



THE EXPERIENCE OF INFORMATICS NURSES IN TAIWAN

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Despite recent progress in information technology, health care institutions are constantly confronted with the need to adapt to the resulting new processes of information management and use. Facilitating an effective technology implementation requires dedication from informatics nurses (INs) to bridge the gap between clinical care and technology. The purpose of this study was to explore the working experiences of INs, and alternatives to assist the growth and development of the specialty. This qualitative study recruited 8 participants, and data were collected in 2009 by use of interview guides related to work roles, responsibilities, competencies, and challenges. The emerged themes included (a) diversified roles and functions, (b) vague job description, (c) no decision-making authority, (d) indispensable management support, and (e) searching resources for work fulfillment. Findings indicate that for organizations where nursing informatics development is ongoing, the IN role should be clearly defined as a specialist with identified support resources and decision-making authority. Nursing informatics interest groups should further develop training and certification programs to validate the professional image of the role. Concepts of nursing informatics should be included seamlessly throughout the educational curricula and informatics competency-based courses designed to strengthen student's technology use and data management capabilities. (Index words: Competency; Experiences; Informatics nurse; Interviews; Nurse roles) *J Prof Nurs 31:158–164, 2015. © 2015 Elsevier Inc. All rights reserved.*

THE USE OF information technology has been growing rapidly in health care to support the improvement of patient care quality. It is expected that the use of this technology could streamline nurses' workflow and enhance their decision-making processes (Saba & Erdley, 2005). Moreover, when users can participate in the early system development stage, the content design to meet nurses' needs is identified, and the adoption process is facilitated (Ward, Vartak, Schwichtenberg, & Wakefield, 2011). Informatics, as the combination of nursing science, computer science, and information science offers nurses the knowledge to use technology to enhance care or use data generated from care outcomes to refine clinical practice and improve care quality (Brokel, 2007; Warren & Thompson, 2010).

Informatics nurses (INs) are those having a bachelor's degree in nursing and additional knowledge and experience (or job training) in the field of informatics, whereas an IN specialist has a master's degree in nursing and has taken graduate-level courses in the field of informatics (American

Nurse Association [ANA], 2008). INs are expected to measure change and care delivery processes. Understanding how INs face work challenges could assist in the identification of knowledge and skill sets important to improve technology use in health care to support a safe and user-friendly environment for both patients and care providers (Bowman-Hayes, 2009; Brokel, 2007). Because there is no certificate program for nursing informatics specialty in Taiwan, INs in Taiwan are those nurses with knowledge and skills in information technology, who work as coordinators in the health care organization to facilitate the technology implementation process.

Most of the nursing technology implementation studies have explored either interface design (Huang & Lee, 2011a), workflow change (Effken, Brewer, Logue, Gephart, & Verran, 2011; Huang & Lee, 2011b; Lammintakanen, Saranto, & Kivinen, 2010), or user perception/satisfaction (Kuo, Lee, Mills, & Lin, 2012; Quan et al., 2013). Because the present research sought to explore participants' experience, views, or beliefs concerning a specific study interest, interview method was utilized as a data collection strategy (Ryan, Coughlan, & Cronin, 2009). The analysis of user perception of technology use has been conducted using in-depth interviews with nurses (Lee, Mills, & Lu, 2009; Quan et al., 2013), patients (Lee, 2007), and administrators (Lammintakanen et al., 2010; Lee, 2006).

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Although the above studies have focused on different user populations, the work experiences of INs have not been explored in Taiwan. Job satisfaction and the career achievements of INs are areas that should receive consideration because they have a substantial effect on nurses who dedicate themselves in this area and benefit organizations with more competent workers (Bowman-Hayes, 2009; Brokel, 2007).

Literature Review

The Emergence of Nursing Informatics

In 1992, ANA recognized Nursing Informatics as a specialty area. The ANA defined Nursing Informatics as a specialty that integrates nursing science, computer science, and information science to manage and communicate data, information, and knowledge in nursing practice (ANA, 2008). INs communicate and coordinate across multiple disciplines and manage data for patient care and support nursing practice by developing and maintaining information systems (ANA, 2008; Hunt, Sproat, & Kitzmiller, 2004). In 1995, the American Nurses Credentialing Center (ANCC) established an IN certification program focusing on computer literacy, information literacy, and professional development/leadership (ANA, 2008). Today, the testing contents of the certification examination include not only knowledge and skills in information technology but also data management and knowledge generation (ANCC, 2014b). In order to take the certificate examination, applicants must have certain continuing education (CE) hours or Nursing Informatics working experiences (ANCC, 2014a). The obtaining of the certification demonstrates that the nurse can work in an organization as an IN with competencies (Kenney & Androwich, 2012).

