Factors Influencing Information-seeking Behavior in Continuing Education of Nurses in Japan

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Abstract—**The effects of the use of information and communication technology (ICT) in the continuous education of nurses have been identified, but no study has examined the information-seeking behavior of nurses who are using ICT. This study quantitatively and descriptively analyzed factors that influence clinical nurses' information-seeking behavior. Information-seeking behavior of 324 nurses was observed and scored; the scores were subsequently compared between levels of the following categories: "individual characteristics," "continuing education factors," and "environmental factors of Internet usage." Information-seeking behavior significantly differed with respect to qualification, institution where basic education was received, job ranking, a form of employment, membership to academic associations, and the environment in which ICT was used. It is necessary to create environments that facilitate information seeking for nurses in various departments, and to implement adequate information literacy education in order to support information-seeking behavior.**

Keywords- Nurses; Continuing education; Information-seeking behavior; Japan.

I. INTRODUCTION

The series of processes used by humans to solve problems is known as "information behavior" and it consists of seeking, acquiring, and processing information. These processes include recognizing the need for information, searching for, using, and sharing it. Though concepts associated with information behavior include information-seeking behavior, information retrieval behavior, and information literacy, information-seeking behavior is a part of information behavior and information retrieval behavior is a part of information-seeking behavior [1]. Thus, information-seeking behavior can be thought of as a core concept in information behavior. Information-seeking behaviors of professionals such as doctors and lawyers can be thought of as the process of perceiving distinctions in the need for information according to tasks that arise from their work roles, accessing information resources, and obtaining results by using the information [2]. Information retrieval behavior, subsumed under information-seeking behavior, focuses on the comparatively narrow range of behaviors involved in accessing and retrieving information resources. Meanwhile, information literacy refers to techniques and skills for utilizing a wide range of information resources during problem-solving. It can be thought of as a part of the ability for information behavior [3].

In recent years, Information and Communication Technology (ICT) focusing on the internet has become the basis of modern social activities while playing a role in improving the convenience of everyday life and working as a driving force in activating the economy. In Japan, a strategy aimed at improving the nation's utilization of information was revealed in 2013. After that, ICT and its utilization were popularized in the Japanese society. Computer networks, which can be utilized in all aspects of daily life, have changed people's living environments and have facilitated various changes in learning environments. Learning by utilizing ICT empowers individuals to actively create their learning environments; however, at times, technology cannot be effectively utilized in learning and the mastery one has gained over ICT cannot be applied to one's personal experiences and surroundings [4]. Thus, we decided to investigate of the results of learning behavior.

Considering that nurses engage in continuing education, ICT based education has long been offered through professional associations, academic societies, and companies. The effect of utilizing ICT in continuing education of clinical nurses is becoming evident through research reports, including studies on topics such as the effectiveness of web-journaling [5], public health nurses' usage of hospital libraries [6], behavior of accessing information during decision-making [7], the current status of information retrieval skills [8], and analysis of communication records of computer discussions by nurses [9]. Nonetheless, all these studies are individual program evaluations; no study elucidating nurses' information-seeking behavior and use of the information were found. It is important to understand how as professionals, nurses practice their autonomous capacity in recognizing, and judging their work roles and resolving the problems that arise from these roles, to contribute to the health of citizens in the modern society [10]. Therefore, there is value in identifying the factors that influence information-seeking behavior in nurses and lead to their use of effective management strategies.

The aim of the present study is to quantitatively and descriptively investigate the factors influencing information-seeking behavior in the context of continuing education of nurses.

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II. Research Method

A. Subjects

Data for this study included a part of the data from a pilot study that developed an information behavior scale for continuing education of nurses. Through opportunistic recruitment, questionnaires were distributed by mail to 560 nurses at ten healthcare facilities; 324 nurses responded.

