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Analysis of the Current Situation and Influencing Factors of Knowledge, Attitude, and Practice of Nursing Informatics Among Intern Nursing Students

Ping Zhao[1], Xiao Ling Ma[2]*

[1]First Affiliated Hospital of Kunming Medical University, Kunming 650000, Yunnan Province, China
[2]Medical School, Xishuangbanna Vocational and Technical College, Jinghong 666100, Yunnan Province, China

***Corresponding author:** Xiao Ling Ma, maxiaoling01145@hotmail.com

Abstract: *Objective:* To investigate the current situation of knowledge, attitude, and practice (KAP) of nursing informatics for intern nursing students. *Methods:* A total of 213 intern nursing students were selected as subjects. *Results:* The total score of the questionnaire of knowledge dimension was 10.32 ± 3.23; the score of attitude dimension was 58.78 ± 6.80; the score of practice dimension was 29.06 ± 14.35. Logistic regression analysis showed that further learning plans, telemedicine hospital intern experience, self-learning ability, and telecare training were the related influencing factors of KAP ($P < 0.05$). *Conclusions:* The current KAP level of nursing informatics among intern nursing students was low to moderate. Hence, the strengthening of school courses and skill training programs is urgently needed.

Keywords: Nursing informatics; KAP; Influence factors; Intern nurses

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1. Introduction

Nursing informatics is the combination of data management and analysis technology to effectively utilize data, messages, knowledge, and experience in the field of nursing [1]. The development of the internet has largely altered the traditional clinical and nursing model. Since then, the Chinese government has developed a series of policies to promote the development of health informatics in the past few years.

Nursing informatics exhibits positive outcomes on different kinds of diseases, playing a positive role in patient recovery and disease control, especially in chronic disease control [2]. Data sharing is another advantage of nursing informatics. It facilitates easier communication between caregivers and healthcare providers, as well as between healthcare providers situated in different hospitals [3,4]. Patients, especially those who are aged, low educated, low-income, and live in remote rural areas benefit more from telemedicine.

Clinical nurses play a vital role in the application of nursing informatics, where the nurses' ability to

operate telecare devices and their professional nursing knowledge depict the quality of telecare provided [5,6]. Research showed a better quality of nursing care increases the patients' willingness to attend telecare [7,8]. Therefore, it is essential to implement learning courses in terms of nursing informatics.

In China, final-year nursing students usually work as intern nurses in hospitals. It is an important phase for them to accumulate basic medical knowledge. Their attitude towards nursing informatics will influence their use of telecare in the future. The theory of knowledge-attitude-practice (KAP) states that a better understanding of a certain topic will lead to more positive practices and behaviors related to that topic. Therefore, colleges and universities should implement nursing informatics courses, where nursing students have a chance to apply what they learned in their future work.

No study has been conducted regarding the current KAP situation of intern nurses. This study deployed a survey of the current KAP scores of intern nurses and influencing factors, including demographic characteristics, intern experiences, and research experiences. A logistic regression analysis was implied to analyze the factors that influence the KAP scores and to provide evidence for the implementation of related training courses.

2. Methods

Data was collected by an electronic questionnaire during May and June 2022. Two hundred and fifty final-year nursing students were included.

2.1. Selection of participants

Inclusion criteria: (1) Nursing students who graduated in 2022; (2) worked as an intern nurse for more than 6 months; (3) willing to participate in the survey. Exclusion criteria: (1) Not final-year nursing students; (2) students without intern experiences; (3) unwilling to participate in the survey.

2.2. Data collection

An online questionnaire was utilized to collect the demographic information and KAP scores. In the first part of the questionnaire, we performed a brief introduction of the survey, followed by the second part of the survey, where social demographic factors about age, gender, name of school, intern experiences, education level, school performance, self-learning ability, further learning plans, telecare courses, basic informatics courses, research experiences, publications, intern experience in telemedicine hospitals, possession of personal computers, online self-learning experiences, hospital information system training, and telecare training were collected.

The third part of the questionnaire was a self-edited investigation including 50 items which were divided into 3 derived component scores regarding nursing informatics: 17 items for knowledge, 16 items for attitude, and 17 items for practice [9–11]. The students answered true or false answers to assess their knowledge level. A five-point Likert scale was rated by respondents in the attitude survey, "1= completely not agree," "2 = do not agree," "3 = unsure," "4 = agree," "5 = highly agree." A five-point Likert scale was rated by participants in the practice survey: "0= not at all," "1= almost not," "2= a few times," "3= many times," and "4 = often." The questionnaire showed a strong internal consistency with Cronbach's alpha value of 0.919.

2.3. Statistical analysis

The data was analyzed by calculating the number and percentage of the demographic information. We also examined the minimum score, maximum score, mean score, and standard deviation of KAP scores. A logistic regression analysis was implemented to explore factors associated with KAP. An odds ratio (OR) with a 95%

confidence interval (CI) was reported. Results were considered statistically significant at $P < 0.05$.

