



Iranian nursing and midwifery students' attitudes towards information and communication technology: A Cross-sectional Study

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Abstract

Nursing and midwifery students' perceptions and attitudes regarding Information and Communication Technology (ICT) play an important role in their educational activities. However, little information is available about the situation in Iran. This study aimed at determining the attitude of Iranian nursing and midwifery students toward ICT.

A cross-sectional study was conducted among 180 Iranian nursing and midwifery students between October and December 2021 using stratified random sampling. Data were collected using a personal information form and a standard questionnaire to assess the attitudes of nursing and midwifery students regarding ICT. Data were analyzed using SPSS software version 16.

The great majority of participants (96.6%) had a positive attitude toward Information and Communication Technology. Subscale analysis showed that the highest and the lowest scores were related to Care Value of ICT, and Workload value of ICT, respectively. Students with a higher average (GPA) had a more positive attitude towards "Care Value of ICT" ($p < 0.001$) and "Training of ICT skills" ($p = 0.007$). Significant correlations were found between "Care Value of ICT" and "Training of ICT skills" ($rs = 0.699$, $p < 0.001$).

Although students' attitudes toward ICT were positive, the subscales "ICT confidence" and "Workload value of ICT" scored low. Educators should improve training in ICT skills to strengthen students' attitudes toward technology and increase self-confidence and productivity-related to ICT use in learning and clinical practice.

Key words: Information Technology, Students, Nursing, Midwifery.

Introduction

Information and communication technology (ICT) is a set of technologies that are used to communicate, transmit and disseminate information (1). Learning ICT and how to use it is an important issue in nursing and midwifery education. Nursing and midwifery students are among the departments for which ICT use in academic education and clinical practice is very important (2). These students should have the necessary competence in using ICT, although their ability is discussed (3). Technology-related aspects should be included in the student education program so that they have the necessary competence to use these technologies during their training and in their future professional practice (4).

ICTs enhance student learning through direct or indirect experiences in clinical settings (5). Nursing students who used ICT tools during their first year of academic education had also greater academic satisfaction and success than other students (6). Therefore, the integration of ICT components in the curriculum of nursing and midwifery students in many countries is recognized as an important and useful teaching aid (6-8). Thus, it is expected to integrate these technologies into the curriculum of nursing and midwifery students so that they can achieve a high level of skills and competence in the use of these technologies (3, 9). In addition to gaining knowledge and skills in the field of ICT, their understanding and attitude towards these

technologies play a very important role in the use or non-use of these tools in teaching and learning activities and their future clinical performance (10). Therefore, studying nursing and midwifery students' attitudes to ICT has been considered an important and fundamental issue in the field of education and clinical practice (3, 11).

With this in mind, Lee & Clarke examined the attitudes of nursing students in South Korea intending to develop a short version of the Information Technology Attitude Scales for Health (ITASH) (3). In another study, Tubaishat examined nursing students' attitudes and personal characteristics affecting technology acceptance. The findings of this study showed a positive attitude of nursing students towards technology. However, in this study, the convenience sampling method and low response rate (55.30%) of the participants were among the limitations of the study (12).

In Iran, however, the attitudes of physicians, medical students, and health workers (8), as well as public health, occupational health and environmental health students in relation to information and communication technology (13), have been studied and a favorable attitude was documented among these participants. So far, the attitudes of nursing and midwifery students towards health ICT have not been studied and there is little information in this field. In line with the research background and the importance of the subject and to fill the existing information gap, the present study was conducted to investigate the attitudes of nursing and midwifery students regarding Health Information and Communication Technology.

Materials and Methods

This cross-sectional study was conducted with the participation of nursing and midwifery students of Torbat Heydariyeh University of Medical Sciences between October and December 2021. The sample size (N=180) was calculated based on a pilot study with the participation of 30 members of the statistical population using the formula $n = (z^2 \times s^2) / d^2$. