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Hypertensive Pregnant Women's Experience Regarding the Use of Mobile Health Application: A Phenomenological Study

Negar Heidari [1], Fatemeh Rajati [1,*], Mojgan Rajati [2], Paria Heidari [1]

[1] Department of Health Education and Health Promotion, Research Center for Environmental Determinants of Health, Health Institute, School of Health, Kermanshah University of Medical Sciences, Kermanshah, Iran

[2] Department of Obstetrics and Gynecology, Motazedi Hospital, School of Medicine, Kermanshah University of Medical Sciences, Kermanshah, Iran

[*] ***Corresponding Author:*** Department of Health Education and Health Promotion, Research Center for Environmental Determinants of Health, Health Institute, School of Health, Kermanshah University of Medical Sciences, Kermanshah, Iran. Email: f_rajati_12@yahoo.com

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Abstract

Background: Considering the popularity of mobile health applications among people in the community and the positive results of studies, these applications can be helpful in improving and better controlling blood pressure in patients. Examining users' experiences using these technologies can enhance their effectiveness.

Objectives: The current study aimed to investigate the experiences of pregnant mothers with high blood pressure using a mobile phone health application with a phenomenological approach in Kermanshah, Iran.

Methods: This qualitative and phenomenological study was conducted in 2023. For this purpose, 17 pregnant mothers with high blood pressure were included in the study. Data were collected through semi-structured interviews and analyzed using the "Van Manen" method.

Results: Four main themes and 12 sub-themes were identified from the interviews. Based on this, reliability (quality of content, educational method, and feedback), waiting time (no need to refer to different sources and speed of response), motivation (achievable goals, structure and order, encouragement and diversity in content), and facilities (interface easy to use, interactive activities and the ability to receive advice from an expert) were the themes and sub-themes extracted from the interviews.

Conclusions: This study's findings shed light on the potential of mobile health applications for hypertensive pregnant women. They underscore the importance of user-centered design and the potential of mobile health applications to empower and support pregnant women with hypertension. Future research and innovation can lead to developing more appropriate and effective mobile health applications for individuals, thereby fostering a more optimistic outlook for healthcare by incorporating users' perspectives and needs.

Keywords: Experiences, Hypertension, Mobile Applications, Qualitative Research, Phenomenology

1. Background

The quality of healthcare services significantly influences maternal health and pregnancy outcomes. Complications arising during pregnancy and childbirth can profoundly impact the family, the broader health system, and society at large. Among the various challenges pregnant women face, hypertension during pregnancy plays a crucial role in causing these complications. Gestational hypertension disorders affect 5 to 10% of pregnancies and are recognized as one of the components of the lethal triangle, alongside bleeding and infection (1, 2).

The proliferation of smartphones in recent years has been remarkable. Emerging technologies, such as mobile phones, have positively influenced health behaviors and enhanced people's quality of life. The widespread use of mobile phones has opened up new avenues for overcoming barriers to adopting and maintaining self-care practices. Moreover, specialized mobile health applications are offered that introduce innovative approaches to health behavior management (3).

While these technologies may not physically transport medications, healthcare providers, or equipment across different locations, they empower users to access necessary programs and reliable information online (4).

Mobile health applications can provide the necessary training for nutrition, physical activity, control of stress and pressures caused by pregnancy, various stages of pregnancy, such as pre-pregnancy preparation, self-care during pregnancy, preparation for childbirth, and overall better pregnancy management (5).

However, all these programs are not suited to the user's needs and are not usable for him. One of the essential challenges for the users of such programs is choosing a suitable functional health program. According to statistics in 2015, of the approximately 100,000 health-related apps available in Apple's App Store, more than 1.800 pregnancy-related apps were identified, with less than 15% of users being able to use them (6).

Therefore, examining mothers' experiences using the mentioned programs can be a suitable guide for future developers and help them adapt to users' needs. Therefore, this study should be conducted with a phenomenological approach so that people's expectations, attitudes, and beliefs about the phenomenon under investigation are examined in depth to gain a deep perspective on this issue, to understand the phenomenon, and to be aware of how mothers experience and point of view. Therefore, this study was conducted to investigate the experiences of pregnant mothers suffering from high blood pressure in using a mobile phone health application with a phenomenological approach in Kermanshah city.