3. Results

3.1 Demographic characteristics of the participants

Among the 250 intern students, 213 completed the questionnaire validly. As reported in **Table 1**, the mean age was 19.89 ± 1.75 years old. Participants were mostly female (89.67%). Only 5.63% reported being educated in university and most of them evaluated themselves as ranking lower than 50% in school performance and self-learning ability.

Table 1. Demographics of the participants (mean ± standard deviation, [*n* (%)])

	***n* (%)**
Age (years)	19.89 ± 1.75
Gender	
Male	22 (10.33%)
Female	191 (89.67%)
Education level	
None	3 (1.40%)
Technology school	86 (40.38%)
College	112 (52.58%)
University	12 (5.63%)
School performance	
0–20	9 (42.25%)
21–50	57 (26.76%)
51–80	102 (47.89%)
81–100	45 (21.13%)
Self-evaluated study ability	
Strong learning ability	7 (32.86%)
Requires monitoring	138 (64.79%)
Does not want to study	68 (31.92%)

3.2. Intern students' KAP scores

As shown in **Table 2**, the mean knowledge score was 10.32 ± 3.22, with a scoring rate of 60.71%. The mean attitude score was 58.78 ± 6.80, with a scoring rate of 65.31%. The mean practice score was 29.06 ± 14.35, with a scoring rate of 42.64%.

Table 2. KAP score of nursing informatics among participants

	Minimum score	Maximum score	Mean score	Standard deviation
Knowledge-1	0	1	0.58	0.50
Knowledge-2	0	1	0.83	0.38
Knowledge-3	0	1	0.62	0.49
Knowledge-4	0	1	0.72	0.45
Knowledge-5	0	1	0.10	0.30
Knowledge-6	0	1	0.71	0.45
Knowledge-7	0	1	0.49	0.50
Knowledge-8	0	1	0.39	0.49
Knowledge-9	0	1	0.61	0.49
Knowledge-10	0	1	0.70	0.46
Knowledge-11	0	1	0.65	0.48
Knowledge-12	0	1	0.11	0.32
Knowledge-13	0	1	0.88	0.32
Knowledge-14	0	1	0.85	0.35
Knowledge-15	0	1	0.78	0.42
Knowledge-16	0	1	0.67	0.47
Knowledge-17	0	1	0.63	0.48
Attitude-1	1	5	3.98	0.73
Attitude-2	1	5	3.42	0.76
Attitude-3	1	5	3.93	0.76
Attitude-4	1	5	3.75	0.82
Attitude-5	1	5	2.97	0.88
Attitude-6	1	5	3.84	0.67
Attitude-7	1	5	3.78	0.71
Attitude-8	1	5	3.96	0.72
Attitude-9	1	5	3.73	0.73
Attitude-10	1	5	3.08	0.83
Attitude-11	1	5	3.99	0.67
Attitude-12	1	5	3.95	0.61
Attitude-13	1	5	4.01	0.66
Attitude-14	1	5	3.84	0.75
Attitude-15	1	5	3.86	0.73
Attitude-16	1	5	2.68	0.89
Practice-1	0	4	1.97	1.01
Practice-2	0	4	0.92	1.06
Practice-3	0	4	1.61	1.13
Practice-4	0	4	1.26	1.15

Table 2.(Continue)

	Minimum score	Maximum score	Mean score	Standard deviation
Practice-5	0	4	1.37	1.15
Practice-6	0	4	1.89	1.10
Practice-7	0	4	1.69	1.11
Practice-8	0	4	1.49	1.14
Practice-9	0	4	1.72	1.12
Practice-10	0	4	1.61	1.17
Practice-11	0	4	2.22	1.10
Practice-12	0	4	1.72	1.25
Practice-13	0	4	1.75	1.13
Practice-14	0	4	1.88	1.18
Practice-15	0	4	1.66	1.16
Practice-16	0	4	2.27	1.08
Practice-17	0	4	2.03	1.10
Total knowledge score	0	15	10.33	3.23
Total attitude score	28	78	58.78	6.81
Total practice score	0	68	29.06	14.35

3.3. Factors associated with students' KAP score

Logistic regression analysis was performed to identify demographic and contextual factors associated with KAP. The results and several factors identified to be independently associated with the KAP score are shown in **Table 3**.

Table 3. Logistic regression analysis of factors associated with KAP

Variable	Knowledge	Attitudes	Practice
Age	0.103	0.871	0.68
Gender	0.712	0.575	0.933
Education level	0.881	0.059	0.354
School performance	0.62	0.365	0.995
Self-learning evaluation	0.748	0.216	0.026*
Further learning plans	0.023*	0.001**	0.849
Nursing informatics courses	0.376	0.73	0.297
Medical informatics courses	0.969	0.979	0.522
Participated in research programs	0.882	0.766	0.296
In charge of research programs	0.551	0.065	0.224
Essay publication	0.201	0.614	0.859
Intern experience	0.356	0.545	0.714
Intern at the hospital level	0.555	0.449	0.697
Intern in telemedicine hospital	0.658	0.038*	0.70

Table 3.(Continue)

Variable	Knowledge	Attitudes	Practice
Intern in a telemedicine hospital before	0.592	0.001**	0.325
Has a personal computer	0.42	0.775	0.137
First time using a computer	0.743	0.277	0.494
Online self-learning	0.308	0.098	0.004**
HIS, PDA training	0.614	0.997	0.718
PDA using	0.943	0.158	0.318
Telecare	0.658	0.86	0.386
Nursing informatics training	0.371	0.292	0.046*

Note: $n = 213$; $^{*}P < 0.05$; $^{**}P < 0.01$. Abbreviations: Hospital information systems, HIS; personal digital assistant, PDA.

