2.847	0.004
Self-management behaviors						
T1	26.25 (577.50)	2.17 (0.09)	18.75 (412.50)	2.11 (0.12)	-1.975	0.051
T2	33.30 (732.50)	2.72 (0.17)	11.70 (257.50)	2.20 (0.17)	-5.600	< 0.001

Note. T1 = Before the program was received, T2 = 12 weeks of implementation the program

MR = Mean rank, SR = Sum of rank, IQR = Interquartile range

Discussion

The study found that both the mHealth self-management (SM) and the Face-to-Face SM groups showed improvements, with increased self-awareness and SM behaviors after completing the program compared to before participation. This result is attributed to the fact that both programs were based on the concept of SM, which fosters motivation and self-awareness, targeting positive health behaviors. The use of the SM concept to improve health behaviors in non-digital technology for hypertensive patients has been supported by previous studies. For example, the application of SM in people with uncontrolled hypertension has been shown to promote better health behaviors and compliance with blood pressure control.^{8,31} Different SM models have been used in hypertension management, such as Kanfer and Gaelicke-Buys's concept, which promotes self-care behavior and blood pressure control.³² Similarly, Creer's SM framework promotes the improvement of health behaviors and blood pressure control in patients

with uncontrolled hypertension.³³ Furthermore, Riegel, Carlson, and Glaser's SM approach demonstrated improved health behaviors and blood pressure control after six weeks of intervention.⁶

However, after 12 weeks, the mHealth SM group had a higher mean rank score for self-awareness and SM behaviors than the Face-to-Face SM group. This result can be explained by the Task-Technology Fit (TTF) model,³⁴ which suggests that when tasks and technologies align well, users have positive attitudes towards the technology's usefulness and efficiency. If users perceive a technology as useless, they are less likely to engage with it. It can be explained by the Technology Acceptance Model (TAM),³⁵ which posits that perceived ease of use affects the perceived expected usefulness, leading to a positive attitude and, ultimately, increased actual use of the technology.

Similarly, the Unified Theory of Acceptance and Use of Technology (UTAUT) explains that actual technology use is determined by intention. The intention to use technology is shaped by factors such as performance expectancy (the belief that employing

technology will improve work output), effort expectancy (the technology's perceived ease of use, which may include aspects of self-efficacy), social influence (the belief that influential people anticipate them using technology), and facilitating conditions (the belief that technological and organizational infrastructure are in place to facilitate the deployment of technology).

Since civil servants with hypertension have demanding responsibilities, they may struggle to manage their high blood pressure. The use of communication technologies like mHealth, which can be accessed anywhere and anytime, is appropriate for their work environment. The mHealth approach, such as the Mho Sapa platform, is easily accessible and can be used via the LINE OA applications. Previous studies have demonstrated the effectiveness of health technologies in managing hypertension, including mobile apps,^{20,21} WeChat,²² mHealth,^{17,21} Chatbot.²³ A systematic review and meta-analysis of 24 studies testing the effectiveness of mobile applications for hypertension monitoring in the adult population found improvement in SM behaviors, treatment motivation, and improved adherence.¹⁰

Limitations and Future Research

The study may be subject to potential biases. First, design bias: the non-randomized quasi-experimental design could not strictly control conditions, possibly threatening internal validity. Second, performance bias: since there was no blinding of participants within the same setting, there could be a risk of the spread of intervention or contamination. Third, detection bias: despite efforts to prevent access to the mHealth SM program (Mho Sapa), data collection could not be blinded, and self-report measures might introduce errors leading to inaccurate results. Fourth, sampling bias: the nature and setting of the participants, coupled with non-randomization, may limit generalizability. Additionally, monitoring should include checking blood pressure changes post-program and body mass index assessments, as most participants were obese. We also recommend expanding the mHealth SM program (Mho Sapa) to address other common chronic conditions such

as metabolic syndrome, obesity, hypertension, diabetes, and high cholesterol. Furthermore, expanding access to mHealth programs for the general public aligns with Thai parliamentary policies.