2. Objectives

This study aimed to investigate the experiences of pregnant mothers with high blood pressure using a mobile phone health application using a phenomenological approach in Kermanshah, Iran.

3. Methods

The present study was a qualitative and phenomenological approach. Hermeneutic phenomenology provides a systematic approach to the study and interpretation of a phenomenon and allows the phenomenon to be analyzed and discovered with an interpretive perspective so that a deeper understanding of people's lived experiences can be achieved during the process of interpretation (7).

In this study, the experiences of hypertensive pregnant mothers regarding the use of mobile health applications were investigated. The researcher designed this mobile health software for hypertensive pregnant mothers. The mentioned software included various lifestyle and blood pressure topics, including nutrition, physical activity, and stress management. In addition, strategies related to self-determination theory were found to meet the needs of independence, competence, and relatedness of pregnant women. Strategies used included goal setting (to improve Autonomy), feedback, history, logging/self-monitoring (to improve Competence), peer comparison, challenge, and messaging (to improve Relatedness).

After receiving permission from Kermanshah University of Medical Sciences, the researcher collected information from the participants (pregnant mothers with high blood pressure who were referred to health centers covered by Kermanshah Health Center). The inclusion criteria were a positive pregnancy test, blood pressure equal to and above 140/90, minimum level of reading and writing, access to a mobile phone and the ability to use it, and the possibility of installing an application on a mobile phone, access to the Internet. Visual and hearing impairment, underlying diseases such as gestational diabetes and cancer, and not using the software were considered exclusion criteria.

Following the purposeful selection of samples, 17 pregnant mothers with hypertension participated in the study. The sampling procedure continued until the theoretical saturation of the data so that no new data was obtained from the interviews (8). the data were collected in 2023 using semi-structured interviews. The duration of the interviews was between 30 and 45 minutes. In the 14th interview, data saturation was achieved, but three more interviews were conducted for more assurance, but no new data was obtained. Therefore, a total of seventeen participants were interviewed.

Questions such as “Did you encounter any difficulties using the software?” and “Did the software meet your needs?” were posed during the interviews. Exploratory questions like “Can you elaborate further on this?” provided detailed information, clarified meanings, and reduced ambiguities (9). The consent of the participants was obtained before conducting the interviews.

These data were analyzed using the Van Manen method (7, 10, 11). This method's six stages, which are also the research methodology structure, are as follows.

3.1. First-Stage: Turning to the Phenomenon Under Study

At this stage, the researcher examines human experiences in the context in which they were obtained. An essential research activity at this stage is formulating phenomenological questions about the desired phenomenon. The researcher has a question: What are the experiences of pregnant mothers with high blood pressure regarding mobile health applications?

3.2. Two-Stages: Exploring the Experiences Under Review as Lived

At this stage, the researcher's effort was to express the experiences as they existed, and clear examples were also emphasized, as well as follow-up questions such as Ccan you give examples, or have you had any experience in this regard before? Helped to implement this category.

3.3. Third-Stage: Reflection on the Inherent Themes Describing the Phenomenon in Question

At this stage, the main themes of the experiences of pregnant mothers with high blood pressure regarding the use of mobile health applications were discussed. Van Manen has proposed three holistic, selective, and partial approaches to analyze themes. Two holistic and selective approaches were used in this research. In the data analysis process using a holistic approach, the text was carefully studied several times after implementing the texts from the interviews, and the general impression was written in several paragraphs using the selective approach. The exact text was carefully read several times, and sentences and phrases that describe people's lived experiences of the mentioned phenomenon were extracted as semantic units. The semantic units extracted from each interview were written on a separate sheet and placed in a separate category based on the semantic similarity to obtain more general and abstract expressions.

3.4. Fourth-Stage: The Art of Writing and Rewriting

According to Van Manen, phenomenological research ultimately aims to produce phenomenological texts to deepen the phenomena at hand. In this study, the researcher considered the art of writing and rewriting in the study process. A few things done in this stage were translating the interviews into an analyzable text, taking notes on the phenomenon's essence under investigation, writing holistically, writing about themes, and categorizing them in a column of similarities and differences.