4. Discussion

This is the first study focusing on the KAP scores of intern nurses concerning nursing informatics and exploring the associated influencing factors. This study illustrated the current situation of nursing informatics and the related impacting factors among intern nursing students. The findings provide information and evidence for the implementation of nursing informatics courses for colleges and universities.

This study showed that the highest score was achieved in the attitude dimension and the lowest score was achieved in the practice dimension. The results were the same as previous studies [12]. A high attitude score is correlated to the development of the internet in our daily lives, where students are more exposed to computers and artificial intelligence. As the devices are beneficial to the students, they harbor positive attitudes towards informatics. However, they are still in the early stage of their nursing career, hence they have little chance to apply what they learned [13]. Hence, the practice dimension achieved the lowest score.

These findings were in accordance with the logistic regression analysis. Further learning plans and internet hospital intern experiences were positively related to higher attitude scores, which means more intern students are willing to utilize health informatics during their internship. Furthermore, the students' self-learning ability, online learning experience, and telecare training provided during the internship positively facilitated the practice scores. Moreover, students with further learning plans also achieved higher knowledge scores [14,15].

This study indicated that nursing students' personal informatics experiences could influence their KAP toward nursing informatics. Intern nursing students are still in the early stages of their careers. Hence, they require abundant knowledge, training, and experience to encourage students to utilize health informatics in their future work, which could benefit patients and facilitate the development of telecare.

5. Conclusion

The nursing informatics attitude score was the highest and the practice score was the lowest among intern nursing students. It was also identified that further learning plans, hospital intern experiences, self-learning ability, online learning experience, and telecare training were positively correlated to nursing informatics scores.

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Disclosure statement

The authors declare no conflict of interest.

References

[1] Beckham R, Riedford K, 2014, Evolution of a Graduate-Level Informatics Course for The Non-Informatics Specialist Nurse. Journal of Nurse Practice, 10(6): 387–392.

[2] Veronika W, Jonathan P, Maxine H, et al., 2014, Using a Mobile Health Application to Support Self-Management in COPD: A Qualitative Study. Br J Gen Pract, 64(624): 392–400.

[3] Wee S, Vrijhoef HA, 2015, Conceptual Framework for Evaluating the Conceptualization, Implementation, and Performance of Transitional Care Programs. J Eval Clin Pract, 21(2): 221–228.

[4] Ontario H, 2013, Continuity of Care to Optimize Chronic Disease Management in The Community Setting: An Evidence-Based Analysis. Ont Health Technol Assess Ser, 13(6): 1–41.

[5] Zhen H, Nian L, DaJiang L, et al., 2020, Telemedicine During The COVID-19 Pandemic: Experience from Western China. Journal of Medical Internet Research, 22(5): 19577.

[6] Ancker JS, Edwards AM, Miller MC, et al., 2012, Consumer Perceptions of Electronic Health Information Exchange. Am J Prev Med, 43(1): 76–80.

[7] Lipschitz J, Miller CJ, Hogan TP, et al., 2019, Adoption of Mobile Apps for Depression and Anxiety: Cross-sectional Survey Study on Patient Interest and Barriers to Engagement. JMIR Mental Health, 6(1): 11334.

[8] Simpson RL, 2015, Big Data and Nursing Knowledge. Nurs Adm Q, 39(1): 87–89.

[9] Farzandipour M, Mohamadian H, Akbari H, et al., 2021, Designing a National Model for Assessment of Nursing Informatics Competency. BMC Medical Informatics and Decision Making, 21(35).

[10] Collins S, Yen PY, 2017, Nursing Informatics Competency Assessment for The Nurse Leader. The Journal of Nursing Administration, 4(47): 212–218.

[11] Lee JJ, Clarke CL, 2015, Nursing Students' Attitudes Towards Information and Communication Technology: An Exploratory and Confirmatory Factor Analytic Approach. Informing Practice and Policy Worldwide Through Research and Scholarship, 71(5): 1181–1193.

[12] Zhu WJ, Chen XW, 2020, A Survey of The Current Situation of Nursing Information Competency Among Undergraduate Nursing Students. Zhong Hua nursing education, 17(3): 245–249.

[13] Choi J, De Martinis JE, 2013, Nursing Informatics Competencies in an Online Informatics Course. Journal of Clinical Nursing, 22(13): 1970–1976.

[14] Kowitlawakul Y, Chan SW, Pulcini J, et al., 2015, Factors Influencing Nursing Students' Acceptance of Electronic Health Records for Nursing Education (EHRNE) Software Program. Nurse Educ Today, 35(1): 189–94.

[15] Song S, 2013, The Status of Computer Literacy and Its Influencing Factors on Clinical Nurses, dissertation, Chinese Medical University, China.