Conclusion and Implications for Nursing Practice

The study results indicated that the mHealth SM program was more effective than the Face-to-Face SM program. It was more compatible with the lifestyles and workloads, especially for those with heavy workloads and responsibilities who could not participate in activities with strict schedules, including Thai civil servants. The mHealth approach allowed continuous access to knowledge, fostering continuous self-awareness through features like progress-tracking graphs showing practice and health outcomes, which facilitated sustainable behavior change. The program has been further enhanced with artificial intelligence (AI) technology, improving convenience by allowing health data to be recorded with photos, eliminating the need for manual data entry. Community practitioner nurses can use this program to promote hypertension management and prevent complications in the public.

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Appendix

Table 1A. Descriptions of the mHealth SM program (Mho Sapa)

Session	Objectives	Program activities	Media
1st Weeks	Create self-awareness about	<i>Activity 1: My goal^a</i>	– LINE Meeting
Day 1	the complications that	Introduce ourselves, explain program	– Google form
Pre-test (1–2 hrs.)	result from uncontrolled hypertension	activities, demonstrate the use of the Mho Sapa LINE OA, give a chance for participants to share experiences related to individual SM, and set mutual goals together	– LINE OA “Mho Sapa”
Day 2 (2 hrs.)	Create self-awareness about hypertension control and methods to prevent complications	<i>Activity 2: Management learning^a</i> – PI provides hypertension control knowledge delivered by lectures accompanied by slideshow presentations. – PI explains and demonstrates methods for hypertension control in six aspects: diet, physical activity, medication, stress, alcohol, and smoking. – Participants analyze their behaviors together with the PI. The PI suggests personalized practices for each individual.	– LINE Meeting – The video presentation titled “Hypertension”
Day 3–7	Create self-awareness about hypertension and methods for hypertension control	<i>Activity 3: Self-learning^d</i> – Individual participants learn about hypertension control on their LINE OA Mho Sapa.	– LINE OA Mho Sapa: Menu – Health education learning room LINE Meeting
2nd Week	– Create knowledge about	<i>Activity 4: Self-review^a</i>	
Day 1 (2 hrs.)	hypertension and control methods	– The PI reviews knowledge of SM in 6 aspects.	
	– Raise self-awareness about hypertension control	– The PI and participants establish mutual agreement in self-awareness to adopt SM behaviors.	
	– Encourage behavioral practices		
Day 2–7	– Create self-awareness about hypertension control	<i>Activity 5: Self-learning^d</i> – Individual participants learn about hypertension control on their LINE OA Mho Sapa.	– LINE OA Mho Sapa
3–12 Weeks	– Establish continuous	<i>Activity 6: Self-reflection^{b,c,d}</i>	– LINE Meeting
1st day of every week (30 min per person)	behavioral practices	The PI provides participants with individualized consultation on SM, assistance in case of problems or obstacles, and support for continuous behavioral engagement.	– LINE OA Mho Sapa

Table 1A. Descriptions of the mHealth SM program (Mho Sapa) (Cont.)

Session	Objectives	Program activities	Media
Day 2-6	- Establish continuous behavioral practices	<ul style="list-style-type: none"> - The PI encourages participants to report their progress in SM through the LINE OA Mho Sapa. - The participants use LINE OA Mho Sapa to report their behaviors and progress in SM. <i>Activity 8: Self-management^d</i> <ul style="list-style-type: none"> - The participants join and utilize the LINE OA Mho Sapa to report their behaviors and progress in SM. 	<ul style="list-style-type: none"> - LINE Meeting - LINE OA Mho Sapa
Day 7	- Create motivation for continuous behavioral practices	<ul style="list-style-type: none"> - The PI encourages participants to review the interpretation of their own reported results through LINE Meeting. <i>Activity 7: Motivation and goals^e</i> <ul style="list-style-type: none"> - The PI creates motivation by publicly acknowledging and praise participants who can manage themselves effectively through LINE meeting. 	LINE Meeting
Last day of week 12	- Evaluate self-awareness and SM behavior	- The PI collaborates with the group of participants to summarize the results of SM throughout the 12 weeks together.	<ul style="list-style-type: none"> - LINE Meeting - Google form
Post-test 5th visit (After 12 weeks of implementation of the program) 2 hrs.	- To find more suggestions for the next program version development	<ul style="list-style-type: none"> - The PI admires all participants with good SM behaviors. - The program closed. - Participants complete the self-awareness assessment, SM behavior assessment. 	

