



Development of a Digital Pocketbook-Based Hypertension Education Media to Improve Self-Management among Hypertensive Patients

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ABSTRAK

Hipertensi masih menjadi masalah kesehatan masyarakat utama dan memerlukan self-management yang berkelanjutan untuk mencegah komplikasi. Media edukasi digital yang praktis dan mudah diakses berpotensi mendukung pembelajaran mandiri pasien hipertensi. Penelitian ini bertujuan untuk mengembangkan media edukasi hipertensi berbasis digital pocketbook dan mengevaluasi perubahan self-management setelah penggunaannya. Penelitian menggunakan desain pre-experimental one-group pretest-posttest yang melibatkan 35 pasien hipertensi di salah satu pusat layanan kesehatan primer di Jawa Tengah, Indonesia. Peserta menerima edukasi menggunakan digital pocketbook yang mengintegrasikan materi visual dan dukungan edukasi berbasis perawat selama empat minggu. Self-management diukur sebelum dan setelah intervensi menggunakan kuesioner self-management hipertensi dan dianalisis menggunakan uji statistik berpasangan. Rerata skor self-management meningkat dari $58,42 \pm 7,15$ pada pretest menjadi $78,65 \pm 6,38$ pada posttest, dengan peningkatan rerata sebesar 20,23 poin ($p < 0,001$). Temuan ini menunjukkan adanya peningkatan self-management yang signifikan setelah penerapan edukasi berbasis digital pocketbook. Namun, karena penelitian menggunakan desain satu kelompok tanpa kelompok kontrol, peningkatan tersebut tidak dapat sepenuhnya diatribusikan pada intervensi. Digital pocketbook berpotensi menjadi media edukasi yang praktis dan mudah diakses

untuk mendukung self-management pasien hipertensi di layanan kesehatan primer, tetapi penelitian terkontrol lebih lanjut diperlukan untuk memastikan efektivitasnya.

ABSTRACT

Hypertension remains a major public health problem and requires sustained self-management to prevent complications. Practical and accessible digital educational media may support independent learning among patients with hypertension. This study aimed to develop a digital pocketbook-based hypertension education medium and evaluate changes in self-management following its use. A pre-experimental one-group pretest-posttest design was employed involving 35 patients with hypertension at a primary healthcare center in Central Java, Indonesia. Participants received education using a digital pocketbook integrating visual educational materials with nurse-led educational support for four weeks. Self-management was assessed before and after the intervention using a hypertension self-management questionnaire and analyzed using paired statistical testing. The mean self-management score increased from 58.42 ± 7.15 at pretest to 78.65 ± 6.38 at posttest, representing a mean increase of 20.23 points ($p < 0.001$). These findings demonstrate a significant improvement in self-management following the digital pocketbook-based educational intervention. However, because the study employed a single-group design without a control group, the observed improvement cannot be attributed solely to the intervention. The digital pocketbook may represent a

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practical and accessible educational medium for supporting hypertension self-management in primary healthcare settings; further controlled studies are needed to establish its effectiveness.

1. INTRODUCTION

Hypertension remains one of the leading global public health problems and contributes significantly to cardiovascular morbidity and mortality worldwide. According to the World Health Organization, approximately 1.28 billion adults worldwide are affected by hypertension, with many cases remaining uncontrolled due to inadequate treatment adherence and poor self-management practices (World Health Organization, 2021). Uncontrolled hypertension increases the risk of stroke, heart failure, kidney disease, and other cardiovascular complications that may reduce quality of life and increase healthcare burdens. In Indonesia, hypertension remains one of the most common chronic diseases managed in primary healthcare services and continues to contribute to increasing healthcare utilization and long-term treatment burdens (Kementerian Kesehatan, 2024). Effective hypertension management requires long-term self-management behavior, including medication adherence, dietary regulation, physical activity, blood pressure monitoring, and lifestyle modification. However, many patients still demonstrate poor self-management practices due to limited health literacy, lack of continuous education, and inadequate access to practical educational media. Conventional health education methods are often considered less attractive, less interactive, and unable to support independent learning among patients with chronic diseases, particularly hypertension (Aji, Gabriel Ching, et al., 2026a).

In response to these challenges, the rapid development of digital technology has encouraged the implementation of innovative digital health education media to improve patient engagement and self-management behavior. Previous studies reported that digital-based educational interventions could improve medication adherence, self-care behavior, and blood pressure control among hypertensive patients. Mobile health education, digital booklets, multimedia learning, and smartphone-based interventions were found to provide flexible access to educational materials and enhance independent learning experiences among patients with chronic illnesses (Fathurrahman et al., 2024). The World Health Organization also emphasized that digital health interventions play an important role in strengthening chronic disease management and community health education (Kario et al., 2024). Furthermore, several studies demonstrated that visual and interactive educational media improved patient understanding, motivation, and participation in self-management programs among patients with hypertension (Aji, Gabriel Ching, et al., 2026b). Nevertheless, many previous digital health interventions were primarily application-based and often required stable internet access, higher digital literacy, and complex technological features that may limit their implementation in community and primary healthcare settings.

