

Facilitators and Barriers of Using Mobile for Patient Education

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ARTICLE INFO	ABSTRACT
<p>Article type: Original Article</p>	<p>Introduction: Patient education is a dynamic and continuous process that starts from the moment of admitting the patient and continues after the discharge. The objective of such education is to empower patients to do self-care and improve their quality of lives. Different methods are available for education. This study was aimed to explore the Facilitators and barriers of remote education using mobile massaging applications.</p>
<p>Article History: Received: 12 Aug 2023 Accepted: 30 Sep 2023</p>	<p>Materials and Methods: The study was conduct as a participatory action research. Participants were 70 nurses, 14 physicians, and 96 patients. Data was collect with interviews. Data analysis method was content analysis and the research process consisted of four phases of planning, implementing, observing, and reflecting.</p>
<p>Key words: Distance Education, Mobile. Self-Care, Patient Education, Virtual Space.</p>	<p>Results: The categories of the Facilitators of mobile learning from physicians, nurses, and patients' viewpoints were "more accessibility, complete and comprehensive, and ease of virtual education." Among the barriers were "large volume of content, out of date content that puzzles the users, invalidity of some references, and the risk of infection transmission through mobile phone." The participants emphasized on the necessity of codifying content, updating educational resources, teaching the methods of using reliable references, and codifying guidelines of disinfecting mobile phones.</p>
	<p>Conclusion: Patient education through remote education in virtual space using massaging applications is an efficient, comprehensive, accessible, and economic method that also brings patients' satisfaction. It is essential to use experts' viewpoints to update the references. The patients need to be educated about the right way of disinfecting mobile devices and find reliable references.</p>
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Introduction

Patient education is one of the main professional health and therapeutic functions. It is a patient-centered process and based on patients' needs to help them make participatory (1). From the quality of care viewpoint, it is a part of patient's rights (2). Patient education is essential for the improvement of self-care in (3-5).

In addition, patient education shortens hospitalization term and treatment cost (6). For every dollar spent on patient education, 3-4 dollars of health costs is saved. According to the statistics, US\$69-100 million is spent on the therapeutic costs caused by the lack of health education in the US (2). It is notable that desirable therapeutic results happen when health personnel have the required skills to educate patients (7). In this regard, the type and method of providing educational content affect the learning and adherence to educations. The type of education refers to the environment, provider of education, and the form of education (e.g. text, face to face, or electronic). The way of providing education is very important (6). In the case of adults, several education methods are more efficient (8). The theory of adults' education emphasizes on problem solving techniques, urgent need of patient, realizing the importance of education, and applied nature of education (9).

Different education methods are available. The normal ways of education are face-to-face, giving lecture, and using pamphlets. Technological advances have added virtual space to the list so that distance education using the technology and virtual space is now an option (9). The use of Internet in everyday life is growing (10) and computer programs have increased the efficiency of patient education (11). Virtual education can result in expansion of knowledge, critical thinking, and problem-solving skills (12). Taking into account that the majority of society members have a smart phone in hand, mobile learning is expanding fast (13). About 64% of the US citizens have a smart phone and there are 40000 to 60000 health applications available (14). According to Athilingam, 7 billion mobile devices are available in the world and 95% of the world populations are using it (15). The user

carries their cell phone with themselves during the day and this creates an opportunity for health and therapeutic education (15). Using cell phone in education is expanding (16) so that it is one of major areas of cell phone usage (17) and it is growing fast (18) and accessible (19). Easy use and access to mobile devices (20) means better connection between the patient and medical team (17). The possibility of virtual examination has drawn a great deal of attention to use mobile for care purposes (20). In addition, 2D and 3D video content (21) for educational purposes have increased the efficiency of these therapeutic applications for providing care to patients (22-24). Aging population of the world and increase in the prevalence of chronic diseases has added to the necessity of using cell phone for the improvement of health and self-management in patients (25). Khorasani et al. (2015) emphasized on using educational, motivational, and monitoring applications and the improvement of health education infrastructure given the specific needs of patients (26). Taking into account the facilitators of using cell phone are education about drugs, nursing intervention, treatment, and knowledge about diseases (16). Mobile technology facilitates relationship between providers and receivers of care services (18). This study was aimed to examine the facilitators and barriers of virtual education using virtual space and mobile massaging applications through an action research.

Material and Methods

Study design and set

The study was carried out as a participatory action research. A research action cycle through participatory method was conducted in four phases of planning, implementing, observing, and reflecting (27).