B. Survey period

May 2014 to July 2014

C. Survey contents

Based on the literature and authors' expertise in the field, the following items were selected. 1) Individual characteristics including gender, qualifications, basic educational institutions, job title, employment status, and facility size; 2) Continuing education factors including affiliation with professional organization, affiliation with nursing-related academic societies, and research experience; 3) Internet environment factors such as internet access environment and electronic database usage environment; and 4) Information-seeking behavior in continuing education of nurses. Responses for the following nine items were sought on a five-point scale from "1 – strongly disagree" to "5 – strongly agree" and the total scores were the "information-seeking behavior scores."

In the "information-seeking behavior" proposal concept, we adopted the "information-seeking behavior model of professionals" [2] as the theoretical basis. In this model, the information-seeking behavior of professionals consists of six different components (1. role in work, 2. tasks related to their role, 3. characteristics of information required, 4. information detection, 5. information resources, and 6. outcome). While considering the concept, we examined whether each component could explain the influential and configurational factors of nurses' continuing education up to now. In previous reports, aspects not specific to nurses, factors not in line with the modern ICT environment, and factors that did not consider ICT as a means of information seeking were included. Therefore, we conducted our investigation using expressions including information behavior with ICT. The contents of the questions were based on the results of such investigation.

Regarding the validity of the contents of the questionnaire, twelve nurses with a master's degree or higher determined whether the concept of information-seeking behavior as identified in the previous research corresponded to the contents of the questionnaire. Items with an agreement rate of 70% or more with the researchers' concept were selected for the questionnaire. For items with an agreement rate of 50% or more, the contents were modified so that it did not change the meaning substantially. Regarding face validity, a pretest was conducted with 18 clinical nurses with differing years of experience and job titles; their opinions on aspects such as difficulty in responding and difficulty of understanding the content was requested, and the questionnaire was modified accordingly.

[Questionnaire Items]

(1) I actively utilize information obtained using a library or ICT, etc. for questions and concerns arising when I consider my career.
(2) I have sometimes gathered information using a library or ICT, etc. to resolve concerns relating to the careers or jobs of nurses other than myself.
(3) Even if I do not have a concern or problem relating to my job or career, I routinely use a library or ICT, etc. to gather information relating to my job or career.
(4) For questions or problems arising at my job, I actively use a library or ICT, etc.
(5) I actively use information obtained using a library or ICT, etc. during my clinical nursing practice.
(6) For information related to my career, I obtain more information from a library or ICT, etc. rather than from the people around me.
(7) For my career or problems at work, I feel that information obtained from a library or ICT, etc. is more valid than that obtained from the people around me.
(8) Before I engage in a new task, I sometimes gather information using a library or ICT, etc..
(9) For information related to a training or seminar, etc., I sometimes gather information using a library or ICT, etc.

D. Analysis Methods

After calculating the descriptive statistics for the data, comparisons of scores of each factor of information-seeking behavior were conducted. For analyzing participant characteristics (gender, employment status, professional organization affiliation, and academic society affiliation) Mann-Whitney U-Tests were conducted, and for analyzing factors of information-seeking behavior (qualifications, basic nursing education program type, job title, facility size, research experience, internet access environment, and electronic database usage environment) Kruskal-Wallis tests were conducted. Regarding items for which a significant difference was found, multiple comparisons were conducted with Mann-Whitney U-Tests between groups for each response to an item. For years of experience as a nurse and years of experience at the current workplace, Pearson's product-moment correlation coefficients were determined. For all of the above, the standard for significance was set at 0.05 and the statistics package SPSS ver.21 was used.

E. Ethical Considerations

A summary of the study was given and aspects such as the voluntary nature of study participation, that there would be no penalties if consent was not given, and the maintenance of anonymity were explained to participants in a document and their reply was considered as consent. This study was conducted after receiving approval from the research ethics committee of the institution with which the researchers are affiliated.

III. Results

A. Participant Characteristics

Questionnaires were distributed to 560 individuals and answers were received from 324 individuals (response rate: 57.9%).

The gender of participants were 43 males (14.2%) and 259 females (85.8%) for the number of valid responses (n=302).