In 1996, hospitals in Taiwan began the transition from a process of paper medical records system to a computerized health care record system, which created a need for the IN. In 2006, the Taiwanese Nursing Informatics Association (TNIA) was established to promote the concept of Nursing Informatics and the development of nursing information systems in health care organizations. In 2008, there were less than 20 INs in Taiwan, but in 2011, R.C. Feng (Chair of the American Nursing Informatics Association [ANIA]) indicated that there were nearly 30 INs (personal communication, October 18, 2011). Although this path did not proceed as expected, by 2012, nearly 23 medical centers had established IN specialist positions (Kuo, Chang, Feng, Westra, & Ball, 2012).

In Taiwan, because hospitals have traditionally focused on the diagnoses and treatments of patient illness, the development of INs may not have drawn the attention of health care providers. Tasks related to the incorporation of technology into nursing practice, such as system design and development, data management, research, and evaluation often rely heavily on the work of INs. Previous studies have shown that nurses in Taiwan must be competent with knowledge and skills in information systems to work in this era of technology (Hwang, Chen, Chang, & Hsiao, 2008; Lin, Lin, Jiang & Lee, 2007). However, compared

with the United States, where nursing informatics has been developed for more than 20 years and has a complete curriculum design, in Taiwan, nursing informatics is still in its beginning stages, and a well-planned nursing curriculum is needed (Hwang et al., 2008).

Factors Affecting the Development of IN Specialty

The introduction of technology has not only changed the clinical environment of health care but also has greatly influenced nurses' patient care process. Specific factors that affect nurses' technology use have been identified as user education and training, device availability, and system usability (Lee et al., 2009; Ward et al., 2011). In addition, nurse's involvement in the planning process is vital (Huang & Lee, 2011b; Lee et al., 2009). Therefore, INs can be a facilitator in promoting technology use such as training the end user or developing the electronic health record (EHR) system to document nursing impact on health care outcomes and to further utilize data in the EHR for outcome analysis to refine best care for clinical practice to assist nurses (Warren & Thompson, 2010).

In order to work between patient care and technology applications, INs are expected to demonstrate informatics competencies in computer and information literacy, professional development, and leadership (ANA, 2008). In 1996, ANIA queried its members regarding the Nursing Informatics specialty role, responsibilities, and challenges. Results indicated that lack of interdepartmental communication and cooperation were work challenges, and information technology, management, and training skills were important to supporting their roles and job competencies (Rosen & Routon, 1998). A survey conducted in 2000 exploring U.S. registered nurses' CE in informatics revealed that only 21% of respondents had taken informatics contact hours in the previous year. In addition, it was identified that Internet access, working in hospitals, and not performing direct patient care were predictive factors of IN competency (Kleib, Sales, Lima, Andrea-Baylon, & Beath, 2010). Informatics competencies are mostly defined in informatics knowledge/skills and attitudes toward technology or IN role (Choi & De Martinis, 2013; Hwang et al., 2008). Bowman-Hayes (2009) suggested that informatics competencies are not only part of INs but also, through working relationships, will likely transfer to bedside nurses. In addition, administrative support of on-the-job training, provision of electronic resources, or access to their decision support were also identified as important (Wahoush & Banfield, 2014).

In the United States, the core responsibilities and certification standards of INs are well developed. For example, the Alliance for Nursing Informatics has indicated that this role consists of (a) managing the design and implementation of technology, (b) providing improved patient-centered care, and (c) reducing nurses' paperwork workload (Greenwood, Murphy, Sensmeier, & Westra, 2011). By contrast, in Taiwan, IN standards and responsibilities have been determined by domestic or local organizations, which results in inconsistent criteria across different regions and work settings (Hwang et al., 2008). Without guidelines for practice, INs may have to

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