At first, required permission for doing the study was secured and the participants were briefed about the objectives. The participants were selected purposefully and their status in terms of education and self-care, the factors, and solutions to make improvement in using mobile massaging applications and the barriers were determined. To this end private and group semi-structured interviews were conducted with the participants. The

interviews were transcribed and analyzed through continuous quality content analysis. The solutions were prioritized based on their importance and practicality with the help of participants and required arrangements were made to implement the solutions.

The second phase (implementation) consisted of preparing educational content with .doc and PDF format along with educational films. The physicians and other participants confirmed the content. All the participants were invited to join the channel.

The third phase (observation) consisted of monitoring probable changes caused by the implementation of the program. This phase was based on interviewing the participants about the quality and quantity of the taught content. In addition, the educational channel was updated based on experts' opinions. In this phase, a specific content about disinfecting cell phones was uploaded to the channels. Phase four (reflection) was about pondering the procedure, taking action, and observing. Concentrated group interviews (and private interviews if needed) were conducted with the participating physicians, nurses, and patients about the efficiency of the program, the process of interventions, the facilitators and barriers of the program, and the problems and issues of implementing the program.

Study participants and sampling

The participants were selected through purposeful sampling. The inclusion criterion was nurses, physicians, and patients from July 2020 to September 2021.

The participants were 70 nurses, 14 physicians, and 96 patients.

Rigor (Validity-reliability)

Two Research assistants separately and simultaneously reviewed the interviews (27, 28) and the data were analyzed simultaneously by them (27-29).

Data collection tool and technique

Data collection was done through private and group interviews and data analysis was done through qualitative content analysis in MAX Q DA.

Ethical consideration

This study was approved by Ethics Committee (IR.SBMU.SME.REC.1401.103). To

observe the ethical considerations, the research goals and procedures were elucidated to the participants, they were assured of information anonymity and confidentiality, and informed written consent was obtained from each nurse. They participated in the study voluntarily and could leave the study at any stage.

Results

This action research was conducted through virtual education of patients using massaging applications in six months. Totally, 70 nurses, 14 physicians, and 96 patients took part in the study.

At the first stage facilitators and the barrier of using cell phone for patient education was investigated with interview with the participants. At this stage, after the initial analysis of the interviews, 744 codes were identified, which were categorized into 14 subcategories and 5 categories (3 categories for facilitators and 2 categories for barrier). Table 1 showed the result of content analysis of interviews.

The facilitators of using cell phone for patient education were categorized into three categories of "easy access, ease of use, and comprehensive content." In addition, the obstacle was infection control in virtual education using mobile devices. With regard to the category "easy access," the patients stated that many points are reminded to the patient when they are discharged and then they forget them in a day or two. Using mobile applications, however, the users can refresh their memories whenever they need. For instance, one of the participants said "In the channel I could check the educational materials that I had forgotten."

The participants also highlighted the ease of use of this method so that they could learn the missed points during face-to-face education in the channel. One of the patients added: "Many things are not covered in face to face education or there might be subjects that are not easy to discuss. These make the online channels very useful."

The physicians and nurses noted, "The content available in the channel has been completed over these three months under supervision of patients, nurses, and physicians. Over time, the channel can become an applicable educational reference

for patients.” A nurse added “animation and images are very efficient tools for education.” Another nurse noted that the content is even useful for newly graduated nurses so that they can complete their knowledge. The medical personnel agreed that this method of education provided complete and comprehensive education to patients. In terms of supervision, the participants mentioned the large extent to

content in online world and that there was a need to supply updated content by experts to avoid users’ confusion. In terms of the barriers, the participants highlighted confusing and unreliable sources and the risk of infections transmission through cell phones. The participants emphasized on providing updated content, references, and introducing cell phone disinfection guidelines (Table1).

Table 1: analysis of interviews (categories and sub-categories)

Number of codes	Code	Sub-category	Category	
87	Mobile phone is accessible everywhere.	Access	Easy access	Facilitators
69	Using it, you can have access no matter where you are. You can check on your way home or late at night.	Continuous access		
74	Finding answer to the questions that one might find it hard to ask.	More ease	Easier	
82	Nothing is missed out.	More complete education	More complete and comprehensive	
62	It is easy to check a subject several times.	Comprehensive education		
45	Like an education guide	Education guide		
53	It is useful for newly graduated nurses			
47	Content on websites and channels are not updated.	Updating content	Supervising content development and updating	Barriers
33	Content on websites and channels are not reliable.	Unscientific content		
59	There is a great volume of content on websites and channels and not all of them are correct.	Wrong content		
48	Confusion in finding reliable content.	Confusion	Disinfection guideline	
36	Mobile phone is a source of infection.	Mobile disinfection		
38	Mobile is widely used in clinical situation.			
41	Unfamiliarity with disinfection and the right way of using mobile phone in clinical situation.	Mobile disinfection education		

In the next stage (implementation) we design consisted of preparing educational content with .doc and PDF format along with educational films.