3.5. Fifth-Stage: Maintaining a Strong and Directional Relationship with the Phenomenon in Question

This stage stressed focusing on the study's primary purpose and not deviating from it. In addition, a strong relationship with the desired phenomenon was tried by reviewing the themes of the interviews and establishing a solid relationship with the participants.

3.6. Sixth-Stage: Creating a Balance in the Context of the Research in Connecting the Part and the Whole

At this stage, the research process was continuously examined, considering the main research question and Van Manen's suggested steps, using a holistic and selective approach. An attempt was made to establish a relationship between themes and semantic units.

The four criteria proposed by Guba and Lincoln were used to ensure the accuracy and strength of the data. Guba and Lincoln (1982) proposed reliability as a criterion to replace validity and reliability in qualitative research, which includes reliability, transferability, confirmability, and dependability (12). In this study, analysis was used simultaneously with data collection and sampling with maximum diversity (economic classes, social classes, education, age, etc.) to increase the credibility of the data until theoretical saturation was reached. Confirmability was obtained by not applying the personal opinions of researchers. To ensure the stability of the findings (Dependability), the interviews were implemented as soon as possible, and the views of experts (External check) and the re-study of the data were used for this purpose. The maximum variety of participants was used to express the data more effectively, along with direct quotes, for the study's transferability.

4. Results

In the present study, 17 pregnant mothers with hypertension were interviewed. Table 1 shows their demographic characteristics.

According to Table 2, the interviews identified four main themes and 12 sub-themes. The main themes

Table 1. Demographic Characteristics of Research Samples [a]

Variables	Values
Mother's age	29.06
Gestational age	22.24
BMI	26.24
Systolic blood pressure	150.59
Diastolic blood pressure	105.29
Gravida	
1	5 (29.41)
2	7 (41.17)
3	5 (29.41)
Number of abortions	
No abortion	12 (70.58)
An abortion	5 (29.41)
Taking antihypertensive drugs	
No use	11 (64.70)
Use	6 (35.29)
Education of mothers	
Secondary education	4 (23.52)
Diploma	8 (47.05)
University education	5 (29.41)
Employment status of mothers	
Employed	6 (35.29)
Housewife	9 (52.94)
Working at home	2 (11.76)

[a] Values are expressed as mean or No. (%).

Table 2. Themes and Sub-themes Extracted from the Interviews

Themes	Sub-themes
Reliability	Content quality
	Various teaching methods
	Feedback
Waiting Time	No need to refer to different sources
	Response speed
Motivation	Achievable goals
	Structure and order
	Encouragement
	Diversity in content
Facilities	Easy user interface
	Interactive activities
	The ability to receive advice from an expert

extracted from the interviews were reliability, waiting time, motivation, and facilities.

4.1. Reliability

The reliability of educational software refers to users' trust and confidence in its performance, quality, and effectiveness. Software that users trust can provide effective and appropriate training and meet their educational needs. The reliability theme was extracted

from three sub-themes: Content quality, various teaching methods, and feedback.

4.1.1. Content and Quality of Education

Educational software should provide efficient and high-quality content, including the information's accuracy and correctness, comprehensiveness and applicability, and suitable training methods for the users. The present study showed that most mothers are satisfied with the quality of the educational content of the software. For better understanding, direct quotes from the interviews are provided:

"It worked for me, and I recommend this software to others. Anyway, the content is good for other women with high blood pressure. I am very sensitive and was sure the content was correct by asking my doctor. Anyway, pregnancy is a sensitive period, if you have high blood pressure, the sensitivity increases during this period" (user number 1).

"Since I was diagnosed with high blood pressure, I have read a lot of educational materials, mostly articles. I have to ensure that the sports or other things I do do not cause problems for my child or me. The application's contents were scientific. I also talked to my doctor about the application's contents, and he assured me there would be no problem and that the contents were helpful" (user number 5).

"Its content about nutrition, exercise, and stress was very complete. I liked it, and the parts that I followed the most, such as nutrition and dos and don'ts, I follow my doctor's advice, and I don't have any problems" (user number 12).

