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Factors affecting community pharmacy customers' decision to use personal health records via smartphone

Lalitaphanit K[1], Theeraroungchaisri A[1*]

[1] Department of Social and Administrative Pharmacy Graduate Program, Faculty of Pharmaceutical Sciences, Chulalongkorn University, Bangkok, 10330, Thailand

Objectives: One of the primary healthcare services offered by community pharmacists is health promotion and prevention. Pharmacists should support patients to take part in health information management and self-care management to make healthcare services more effective. Self-care is an important factor which helps to prevent and control the severity of chronic diseases. Having a personal health record application on a smartphone is an easy method to support individual to do self-care. Although there are many personal health record applications available in the market, few people have adopted them. The aim of this study is to identify factors affecting community pharmacy customers' decision to use a personal health record app on a smartphone based on the unified theory of acceptance and use of technology (UTAUT) theory.

Methods: An observational study design was conducted in Bangkok, Thailand. A total of 72 community pharmacy customers aged twenty-three years old and over were randomly selected. All received an explanation about personal health records, functions and features of the Microsoft HealthVault application, and were shown how to use it. Data collection was conducted using a cross-sectional survey by self-administered questionnaire. The data analysis was performed using multiple regression analysis. The study protocol, study materials, and study-related documents were approved by the Chulalongkorn University's Institutional Review Boards (IRB).

Results: The key factor significantly affecting the intention to use a personal health record via a smartphone was social influence (p = 0.000). The result showed that performance expectancy (PE), effort expectancy (EE), social influence (SI), and voluntariness (Vol) together explained 56.4% of the variances for the intention to use PHR (INT).

Conclusion: Social influence was a key factor influencing the decision to use a personal health record via a smartphone of community pharmacy customers in Bangkok based on the unified theory of acceptance and use of technology (UTAUT) theory. To enhance the intention to adopt and use a personal health record via a smartphone, the personal health record should have additional functions which benefit self-care such as tools for communication between users and health professionals and medication reminders. This will encourage users to employ a personal health record as a self-care tool to improve their health status.

* Corresponding author: Department of Social and Administrative Pharmacy Graduate Program, Faculty of Pharmaceutical Sciences, Chulalongkorn University, Bangkok, 10330, Thailand; Tel. +66(0)22150871-7; Fax. +66(0)22558227 E-mail address: Anuchai.t@pharm.chula.ac.th

Introduction

In 2008, the World Health Organization (WHO) reported about 63% of deaths were due to non-communicable diseases.[1] Moreover, treating chronic diseases leads to significantly increased healthcare expenditures.[2] Lifestyle modification and self-care are important factors which help to prevent and control the severity of chronic diseases. Good medication adherence, self-care, and health behaviour modification such as dietary control and exercise could help chronic patients to reduce risks of complications and improve their quality of life.[3] A personal health record (PHR) defined as "an electronic application through which individuals can access, manage and share their health information, and that of others for whom they are authorized, in a private, secure, and confidential environment anytime and anywhere[4], is co-controlled by both patient and health professionals. It is one of the advantageous tools available for healthcare management and self-care monitoring.[5] One of the primary healthcare services offered by community pharmacists is health promotion and prevention. Pharmacists should support patients to take part in health information management and self-care management to make healthcare services more effective.

Although there are many health and fitness applications available to smartphone users that can facilitate self-care tools embedded in daily routine activities of individuals, few people have adopted and continuously use them. Since a personal health record application on smartphone is a new tool for supporting healthcare, there is limited medical research to have been conducted to date.[5]

The aim of this study is to understand factors affecting the decision to use a personal health record via a smartphone of community pharmacy customers. The study was conducted based on the unified theory of acceptance and use of technology (UTAUT) theory, which was formulated by Venkatesh.[6] It is a behavioural theory developed from the technology acceptance model (TAM) and is widely used to study user acceptance of information technology. Therefore, this theory is suitable to use in this study to identify factors influencing the intention to use a personal health record via smartphone.[6-7] The result from this study would benefit in encouraging personal health record usage via smartphone in the future.