Regarding qualifications (n=303), Registered Nurses (RN), Licensed Practical Nurses (LPN), Midwives & Public Health Nurses (MW/PHN), Certified Nurses & Certified Nurse Specialists (CN/CNS) were 250 (82.5%), 36 (11.9%), 10 (3.3%) , and 7 (2.3%), respectively.

In response to basic nursing education program type (n=290), 32 (11.0%) indicated university, 17 (5.9%) indicated junior college, and 241 (83.1%) indicated vocational school.

The average number of years of experience was 13.6 (SD 10.2), and that of years serving at the present facility was 8.8 (SD 8.5).

Regarding employment status (n=303), 279 (92.1%) were full-time and 24(7.9%) were part-time employees.

Regarding job title (n=298), 236 (79.2%) were general staff, 44 (14.8%) were senior or assistant head nurses, 13 (4.3%) were head nurses or facility supervisor and administrators, and 5 (1.7%) had other titles.

Regarding the size of their workplace based on the number of beds, (n=296), 38 (12.8%) indicated 500 or more beds, 164 (55.4%) indicated 200–499 beds, and 94 (31.8%) indicated 20–199 beds.

Regarding continuing education factors (n=301), 213 (70.8%) were affiliated with professional organizations and 88 (29.2%) were affiliated with nursing-related academic societies.

Regarding research experience (n=303), 87 (28.7%) had presented their research outside of their facility, 127 (41.9%) did not present their research outside the facility, and 89 (29.4%) did not have any experience in conducting research.

Regarding internet environment factors, 251 (83.4%) had internet access both at home and at work, 18 (6.0%) had access only at home, 26 (8.6%) had access only at work, and 6 (2.0%) could not access at home nor work (n=301). For electronic database usage environment (n=300), 100 (33.3%) could use it at work, 26 (8.7%) could use it at home, 31 (10.3%) could not use it at home nor work, and 143 (47.7%) did not know how to use it.

B. Relationship between information-seeking behavior score and each item (Table 1)

Regarding the relationship between information-seeking behavior and individual characteristics, for gender, no a significant difference between males and females was found ($U = 5169.00$, $p = 0.45$). For qualifications, there was a significant difference between RN, LPN, MW/PHN, and CN/CNS ($H = 14.29$, $p < 0.001$), and significant differences were found between CN/CNS and RN ($U = 369.00$, $p = 0.02$), LPN ($U = 34.00$, $p < 0.001$), and MW/PHN ($U = 10.50$, $p = 0.03$). For basic nursing education program, there was a significant difference between those with a university, junior college, and vocational school educational backgrounds ($H = 20.38$, $p < 0.001$), and a significant difference was observed between those with a university and vocational school educational backgrounds ($U = 2088.50$, $p < 0.001$). For number of years of experience, correlation was not found with information-seeking behavior for neither number of years of nursing experience ($r = 0.06$, $p = 0.30$) nor number of years of experience at the present workplace ($r = 0.03$, $p = 0.57$). For employment status, a significant difference was observed between full-time and part-time ($U = 2026.00$, $p < 0.001$). For job title, there was a significant difference between general, senior/assistant head nurse, head nurse/facility supervisor and administrator, and other titles ($H = 14.20$, $p < 0.001$), and a significant difference was observed between general and head nurse/facility supervisor and administrator ($U = 974.50$, $p = 0.03$). For facility size, no significant difference was found between 500 beds or more, 200–499 beds, and 20–199 beds ($H = 5.654$, $p = 0.06$).

Regarding the relationship between information-seeking behaviors and continuing education factors, for professional organization affiliation, no significant difference was observed between affiliated and not affiliated groups ($U = 8826.00$, $p = 0.43$). For those with medical/nursing-related academic society affiliation, a significant difference was observed between affiliated and not affiliated groups ($U = 5758.00$, $p = 0.04$). For research experience, no significant difference was observed between experience in presenting outside the facility, no experience in presenting outside the facility, and no experience in conducting research ($H = 3.29$, $p = 0.19$).