Despite the growing use of digital health education, limited studies have specifically focused on the development of digital pocketbook-based educational media designed to support hypertension self-management in primary healthcare settings. Most previous interventions mainly utilized mobile applications or web-based systems that often required stable internet access and higher digital literacy levels. In contrast, digital pocketbooks may provide more practical, accessible, and user-friendly educational media that can be easily utilized by hypertensive patients in community and primary healthcare settings. The findings of this study are expected to contribute to the development of innovative nursing educational media and strengthen digital health education implementation in primary healthcare services. Therefore, this study aimed to develop and evaluate the effectiveness of a digital pocketbook-based hypertension education media in improving self-management behavior among hypertensive patients in primary healthcare settings.

2. METHOD

This study employed a pre experimental design with measurements conducted before and after the intervention in a single group. The design was used to examine changes in hypertension self-management scores following the implementation of digital pocketbook education. Because no control group was included, the study was intended to evaluate changes observed during the intervention period rather than to establish a causal effect of the intervention (Politi et al., 2021).

The study was conducted from January to March 2026 at a primary healthcare center in Central Java, Indonesia. Participants were patients diagnosed with hypertension who were older than 18 years, able to read and use a smartphone, and willing to participate in the study. Patients

with severe complications, cognitive impairment, or communication difficulties that could interfere with participation were excluded. A total of 35 participants who met the eligibility criteria were recruited using purposive sampling.

The intervention consisted of hypertension education delivered through a digital pocketbook together with educational support from nurses. The pocketbook contained information on hypertension management, medication adherence, healthy diet, physical activity, blood pressure monitoring, stress management, and lifestyle modification. Its design combined concise educational content, infographics, and a layout optimized for smartphone viewing (John Creswell; J. David, 2020). The pocketbook was distributed to participants as a PDF file that could be accessed through their smartphones.

At the beginning of the intervention, participants attended an educational session delivered by trained nurses. They subsequently used the digital pocketbook for independent learning over a four-week period. Follow-up was conducted once a week to monitor participation, reinforce the educational content, and address questions related to hypertension self-management. Standardized educational procedures and the same digital materials were used throughout the study to maintain consistency in intervention delivery (Kim et al., 2023).

Self-management was assessed before and after the four-week intervention using a structured hypertension self-management questionnaire. The questionnaire assessed medication adherence, dietary management, physical activity, self-monitoring, and lifestyle modification. Participant characteristics, including age, sex, educational level, and duration of hypertension, were also recorded. The questionnaire underwent validity and reliability testing before data collection and demonstrated good internal consistency, with a Cronbach's alpha coefficient of 0.89. Blood pressure was measured using a calibrated digital sphygmomanometer according to standardized measurement procedures (Upoyo et al., 2024).

Data were analyzed using IBM SPSS Statistics version 26. Participant characteristics were summarized using frequencies and percentages, while continuous variables were summarized using means and standard deviations (Shersher et al., 2021). The distribution of self-management scores was assessed using the Shapiro-Wilk test. Preintervention and postintervention self-management scores were compared using an appropriate paired statistical test based on the distribution of the data. Statistical significance was set at $p < 0.05$.

The study was conducted in accordance with ethical principles for research involving human participants. Permission to conduct the study was obtained from the participating primary healthcare institution before data collection. All participants received information about the study and provided informed consent before participation (Kurihara et al., 2024). Participation was voluntary, and participants were informed of their right to withdraw at any time without consequences. Confidentiality, anonymity, and privacy were maintained throughout the research process.

3. RESULT AND DISCUSSION

Result

A total of 35 hypertensive patients participated in this study and completed the intervention process. The majority of participants were female, aged between 45–65 years, and had experienced hypertension for more than three years. Most participants also had secondary education backgrounds and routinely attended primary healthcare services for hypertension control. The demographic characteristics indicated that hypertension predominantly affected middle-aged and older adults who required continuous self-management support and long-term educational interventions. Participant characteristics are presented in Table 1.