Note. The adherence to Browder and Shapiro's self-management concept⁷ consists of four components: (a) setting feasible goals, (b) monitoring progress towards the established goals, (c) generating motivation to achieve the set goals, and (d) self-regulation and responsiveness to feedback.

Table A2. Descriptions of the Face-to-Face SM program

Session	Objectives	Program activities	Media
1st Weeks			
Day 1 Pre-test (1-2 hrs.)	- Create self-awareness about the complications that result from uncontrolled hypertension.	<i>Activity 1: My goal^a</i> The PI explains and introduces the program activities; Explain the hypertension handbook, blood pressure record book, and other information; Provide a chance for participants to share individual experiences on SM methods and create goals.	- Hypertension guide handbook - Blood pressure record book
Day 2 (2 hrs.)	Create self-awareness about hypertension control and methods to prevent complications	<i>Activity 2: Management learning^a</i> - The PI provides hypertension control knowledge delivered by lectures accompanied by slideshow presentations. - The PI explains and demonstrates methods for hypertension control in six aspects: diet, physical activity, medication, stress, alcohol, and smoking. - Participants analyze their behaviors together with the PI. The PI suggests personalized practices for each individual.	- Power point presentation - The video presentation titled Hypertension
Day 3-7	Create self-awareness about hypertension and methods for hypertension control	<i>Activity 3: Self-learning^d</i> - Individual participants learn about hypertension control on their own.	Hypertension guide handbook
2nd Week Day 1 (2 hrs.)	- Create knowledge about hypertension and control methods - Raise self-awareness about hypertension control - Encourage behavioral practices	<i>Activity 4: Self-review^a</i> - The PI reviews knowledge on SM 6 aspects. - The PI and participants establish a mutual agreement in self-awareness to adopt SM behaviors.	Hypertension guide handbook
Day 2-7	- Create self-awareness about hypertension control	<i>Activity 5: Self-learning^d</i> - Individual participants learn about hypertension control on their own.	Hypertension guide handbook
3-12 Weeks 1st Day of every week (30 min per person)	Establishing continuous behavioral practices	<i>Activity 6: Self-reflection^{b,c,d}</i> - The PI provides individualized consultation to participants on SM, assistance in case of problems or obstacles, and support to maintain continuous behavioral practices. - The PI encourages participants to record their SM activities progress in the BP record book.	- Private room - Blood pressure record book
Day 2-6	- Establish continuous behavioral practices	<i>Activity 8: Self-management^d</i> - Participants engage in self-directed SM behaviors.	

Table A2. Descriptions of the Face-to-Face SM program (Cont.)

Session	Objectives	Program activities	Media
Day 7	Create motivation for continuous behavioral practices	<i>Activity 7: Motivation and goal</i> – Participants submit their BP record book to the PI for analysis and interpreted SM progress. – The PI commends and applauds participants who show good behaviors and progress in SM.	– Blood pressure record book – Information board at the Medical Service Department
Last day of week 12	– Evaluate self-awareness and SM behavior	– The PI summarizes the results of SM throughout the 12 weeks with the participant group.	– Questionnaire
Post-test 5th visit (After 12 weeks of implementation of the program) 2 hrs.	– To find more suggestions for the next program version development	– The PI admires all participants with good SM behaviors. – The program closed. – Participants complete the self-awareness assessment and SM behaviors.	

Note. Adhering to Browder and Shapiro's self-management concept⁷ involves four components: (a) setting achievable goals, (b) monitoring progress towards set goals, (c) creating motivation to achieve set goals, and (d) self-regulation and responding to feedback.