"I think the contents were simple and fluent, but I wish we could access the contents offline" (user number 9)

4.1.2. Various Teaching Methods

An effective teaching method should improve the learning process using modern techniques and allow users to choose various teaching methods. In the current study, mothers often welcomed educational strategies such as goal setting, feedback, and history of activities. For better understanding, direct quotes from the interviews are provided:

"I liked the two methods of goal setting and activity history because they make me stick to what I set, and when I look at my activity history, I'm kind of proud of myself" (user number 11).

"It has attractive learning methods, and nothing is imposed on us. I felt that I had chosen some goals for myself and used some parts, such as yoga and other sports. This power of choice is essential to me. It was because it made me follow the program with pleasure" (user number 9).

"I used all the software methods. I think it can be helpful, but it was not good that I could only send a text message to the doctor, and it would be much better if I could talk to them via video and online" (user number 13).

"I liked the challenge part. I think it was a good variety, but other mothers don't respond to my request" (user number 16)

4.1.3. Feedback

The feedback feature helps users improve their learning path, increase motivation and self-confidence, and find the best way to achieve their educational goals. In addition, this feature creates communication and interaction between users and software developers. The software can be improved and optimized. As a result, feedback capability for users is very important in educational software and helps to improve the quality of learning and user experience by providing feedback and responding to users' needs and problems.

"After I reached my goal, an encouraging message was displayed to me, which made me continue and motivated me" (user number 6)

"Most of the time, I was one of the best in setting goals and sticking to them, and I think that showing who performed better was helpful both for me and those who did not perform well when others were trying, why not me?" (user number 9)

"The problem I had was that we could ask the doctor only one message in 24 hours, and it would be better if we could send more messages" (user number 12)

"I didn't think before that my physical activity was not enough for pregnancy, but I realized this problem after seeing the progress chart of my physical activity in the software" (user number 8)

4.2. Waiting Time

Managing and reducing waiting times in educational software are crucial for facilitating learning and enabling users to access academic resources and content quickly. The central theme of waiting time was

extracted from two sub-themes, and there is no need to refer to different sources and response speeds.

4.2.1. No Need to Refer to Different Sources

Education software that does not require users to refer to multiple sources has many advantages, such as ease of access to educational materials, reduction of search and preparation time, and appropriateness of the contents.

The present study showed that most mothers were satisfied with not having to collect the materials they needed from different sources and instead using educational software to access most educational resources. This possibility gives them easy and quick access to their needed materials and eliminates their need to collect educational resources from other places. For better understanding, direct quotes from the interviews are provided:

"Well, in my opinion, the software covered all the areas. I was always looking for a program that could help me whether it was about nutrition, exercise, and especially stress, and this software had them all" (user number 3)

"For high blood pressure, you have to observe many things. On the other hand, if you want to search for what is good to eat or what is bad, what sports to do and what not to do, there are so many things that a person gets confused. The software talked about everything I was looking for, and I was satisfied with that" (user number 8)

"I can say that it is good software and contains many tutorials with interesting methods. If a person wants to search for the same, he has to devote a lot of time to this task, and then he gets confused about what to do. I intend to continue my goals with it" (user number 10)

"What I liked was that the software didn't just explain the sports, and in addition, it showed the movements in an animated form, and we didn't need to search the internet for how to do it correctly" (user number 7)

4.2.2. Response Speed

The response speed is essential in educational software, which includes answering users' questions, providing immediate guidance and explanations, providing instant results and feedback, and providing timely content and educational resources. The speed of appropriate response to these needs improves users' performance and learning quality and plays an essential role in the success of educational software. In this research, most mothers were satisfied with the speed of response in the message to the doctor section and support when a problem occurred. For better understanding, direct quotes from the interviews are presented:

"I had a problem; I wanted to message the doctor. I thought about it. I saw that it might take a long time for the doctor to come and read and give an answer. I preferred to go to my doctor in person. It would be better if I could talk to the doctor online and get an answer to my question right away" (user number 2)

"I had a problem with the challenge part. I sent a message to guide me, and it was solved. I think it is necessary for every application to be supported" (user number 16)

"Sometimes, when I have a problem using the software, for example, the part of registering goals, I would discuss it with the developer of the software, and they would solve the problem very quickly" (user number 6)

4.3. Motivation

Paying attention to motivation in educational software can improve users' performance, increase participation and interaction, maintain consistency, and improve user experience. In addition, motivation helps users cope with obstacles and challenges encountered during learning and avoid feelings of giving up and despair. The central theme of motivation was extracted from four sub-themes: Achievable goals, structure and order, encouragement, and diversity in content.