The physicians and other participants confirmed the content. All the participants were invited to join the channel.

In the third phase (observation), based on the analysis of the interviews, we have found that it can be more useful to consolidate training related to the patient in a mobile software, which is available offline to clients from the beginning of hospitalization and

provides them with the necessary educational step by step.

In the fourth phase (reflection) all participating emphasized that the efficiency of the program is better than the usual patient education but we have to educational content about mobile disinfection guidelines.

Discussion

Webb et al. reported that the facilitators of using technology and virtual space were flexibility, easy access, and deeper learning

and the barriers were technical flaws of application, and lack of skill in the users (30). Guo et al. listed the facilitators as fast access to information, reliability, efficiency, and easier decision making based on evidences in different fields (31). Odam et al. argued that education based on mobile applications was efficient (32). The patients can report the causes of dissatisfaction and enjoy access to the content no matter when or where (32).

Da Costa et al. maintained that the patients were satisfied with SMS follow-up services and accessibility during traveling or when direct access to experts was not possible (33). Day et al. reported that SMS service and mobile education before arthroplasty operation increased satisfaction of patients and created an efficient relationship between patient and surgeon so that fewer post-operation side effects were reported (34). Our results showed that easy access was a category that leads to satisfaction with mobile education. Studies have shown that using mobile applications is economic and useful for improving adherence to diet (14), nutrition check and losing weight (35), providing care at home, and following-up patients (36). In addition, mobile applications are useful for alleviating stress and relaxation in psychological patients (depression and stress) (37), skin care (18), cancer prevention behaviors (38), breast cancer cares (39), renal disorder and kidney transplantation cares (40), diabetes type II cares (41), blood sugar check (42,43), self-care (43), self-management in diabetic patients (44), supporting medical team and adherence to care programs (45), and promotion of health programs (15).

As the results showed, patient education with the help of mobile massaging applications facilitated patient education.

Arian et al. (2013) argued that complicity of the education content in pamphlets was a main educational obstacle (46).

In addition, Cook et al. noted that age, hospitalization term, and surgery were not barriers to the efficiency of education provided that the educations were useful and pertinent to everyday cares. It is possible to familiarize the elderly with mobile technology. Mobile learning is dynamic, stepwise, personal, fast, and applicable (9). The participants in this study noted that the

materials were provided to the patients in an understandable manner.

O'Connor and Andrew pointed out that the factors in mobile learning were the cost, usefulness, and the quality of applications (47). In addition, Pai and Alathur mentioned the cost of a cell phone and accessibility of applications as the factors in using cell phones. Other challenges in using mobile devices are poor security and the negative effect of some applications that required better supervision by authorities. Efficiency of mobile application also depends on demographics of users like the age (10). These applications are very useful for the users living in virtual areas to improve the connection between the patient and medical team. Among the limitations are the decrease in face-to-face connections and reliability of data (13). Brandell and Ford emphasized that there were several educational applications for diabetes and only a small number of them are acceptable. In addition, the patients did not receive education about how to find a reliable reference and using application (48). Therefore, in addition to the education about using cell phones, the users need education about using reliable guidelines (48).

Giunti et al. argued that the applications are more efficient when they are developed by experts (49). There are several web-based and offline applications in health field (50) that they are categorized as physician-centered and patient-centered (51).

The applications can create a revolution in health system by improving health outcomes and lowering prices (14). Educations about using mobile devices can improve the connection between the suppliers and receivers of services and decrease the costs. Still, despite all these facilitators, there is need for a stronger presence of supervising bodies to support users and prevent errors. Applications' content and updates should be confirmed by experts (50). The results of this study highlighted the necessity of experts' supervision on the content and updates. Mobile devices in health centers become a colony for bacteria. It is essential to educate patients about the right way of washing hands and other safety points like charging the devices (52). There are different treatment resistive bacteria in ICUs (53). Manning et al. emphasized on designing

proper guidelines of disinfecting mobile devices, using them, and access to reliable information [54].

The results here emphasized on the education and observation of infection control principles in using cell phones. Harrison et al. maintained that cell phones can be useful in clinical situations; still, there is a need for regulations to make the use of cell phone a norm in clinical situation [53]. Our results showed that cell phone is one of the practical and accessible solutions for patient education; however, there was a need for supervising the educational content.

Conclusion

Patient education through virtual education in virtual space using massaging applications is an efficient, comprehensive, accessible, and economic method that also brings patients' satisfaction. The best proposed solutions for better use of mobile phones in patient education, at the first, is to prepare mobile disinfection guidelines and then prepare an offline mobile software related to common diseases in every hospital.

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