Regarding the relationship between information-seeking behavior and internet environment factors, for internet access environment, no significant difference was observed between access both at home and at work, access only at home, access only at work, and no access at home nor work ($H = 6.43$, $p = 0.09$). For electronic database usage environment, there was a significant difference between groups that could use at work, at home, could not use at work nor home, and did not know how to use ($H = 9.35$, $p = 0.03$), and a significant difference was observed between those that could use at work and do not know how to use ($U = 5638.00$, $p = 0.01$).

IV. Discussion

Regarding individual characteristics that influence information-seeking behavior, for qualifications, a significant the difference was observed between CN/CNS and RN, LPN, and MW/PHN. This is reflected in the features of the job description for CN/CNS. In Japan, CN/CNS are those whose role focuses on practice, guidance, and consultation. In 1994, the Japan Nursing Association established a certification system for CN/CNS. Certified Nurse Specialists (CNS) have obtained certification through their master's degree, coordinate both ethically and generally between healthcare and welfare workers, have educational roles as well as roles in research activities, and are thought to face many challenges in their practice. Regarding the mechanisms preceding the appearance of information-seeking behavior, Kunimoto (2010) has

revealed that the "appearance of opportunity" does not simply involve thinking vaguely that "I want to know something;" instead, there is a process leading one to concretely identify what kind of information one wants [11]. Additionally, in his a comprehensive model of information seeking, Wilson (1999) indicated "passive attention," "passive search," "active search," and "continuous search" as the processes leading to information-seeking behavior [1]. CN/CNS are thought to have higher information-seeking behavior scores than the other groups because they have many opportunities for passive information-seeking as they are in an environment where they are dealing with concrete demands from their roles as CN/CNS and from the organization, particularly for specialized nurses, because they also have active information-seeking opportunities occurring in the context of research and their own interests. Significant differences between those in full-time and part-time employment, and between general and head nurse/facility supervisor and administrator positions, may also be influenced by opportunities for information-seeking behavior. For basic nursing education programs, a significant difference was observed between university and vocational school. Information-seeking behavior may be influenced by acquisition of and experience with information literacy [3]; however, in Japanese university education, compared to vocational education, factors influencing information-seeking behavior may include the substantial media environment [12] and information science-related subjects included in the curriculum [13]. In the future, strategies to fill the gap between nurses who have received information-related education and those who have not, and plans to enrich information literacy education, will be needed to improve the environment in which clinical nurses exhibit information-seeking behaviors.

Regarding continuing education factors influencing information-seeking behavior, there was a significant difference between those affiliated and not affiliated to a medical/nursing-related academic society. It has been previously demonstrated that nurses who are affiliated with academic societies have a higher professional autonomous capacity than those who do not have an affiliation. In Japan, it is thought that acknowledgment of one's role as a nurse is deeply connected with one's professional autonomous capacity, and that information seeking is a part of the behavior performed to fulfill that role. Furthermore, regarding the internet environment factors influencing information-seeking behavior, there was a statistically significant difference between those who can use electronic databases in the work place and those who do not know how to use them. Hence, managing improvements in the environment related to information seeking would possibly promote the professional autonomous capacity of nurses.

As the participants of the present study were nurses from a limited number of facilities, the composition of the sample is imbalanced in some aspects, limiting the scope for generalization. Additionally, there may be other factors that influence the information-seeking behavior of nurses. In the present study, aspects such as internet access environment, ease of electronic database use, an existence of a library at the affiliated institution, and usage environment were not investigated. Future studies will need to elucidate the factors composing information-seeking behavior in nurses through an exhaustive investigation of influential factors and reveal aspects of the outcomes of information-seeking behavior.

V. Conclusion

Among the individual characteristic factors, significant differences were observed for qualifications between CN/CNS and RN, LPN, and MW/PHN, for basic nursing education programs between the university and vocational school, for job title between general staff and head nurse/facility supervisor and manager, and between full-time and part-time employment status. Among the continuing education factors, there was a significant difference between those affiliated and not affiliated with a medical/nursing-related academic society. Among the internet environment factors, there was a statistically significant difference between those who can use electronic databases at work and those who do not know how to use them.