Methods

Identification and selection of applications: The Microsoft HealthVault application, developed by the Microsoft Company, was selected to be the representative of the personal health record applications available to download to a smartphone. There are comprehensive features and functions contained in this app as a self-care management tool such as a health information repository, self-monitoring, and goal setting.[8]

Study design and population: An observational study design was conducted from November 2015 to January 2016 with community pharmacy customers in Bangkok. A convenient sample of 72 community pharmacy customers calculated from 15 cases per one predictor[9] plus 20% of total sample size for preventing low response rate was randomly selected. The inclusion criteria were aged 23 years old or above because they are working-aged adults who can afford a smartphone and have the ability to share their private health information without consent from their guardians, usually use their own smartphone, able to use the internet and be proficient in English. The demographic data of participants such as gender, age, education level, and incomes were also collected.

Data Collection: All participants were informed about the details of the study and about the personal health record definition and its advantages. The Microsoft HealthVault application preview was shown detailing functions and features and how to use it. After that, all participants were asked to do a self-administered questionnaire.

Statistical analysis: All outcomes were analyzed by multiple regression analysis (MRA) to identify factors affecting community pharmacy customers' decision to use a personal health record via a smartphone (alpha < 0.05).[10] The data analysis was performed using SPSS version 22.

Ethical approval: The study protocol, demonstration materials, data collection tools, and study-related documents were approved and monitored by Chulalongkorn University's Institutional Review Boards (IRB).

Results

Conceptualization and measurement: All variables were defined as shown in Table 1

Table 1. The definition of all variables in the study

Variables	Definition
Performance expectancy (PE)	The degree of respondents' perception of getting benefits from PHR.
Effort expectancy (EE)	The degree of respondents' perception that using a PHR is easy.
Social Influence (SI)	The degree of respondents' perception of their important people who may influence them to use PHR.
Voluntariness (Vol)	The degree of respondents' perception of their PHR use is free will.
Intention to use PHR (INT)	The degree to which respondents intend to use PHR.

All variables were measured by five point Likert scales questionnaire

Reliability test and descriptive statistics:

The reliability of the questionnaire was assessed by the Cronbach's alpha coefficient. The Cronbach's alpha coefficient for intention to use PHR (INT), performance expectancy (PE), effort expectancy (EE), social influence (SI), and voluntariness (Vol) were 0.93, 0.87, 0.92, 0.87, 0.88 and 0.78, respectively, which were all more than the conventional level of 0.7.[11]

Descriptive statistics:

A sample size of seventy-two was analyzed. The mean score of the intention to use was 11.33±2.12.

Correlation:

All predictors were significantly correlated to the intention to use PHR. Multicollinearity was ruled out because the correlations between each predictor were all less than 0.8, the tolerances were all more than 0.19, and the VIFs (variance inflation factor) were all less than 5.26.[10]
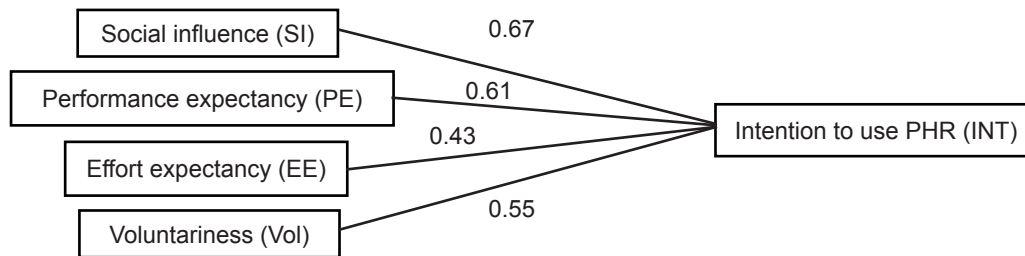

Figure 1. Correlation of all predictors with the intention to use PHR (n = 72; *p < 0.001)

Analytical strategy for assessing the model

The data was analyzed using multiple regression analysis by enter method. The multiple correlation (*r*) of performance expectancy, effort expectancy, social influence, and voluntariness with the intention to use PHR was 0.75. In terms of goodness-of-fit indicators, the model accounts for 56.4% of the variance in the intention to use PHR. Only social influence (SI) had a significant unique contribution in the prediction of intention to use PHR as shown in Table 2 (*p < 0.05)