4.3.1. Achievable Goals

Specific and achievable goals in educational software increase users' motivation. When users can clearly define their goals and move towards them, their sense of progress and satisfaction increases.

The goal setting by the individual and trying to achieve it will be valuable and satisfying from the mothers' perspective in the current study. When a person sets a clear goal for himself and strives for it, he feels motivated and develops. Also, achieving the desired goal can convey a sense of spontaneity and a sense of success to a person. For better understanding, direct quotes from the interviews are presented:

"I determined my goals according to the abilities I knew about myself, and it was not mandatory, and

because I had determined my goals of my own free will, I stuck to them, and it was important to me" (user number 2)

"I think that if you specify your goal, you have taken the first step and are not unmotivated. I set my goal to achieve it, and then my motivation for the next more challenging goal would increase" (user number 4).

"In the beginning, I didn't have much motivation to follow a regular program, but I started to set a small goal with this program. After a while, my interest increased, and this feeling of progress and being with a plan motivates a person a lot" (user number 8).

4.3.2. Structure and Order

A clear and orderly structure in educational software helps users better understand what they need to do and at which stage they are. Structure and order can convey a sense of control and progress to users and increase their motivation.

This research used content division, understandable user interface, various training methods, user progress monitoring, and technical support to create a regular structure in the software. For better understanding, direct quotes from the interviews are presented:

"I saw my progress and activity history every week, and it motivated me to continue" (user number 2)

"I think it was essential to be able to talk about the problems that occur to us when using the software because if it weren't for this conversation, maybe we wouldn't be able to continue the programs" (user number 3)

"I was attracted to educational methods, especially the topic of stress control; it was practical because it was also audio" (user number 15)

"The software had various topics, but I was not confused. For example, before, it was difficult for me to maintain my physical activity and control my stress, but with this software, I did not have this problem, and everything was orderly. I was satisfied with it" (user number 8)

4.3.3. Encouragement

Encouraging users is essential. This action can significantly affect users' participation and progress by motivating and increasing their morale and self-confidence, enabling them to continue learning and using the software.

In this research, solutions such as a reward and scoring system, ranking and competition of users based on progress and activity, positive feedback, diverse content, communication with users to answer their questions and needs, and opportunities for interaction between users were used to encourage users. Here are direct quotes from the interviews:

"I used to get tired and unmotivated sometimes, but I saw that other mothers were trying for the health of themselves and their fetuses; I also put aside disappointment and fatigue" (user number 2)

"I was lazy to do physical activity, and I was not good at recording and achieving goals, but I was encouraged and guided by the support of the application, and my performance improved" (user number 5)

"I like competition in general, and every time I became one of the best, my motivation to continue the program increased" (user number 2)

4.3.4. Diversity in Content

Diversity in content is essential for reasons such as attracting attention, creating motivation, and encouraging continuity. The current research tried to increase users' motivation with different types of content and learning styles (textual, visual, video, and audio) and other subjects and activities. Here are direct quotes from the interviews:

"For me, the content was not boring at all; we could see the content we needed in the form of audio and video, and this was interesting for me" (user number 10)

"Application taught the exercises visually and animatedly, so it was easy for me how to do the movements. If it were only text, we would either have to search for it ourselves or give up" (user number 5)

"I liked the stress training the most; I needed it, and it calmed me down" (user number 3)

"The software had different parts and used interesting methods, and anyone could use any part they liked" (user number 9)

4.4. Facilities

Facilities in educational software are essential and include educational videos, easily accessible educational files, direct communication with doctors and other people, and progress history. These features can help people make the best use of educational software and progress in their learning process. In addition, the proper facilities can improve the learning experience for

users and help create a more effective learning environment.

The central theme of the facility was extracted from three sub-themes: Easy user interface, interactive activities, and the ability to receive advice from a medical expert.