There is a need to improve the environment in a way that allows information seeking to be conducted smoothly when opportunities arise in one's role. Strategies to reduce individual differences in information literacy and plans to enrich education are needed. The results of these changes may enable the promotion of professional, autonomous capacity in nurses.

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TABLE 1. Comparisons of information-seeking behavior score

	n	Mean (SD)	Median	IQR	Statistic	p	Multiple Comparison
Gender (n=302)							
Male	43	25.13 (1.25)	27	2.50–28.50	U = 5169.00	0.45	
Female	259	24.75 (0.49)	26	0.00–29.00			
Qualifications (n=303)							
RN	250	25.04 (0.48)	27	1.00–29.00	H = 14.29	<0.001*	U = 369.00 (p = 0.02)
LPN	36	21.03 (1.46)	21.5	4.00–27.00			U = 34.00 (p<0.001)
MW/PHN	10	25.00 (1.31)	25.5	3.00–28.00			U = 10.50 (p = 0.03)
CN/CNS	7	33.43 (2.69)	33	8.00–38.00			
Basic Nursing Education Program (n=290)							
University	32	29.81 (1.18)	29	7.00–34.00	H = 20.38	<0.001*	U = 2088.50 (p <0.001)
Junior College	17	27.44 (1.67)	27.5	5.00–32.50			
Vocational School	241	23.99 (0.50)	26	9.00–28.00			
Average Number of Years of Experience							
Years of Experience	299				-0.06	0.3	
Years of Experience at the Present Workplace	289				-0.03	0.57	
Employment Status (n=303)							
Full-time	279	25.38 (0.45)	27	1.00–29.00	U = 2026.00	<0.001*	
Part-time	24	17.90 (1.68)	19	0.00–25.00			
Job title (n=298)							
General Employee	236	24.32 (0.51)	26	9.00–28.00	H = 14.29	<0.001*	U = 974.50 (p = 0.03)
Senior & Assistant Head Nurse	44	25.59 (1.14)	27	2.00–29.50			
Head Nurse & Facility Supervisor & administrators	13	29.38 (1.88)	28	4.00–35.00			
Other	5	26.60 (3.50)	30	7.00–31.00			
Facility Size (n=296)							
500 beds or more	38	27.31 (1.18)	28	2.00–32.00	H = 5.654	0.06	
200–499 beds	164	24.47 (0.64)	27	0.50–29.00			
20–199 beds	94	24.37 (0.75)	25	9.00–28.00			
Professional Organization Affiliation (n=301)							
Affiliated	213	24.90 (0.55)	27	1.00–29.00	U = 8826.00	0.43	
Not Affiliated	88	24.56 (0.79)	26	0.00–28.00			
Research Experience (n=303)							
Experience presenting outside the facility	87	25.65 (0.88)	27	2.00–29.00	H = 3.29	0.19	
No experience presenting outside the facility	127	24.70 (0.71)	27	0.00–29.00			
No experience conducting research	89	24.05 (0.87)	25.5	9.00–28.00			
Internet Access Environment (n=301)							
Access at home and at work	251	25.12 (0.49)	27	1.00–29.00	H = 6.43	0.09	
Access only at home	18	24.82 (2.19)	27	9.00–29.00			
Access only at work	26	21.61 (1.59)	24	6.00–27.00			
Cannot access	6	24.67 (2.33)	27	3.50–27.00			
Electronic database usage environment (n=300)							
Can use at work	100	26.51 (0.78)	27	1.00–31.00	H = 9.35	0.03*	U = 5638.00 (p = 0.01)
Can use at home	26	26.54 (1.91)	27	3.00–31.50			
Cannot use at work & home	31	23.83 (1.12)	25.5	9.00–28.00			
Do not know	143	23.40 (0.64)	25	0.00–28.00			

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