The prediction equation was: intention to use PHR = 0.226 PE + 0.089 EE + 0.452 SI* +0.152 Vol

Table 2. Multiple Regression analysis (Enter method)

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	-1.737	1.565		-1.110	.271
Performance expectancy	.124	.064	.226	1.931	.058
Effort expectancy	.069	.074	.089	.930	.356
Social influence	.386	.083	.452	4.655	.000
Voluntariness	.194	.148	.152	1.315	.193

*p < 0.05, R = 0.751, R Squared = 0.564, Adjusted R Squared = 0.538

Discussion

The purpose of this research was to study the factors affecting community pharmacy customers' intention to use a personal health record via their smartphone by applying the unified theory of acceptance and use of technology (UTAUT) theory. The result showed that social influence was a significant factor in the intention to use PHR.[12-14] The predictive power of all four independent variables was substantial and accounted for 56.4% of the variance for the intention to use a PHR. This is similar to the results of Kijsanayotin, et al.[12], Maillet, et al.[13], and Iqbal, et al.[14]. However, the samples of these researches were health information technology workers and health professionals.

According to Brandt, et al.[8], Google Health, which is a personal health record application similar to Microsoft HealthVault was discontinued in 2012. There were 22 reasons for discontinuation such as it is only a data repository and a lack of incentives or additional extrinsic rewards for patients and health providers to use it, lack of assistance from health professional to use it, user-directed data entry caused burden of use and incorrect data, little advertising efforts and lack of good marketing strategy, lack of social discussion or peer pressure to share their health information on social networks, and not enjoyable.[8] Lai, et al.[15] reported that social influence would play an important role with users' intention at the initial stage of adoption because users have no experience or very little experience of benefits coming from using a personal health record via their smartphone.[15] Moreover, the result from Johansen, et al.'s study[16] showed that personal health records could be an effective self-care tool, which needs to be integrated with the electronic health record system of healthcare providers.[16]

The health information that is recorded in the personal health record should be shared and be accessible to both patients and health professionals. The Microsoft HealthVault application has many features and functions supporting good personal health records such as free software, web-based system, security standards, health information repository, health status monitoring, intelligent data presentation and data export.[17] However, according to Genitsaridi, et al.[17], Liu, et al.[18], and Sunyaev, et al.[19], a personal health record application should have four additional important functions to facilitate adoption and use such as: 1) collaboration and communication services between patients and health professionals to make decisions, support treatment and give recommendations or feedback to improve health status, 2) data transfer and integration with medical devices to reduce burden of directed-data entry and ensure data accuracy, 3) health activity alerts and medication reminders can help to improve self-care and medication adherence, 4) social support group to share their health information with other patients on social networks.[18-19]These functions will encourage patients to take care of their health.

This study has clarified the understanding of factors which influence the intention to use a personal health record via a smartphone. When the results of the study were compared to other related studies, it showed that personal health record functions which connect to others to make recommendations or feedback from health professionals and social support or peer pressure are important to increase adoption and use. This indicates the impact of social influence on the intention to use a personal health record.

Conclusion

This study aimed to understand the factors affecting community pharmacy customers' intention to use a personal health record via their smartphone in Bangkok by applying the unified theory of acceptance and use of technology (UTAUT) theory. The result showed that the intention to use a personal health record via a smartphone was correlated to the perception of getting benefits from using it, perception of ease and comfortable to use, perception of influences from other important persons, and perception of voluntariness. Among these factors, social influence had the strongest effect on the intention to use. To facilitate and enhance intention to adopt and use a personal health record via a smartphone, the personal health record application should have some necessary functions that provide communication between users and significant others such as their families, friends, and health professionals. These people will encourage and support patients to use a personal health record as a self-care tool to improve their health status. Further studies should be conducted to find factors which influence actual use of a personal health record via a smartphone to compare different predictors between pre-adoption and adoption stages and learn more about patterns of use in various environmental settings or different characteristic groups. Moreover, future studies related to promotion of continued use of a personal health record at the post-adoption stage will be interesting and valuable.

Acknowledgements

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