Appendix



Figure 1. Examples of tools: the Mho Sapa LINE OA application

การเปรียบเทียบประสิทธิผลระหว่างโปรแกรมการจัดการตนเองแบบ mHealth และแบบพบหน้าสำหรับข้าราชการไทยที่ควบคุมโรคความดันโลหิตสูงไม่ได้ : การศึกษาถึงทดลอง

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บทคัดย่อ: ความดันโลหิตสูงที่ควบคุมไม่ได้จะเพิ่มความเสี่ยงต่อภาวะแทรกซ้อนและการเสียชีวิตก่อนวัยอันควร ซึ่งเป็นปัญหาสาธารณสุขระดับโลกที่สำคัญ การจัดการตนเองเป็นแนวคิดที่เป็นกลยุทธ์ส่วนบุคคลเพื่อสร้างการตระหนักรู้ในตนเองที่นำไปสู่การเปลี่ยนแปลงพฤติกรรมในการจัดการตนเอง การศึกษาถึงทดลองนี้เปรียบเทียบการตระหนักรู้ในตนเองและพฤติกรรมในการจัดการตนเองเพื่อควบคุมความดันโลหิตสูง ได้แก่ การจำกัดบริโภคโซเดียม การงดดื่มแอลกอฮอล์ การเลิกสูบบุหรี่ การลดความเครียด และการออกกำลังกายเพิ่มขึ้น ระหว่างโปรแกรมการจัดการตนเองแบบ mHealth และแบบพบหน้า กลุ่มตัวอย่างเป็นข้าราชการสังกัดสำนักงานเลขาธิการสภาผู้แทนราษฎร จำนวน 50 คน โดย 25 คนได้รับโปรแกรมการจัดการตนเอง mHealth และ 25 คน ได้รับโปรแกรมแบบพบหน้า การจัดเข้ากลุ่มด้วยการสุ่มตัวอย่างง่าย และจับคู่ตามอายุ เพศ และระดับการศึกษา เครื่องมือวิจัยประกอบด้วยโปรแกรมทั้งสองโปรแกรม เครื่องมือประเมินการตระหนักรู้ในตนเองและเครื่องมือประเมินพฤติกรรมในการจัดการตนเอง วิเคราะห์ข้อมูลด้วยสถิติเชิงพรรณนา การทดสอบไคสแควร์ การทดสอบที สถิติ Wilcoxon signed-rank test และ Mann-Whitney U test

ผลการศึกษาพบว่ากลุ่มที่เข้าร่วมโปรแกรมการจัดการตนเอง mHealth มีค่าอันดับเฉลี่ยการตระหนักรู้ในตนเองและพฤติกรรมในการจัดการตนเองสูงกว่ากลุ่มที่เข้าร่วมโปรแกรมแบบพบหน้า อย่างมีนัยสำคัญทางสถิติ การศึกษาครั้งนี้สนับสนุนถึงประสิทธิผลของโปรแกรมการจัดการตนเอง mHealth เมื่อเทียบกับโปรแกรมแบบพบหน้าในการเพิ่มการตระหนักรู้ในตนเองและพฤติกรรมในการจัดการตนเองใน 12 สัปดาห์ พยาบาลสามารถบูรณาการโปรแกรมนี้เพื่อส่งเสริมสุขภาพคนไทยที่สามารถเข้าถึงเครื่องมือสื่อสารผ่านแอปพลิเคชัน LINE เพื่อป้องกันการเกิดโรคความดันโลหิตสูงรายใหม่ และควบคุมความดันโลหิตสูงได้ ซึ่งจำเป็นต้องมีการทดสอบเพิ่มเติมในกลุ่มประชากรอื่นก่อนที่จะนำไปใช้อย่างแพร่หลายทั่วประเทศ

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คำสำคัญ: แบบพบหน้า mHealth การตระหนักรู้ในตนเอง พฤติกรรมในการจัดการตนเอง โรคความดันโลหิตสูงที่ควบคุมไม่ได้

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