4.4.1. Easy User Interface

The user interface of educational software should be easy and understandable so that users can easily use it and interact with educational content and tasks. In this research, an attempt was made to use a simple design, symbols, and clear instructions. Here are direct quotes from the interviews:

"Using the software was easy, it was not particularly complicated, and I had no problem using it because there was a video to use; I looked wherever I had problems" (user number 7)

"I had a problem in inviting other mothers to the challenge. I got help from the software support, and the problem was solved" (user number 16)

"One of the parts that I thought was difficult to use was setting and registering goals. By the way, this part was important to me, but I could register my goals with just a few simple clicks" (user number 8).

4.4.2. Interactive Activities

Educational software should enable interactive activities so users can share their experience, skills, and knowledge. This capability included exercises, challenges, and group activities in the current research. Interaction with content and other users can enhance learning and improve the educational experience. Here are direct quotes from the interviews:

"The challenge section of the software was interesting to me. If other women answered, we could get help from each other" (user number 16)

"The software made it possible to communicate with the doctor and support, and I think it was useful to use it" (user number 7)

4.4.3. The Ability to Receive Advice from an Expert

Direct communication with medical professionals in the educational software allows users to ask questions and clear their doubts. Correct and timely advice can prevent errors and severe injuries and help users make important decisions about their health. In this research, an attempt was made to pay attention to things such as patient privacy, doctor's competence and expertise, continuous communication, and service quality. Here are direct quotes from the interviews:

"I liked that it was possible to communicate with the doctor several times during the day. It was every day but once a day, I understand anyway, and it was good overall" (user number 1)

"It would be great if it were possible to video call the doctor through the app; I was worried that I wouldn't be able to express what I meant in a text message to the doctor" (user number 14).

"I thought that another person could read the messages, and I was not sure about this. I think communicating with the doctor online can solve many problems" (user number 10).

5. Discussion

Mobile applications for health promotion have increased dramatically in recent years, and mobile devices and health technologies have created a new paradigm in care delivery. The use of mobile health technology can, in particular, improve primary and secondary prevention of diseases and provide personalized, consistent, and sustainable interventions, as well as improve patient communication, access to health care services, engagement with health behaviors, and adherence to these services and treatments (13-15). In this regard, using users' experiences regarding mobile phone applications can be effective, so the present study was conducted to investigate the experiences of pregnant mothers with high blood pressure regarding mobile phone health applications.

An essential feature in making mobile phone applications is ease of use, simplicity, and the ability to provide information. Some information was provided directly by the program, and others were produced by the mothers and recorded in the program. Mothers stated that scientific, diverse, up-to-date information in the program is necessary so that people with different needs and interests can find relevant information. Peng et al. conducted a qualitative study on users' perceptions of mobile health applications. The results of this research, similar to the present study, indicated the importance of ease of use and simplicity as criteria for the acceptance and use of mobile health applications (16). Some studies have cited difficulty or complexity as a barrier to using mobile health applications (17, 18).

Another important feature in building mobile applications is targeting. Most participants were

satisfied with the goal-setting part and believed that goal setting by the individual, according to ability and interest, and far from coercion, in the form of small daily and weekly goals, can slowly lead to behavior change. On the other hand, positive feedback encourages the individual, and negative feedback, along with providing a solution, can play a role in adopting and continuing the behavior. In addition, most participants wanted to have a history feature in their apps because this type of monitoring increases their self-awareness. In addition, people could see their progress over time through this feature. In this regard, Szinay et al. stated that feedback, goal setting, reward, and commitment affect people's interaction with health programs (19). Moreover, Dennison et al. mentioned mobile health applications as a tool to track users' progress (20).

Extrinsic motivational factors, such as observing others using the application, facilitate the use of mobile health applications because a person can thus compare himself with others and observe his condition. Peng et al. and Connolly et al. stated that extrinsic motivational factors such as observing others using mobile health applications and sharing behavioral data facilitate using these applications because they can compare themselves with others in this way. Users cited social influence as facilitating the use of mobile health applications (16, 21).

Mobile health applications can reduce transportation costs, reduce time spent, and spread information quickly and effectively, but many people prefer face-to-face communication to other communication methods, especially when they are being diagnosed or treated for a disease. Many mothers find it very difficult to communicate with the doctor through phone and text messages instead of face-to-face, suggesting that video communication along with text messages can be effective. Abelson et al. and Khatun et al. also stated, in line with the results of the present study, that people prefer face-to-face communication and even consider it valuable (17, 22).

