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# Predicting intentions of nurses to adopt patient personal health records: A structural equation modeling approach

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## ABSTRACT

**Objective:** The American Nurses Association endorsed the use of online patient personal health records (PHRs) and challenged all nurses to obtain the health records of patients. However, few studies have explored the factors associated with the intentions of nurses to use patient PHRs. Our study used an extended technology acceptance model, with the theory of planned behavior and perceived credibility, to explore factors associated with the intentions of nurses to use patient PHRs.

**Methods:** This cross-sectional quantitative study comprised a sample of 635 nurses who had worked full time for at least 3 months, and they were recruited from three hospitals affiliated with a university in northern Taiwan. We used a questionnaire to obtain information on perceived usefulness, perceived ease of use, perceived credibility, subjective norms, computer self-efficacy, attitudes, and intentions to use patient PHRs.

**Results:** This study indicated that perceived usefulness, computer self-efficacy, and subjective norms significantly and positively affected intentions to use patient PHRs. The attitudes of nurses toward PHR adoption directly influenced their intentions to use patient PHRs. Moreover, subjective norms indirectly affected intentions to use patient PHRs through the factor of attitudes. The proposed model explained 82.1% of the variance in the intentions of nurses to use patient PHRs.

**Conclusions:** Subjective norms had stronger total effects on the attitudes and intentions of nurses to use patient PHRs than perceived usefulness, perceived ease of use, or perceived credibility did. The results may help practitioners further understand that the attitudes of nurses toward using patient PHRs are influenced by peer groups and administrators. The current study provides evidence that peer groups influence the attitudes of nurses to use patient PHRs, which in turn influence their intentions toward PHR adoption.

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## 1. Introduction

Personal health records (PHRs) consist of an aggregated health information managed by which includes personal information, medical history, allergies, laboratory and radiographic test results, and current health status [1]. PHRs are electronic health records and essential sources of online health information that offer multidisciplinary communication among health providers [1]. In Taiwan, the government started promoting electronic medical record systems (EMRs) in 2000 and accelerated the implementation of inter-institution EMR exchange in 2009–2012. National Health Insurance Administration (NHIA) has set up “My Health Bank System” regarded as one kind of PHR which is separated from hospital’s electronic medical record systems since 2014 [2]. PHRs increase the potential for timely and efficient access through the Internet, enabling the exchange of health information and patient data among healthcare institutions. Thus, patients can provide their health information to practitioners during their hospital visits and enhance the continuity of care.

Recently, patient PHRs have been developed from a nursing perspective and may enhance the capacity of nursing to promote health care [3]. Nurses can encourage patients to be more proactive in managing their own health care by using PHRs and not just be passive recipients of care [4]. Nurses should play a more important role in the development of the patient PHR in terms of content, ease of navigation, time needed to complete tasks, ability to find desired information, and site presentation [5]. Thus, the PHR could be an important component of patient-focused care combined with the advanced information technologies available for different stakeholders. Furthermore, using information technology will be an innovative and effective measure which can simplify nursing practice [6]. According to the survey of more than 600 nurses in the U.S., conducted by Healthcare Information and Management Systems Society (HIMSS) analytics, nurses report generally positive experiences with EMRs. An overwhelming majority of respondents agreed that EMRs help healthcare providers improve patient safety, make it easier for them to have immediate access to comprehensive health records and enhance collaboration on patient care with clinicians inside their organizations [7]. Nurses are key persons in introducing PHRs to patients in various healthcare settings and in the expansion of the patient PHR. Therefore, for the widespread deployment of patient PHRs, analyzing the intentions of nurses to adopt patient PHRs is crucial and necessary.

The technology acceptance model (TAM) is a verified model and has been applied to explain and predict motivational factors underlying technology acceptance by users [8]. It states that the intentions of an individual to use a technology are determined by the perceived usefulness (PU) and perceived ease of use (PE) of the technology. PU measures the beliefs of individuals that using a specific system will improve their job performance [8]. PE is defined as the degree to which using an information system is effortless for a person [8]. However, the traditional TAM cannot entirely explain the intention to use emerging information technology, because the characteristics of PHRs and online information systems differ substantially. Related factors differ depending on the type of technology, target

user, and user environment [9]. Therefore, the variables PU, PE, attitude, and intention in the traditional TAM cannot completely explain the intentions of health professionals to use patient PHRs, and it is necessary to use other variables, such as subjective norms and computer self-efficacy (CSE) in the theory of planned behavior (TPB), that provide further explanation.

According to the TPB proposed by Ajzen [10], the behavior of a person can be explained on the basis of intention, which is affected by three factors: attitude, subjective norms, and perceived behavioral control such as CSE. Attitude can be defined as the positive or negative appraisal of the intention of an individual. Subjective norms are influenced by people who are important to a person in the social environment and cause the person to have or not have certain intentions. CSE is an individual judgment of the ability of a person to use computers and represents the perception of behavioral control by a person in the information technology domain [11]. CSE is likely to affect the intentions and beliefs of an individual. Consequently, the TPB is necessary for explaining the intention to adopt technology by considering the role of an individual and organizational system.

Perceived credibility (PC) is defined as the degree to which a person believes that using PHRs is free of privacy and security threats [12]. According to Admin (2007), perceived credibility is a determinant of behavioral intention to use an information system. Security refers to the protection of information or systems from unauthorized intrusions [13]. Privacy determines the control of sharing and access to PHR data. PHRs are portable for personal use and provide support for various medical activities; particularly, PC is a major concern for health professionals, because using PHRs is closely related to the health of patients and health professionals must ensure that PHRs provide privacy and security before using them. Consequently, a new construct, PC, is proposed to enhance the understanding of the intentions of nurses to adopt PHRs.

Several researchers have published studies on nurses and the TAM [14,15]; however, most previous studies have used only the TAM for exploring factors affecting the adoption of information technologies [16,17]; few researchers have used an extended model for exploring factors related to medical information technology [18]. The TAM focuses on technological constructs, and its strengths are its parsimony and high explanatory power. However, it does not consider the effects of individual and organizational factors in PHR adoption. Taylor and Todd [19] determined that the TAM can be augmented by adding constructs such as subjective norms and perceived behavioral control from the TPB. Therefore, this study used the TAM as the core framework and combined PC and variables from TPB (e.g. CSE and subjective norms) for exploring factors affecting the intentions of nurses to use patient PHRs.

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## 2. Methodology

### 2.1. Research model and hypotheses

The research model (Fig. 1) is based on the TAM, TPB, and PC. Therefore, it can enhance the understanding of the intentions of nurses to use patient PHRs. In addition, Vijayasathy

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