Table 1. Participant Characteristics (n = 35)

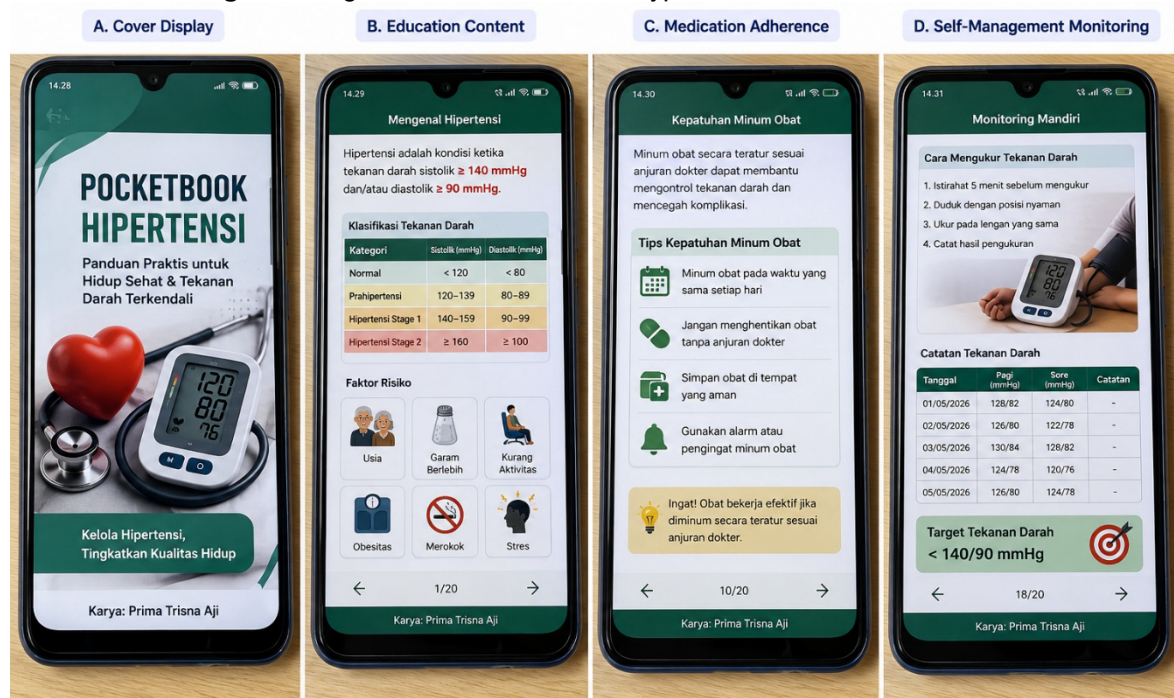
Characteristics	Frequency (n)	Percentage (%)
Gender		
Male	14	40.0
Female	21	60.0
Age		
45–54 years	12	34.3
55–65 years	17	48.6
>65 years	6	17.1
Education Level		
Primary School	9	25.7
Secondary School	18	51.4

Higher Education	8	22.9
Duration of Hypertension		
<3 years	10	28.6
≥3 years	25	71.4

Table 1 showed that most participants were female (60.0%), aged 55–65 years (48.6%), had secondary education backgrounds (51.4%), and experienced hypertension for more than three years (71.4%).

The digital pocketbook-based hypertension education media was developed using visual educational materials, concise explanations, infographic illustrations, and self-management guidance that could be easily accessed through smartphones. The media contained educational topics regarding hypertension management, medication adherence, low-salt diet, physical activity, stress management, and blood pressure monitoring. Participants reported that the digital pocketbook was practical, attractive, and easy to understand during the intervention process. The overview of the digital pocketbook-based hypertension education media is presented in Figure 1.

Figure 1. Digital Pocketbook-Based Hypertension Education Media



The digital pocketbook was designed using a smartphone-friendly layout with infographic-based educational materials to improve readability, visual attractiveness, and participant engagement during the learning process.

After participants utilized the digital pocketbook during the intervention period, changes in self-management behavior were evaluated using pretest and posttest assessments.

Following four weeks of intervention, participants demonstrated improvements in hypertension self-management behavior. The mean self-management score increased significantly after participants received education using the digital pocketbook media. The findings indicated that digital educational media effectively enhanced participant understanding and encouraged independent self-management behavior among hypertensive patients. The comparison of self-management scores before and after intervention is presented in Table 2.

Table 2. Comparison of Self-Management Scores Before and After Intervention

Variable	Mean ± SD	Mean Difference	p-value
Preintervention	58.42 ± 7.15		
Postintervention	78.65 ± 6.38	20.23	<0.001

The results therefore showed a statistically significant increase in overall self-management scores after the four-week educational intervention. Because the study did not include a control group, this observed change should be interpreted as a within-group improvement during the

intervention period rather than as evidence of a causal effect attributable solely to the digital pocketbook.

Discussion

The principal finding of this study was a significant increase in hypertension self-management scores following four weeks of education using a digital pocketbook combined with nurse support. The mean score increased from 58.42 ± 7.15 to 78.65 ± 6.38 , corresponding to a mean increase of 20.23 points. This finding indicates that participants demonstrated better overall self-management scores at the end of the intervention period. However, given the absence of a control group, the improvement cannot be attributed exclusively to the digital pocketbook intervention. Other factors occurring during the study period may also have contributed to the observed change.