Security concerns regarding releasing confidential information are one of the main concerns of mobile health application users. Providing people with confidence in maintaining their confidential information can be a crucial step toward overcoming this challenge. Mothers expressed concerns about the disclosure of information and the ability to see their information by other mothers, and it was tried to show how the program works and the parts that can be seen by other mothers to give them the necessary assurance regarding the privacy of their information. Studies have shown that a mobile health application allows women to share confidential information with their doctors (17, 23) more easily. Some studies reported that mobile health applications are suitable for people with poor socioeconomic status who have less access to healthcare facilities (17). Some studies showed mobile health application users' concern about protecting personal information and privacy (18, 24, 25).

Mobile health applications are changing and developing, and the prospects for their development in the coming years are very bright. It is not far-fetched to expect their increasing growth. Therefore, the field of researching mobile health applications and their effects on society is vast.

Although the present study led to significant findings, it is suggested that culture-oriented studies, especially ethnographic studies, be used to research people's behavior and needs regarding the correct use of mobile health applications.

User experience in mobile health programs is a multi-dimensional concept that requires attention to all its dimensions for the success of such programs. Creating a better experience for mobile health users requires considering all its dimensions, including the technological and functional dimensions, the sensory and emotional dimensions, the cognitive dimensions, and the social-interactive dimensions.

5.1. Limitations

Like other studies, the present study was also associated with limitations. First, in this study, there were problems related to the environmental conditions of the interview, such as noise in the environment, which could have been influential in the quality of the response.

The second limitation of this study was the lack of articles and research on using mobile health applications to improve healthy lifestyles and control the blood pressure of pregnant mothers. Therefore, it is suggested that this issue be addressed more in future research.

5.2. Conclusions

The findings discussed the significance of mobile health applications in addressing the specific needs of

hypertensive pregnant women. The field of mobile health (mHealth) has witnessed remarkable growth in recent years, and this study's insights contribute to our understanding of how these applications can be optimized for the unique circumstances of pregnant women with hypertension.

The study emphasizes user-centered design as a crucial aspect. By examining the perspectives and needs of the target users, mHealth applications can be tailored to provide maximum value and support. Understanding the challenges, concerns, and preferences of hypertensive pregnant women is essential for creating solutions that truly address their requirements. User-centered design principles involve involving pregnant women with hypertension in the development process, incorporating their feedback and suggestions, and ensuring the application is intuitive, accessible, and user-friendly.

The study's findings also call attention to the need for ongoing research and innovation in the field of mobile health applications for hypertensive pregnant women. Researchers and developers can refine and enhance the functionality and usability of these applications by exploring user experiences, evaluating existing applications, and identifying areas for improvement. This process can lead to the development of more appropriate and effective mobile health solutions that better serve the specific needs of pregnant women with hypertension. Furthermore, collaboration between multidisciplinary teams comprising healthcare professionals, researchers, designers, and technology experts is crucial for advancing the field. Innovative ideas can be generated, and comprehensive solutions can be developed by combining diverse expertise. This collaborative approach ensures that mobile health applications for hypertensive pregnant women are evidence-based, medically accurate, and aligned with best practices in both healthcare and technology domains.

In conclusion, the findings discussed contribute valuable insights into the field of mobile health applications for hypertensive pregnant women. The study emphasizes the importance of tailoring solutions to meet the needs of pregnant women with hypertension by emphasizing user-centered design. Through ongoing research, collaboration, and innovation, more appropriate and effective mobile health applications can be developed, ultimately improving the health outcomes and experiences of individuals in this population.

Footnotes

Authors' Contribution: F. R. and M. R., contributed to the idea of study interpretation; F. R. and M. R., contributed to the data analysis; and N. H. and P. H., contributed to the layout of the first draft of the manuscript and data collection. All authors participated in the final approval of the revised manuscript for publication.

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Data Availability: The corresponding author will provide the dataset used in the present study upon reasonable request.

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Informed Consent: Written and verbal consent was obtained from the participants to participate in the present study.

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