The observed improvement is consistent with previous evidence suggesting that digital approaches can support hypertension self-management. Digital educational resources provide patients with opportunities to revisit health information outside scheduled healthcare encounters and may complement education delivered by healthcare professionals. Previous studies have reported favorable self-management and behavioral outcomes following digital health interventions among people with hypertension and other chronic conditions (Alshammari, 2024). The present findings add preliminary evidence regarding the use of a relatively simple digital pocketbook delivered through smartphones in a primary healthcare setting (Aji, Gabriel Ching, et al., 2026a).

Several characteristics of the digital pocketbook may have contributed to its usefulness as an educational medium. The material combined concise text, visual information, infographics, and practical guidance related to hypertension management. Its PDF format also allowed the educational material to be stored and accessed through smartphones without requiring a dedicated application. These characteristics may facilitate repeated access to health information (Unda Villafuerte et al., 2024). Nevertheless, usability, participant engagement, satisfaction, and independent learning were not directly measured in this study. Therefore, these potential advantages should be regarded as characteristics and possible implications of the educational medium rather than demonstrated outcomes of the present study (Unda Villafuerte et al., 2024).

Nurse involvement was another component of the intervention. Participants received an initial educational session and weekly follow-up during the four-week intervention period. Digital materials combined with professional educational support may provide a practical approach to reinforcing health information between healthcare encounters. Previous research has suggested that digital interventions accompanied by professional support can contribute to hypertension self-management (Sato, 2020). In the present study, however, the contribution of nurse support cannot be separated from that of the digital pocketbook because both components were delivered as a single intervention package. Consequently, the observed improvement should be interpreted as occurring after the combined educational intervention rather than as an independent effect of either component (Yardley, 2020).

From a nursing perspective, the digital pocketbook may provide a practical supplementary medium for hypertension education in primary healthcare. Its smartphone-accessible format can allow nurses to provide patients with educational material that remains available after face-to-face education. This approach may be particularly relevant for chronic disease management, in which patients need to apply self-management behaviors beyond healthcare visits (Trisna, 2026). Further research should directly evaluate usability, acceptability, engagement, and patterns of pocketbook use to determine how these characteristics influence self-management outcomes.

The contribution of this study lies in the preliminary evaluation of a simple digital pocketbook for hypertension education that combines visual educational material with nurse support in a primary healthcare setting. Unlike interventions that require dedicated mobile applications or web platforms, the pocketbook was distributed as a PDF that could be accessed using a smartphone. This format may offer a relatively simple option for delivering digital educational material. However, comparative studies are required before concluding that this approach is more accessible or effective than application-based or web-based interventions (Aji, Rizkasari, et al., 2026).

Several limitations should be considered when interpreting the findings. First, the single-group design without a control group prevents causal attribution of the observed improvement to the intervention and does not exclude alternative explanations, including temporal or measurement effects. Second, the sample consisted of only 35 participants recruited through purposive sampling at one primary healthcare center, which limits the generalizability of the findings. Third, the intervention combined the digital pocketbook with an initial nurse-led educational session and weekly follow-up; therefore, the independent contribution of the pocketbook cannot be determined. Fourth,

usability, engagement, satisfaction, and independent learning were not directly measured. Finally, the present analysis reports the overall self-management score; therefore, changes in individual self-management domains should not be inferred without separate domain-specific analyses.

Despite these limitations, the findings provide preliminary evidence of a significant within-group improvement in hypertension self-management scores following the four-week educational program. The digital pocketbook may serve as a practical supplementary medium for nurse-supported hypertension education in primary healthcare. Future studies using controlled designs, larger and more diverse samples, longer follow-up periods, and specific measures of usability and engagement are needed to determine the effectiveness and implementation potential of this educational approach.

4. CONCLUSION

This study found a significant increase in overall hypertension self-management scores following four weeks of digital pocketbook education combined with nurse support in a primary healthcare setting. The mean self-management score increased from 58.42 ± 7.15 before the intervention to 78.65 ± 6.38 after the intervention, representing a mean increase of 20.23 points ($p < 0.001$). These findings indicate a significant within-group improvement during the intervention period. However, because the study employed a single-group design without a control group and combined the digital pocketbook with nurse educational support, the observed improvement cannot be attributed solely to the digital pocketbook.

The digital pocketbook may provide a practical supplementary medium for delivering hypertension education through smartphones in primary healthcare settings. However, its effectiveness, independent contribution, usability, and longer-term outcomes require further evaluation. Future studies should employ controlled or randomized designs, larger and more diverse samples, multicenter settings, and longer follow-up periods. Future research should also assess specific self-management domains and implementation outcomes, including usability and participant engagement, to provide a more comprehensive evaluation of digital pocketbook education for hypertension management.

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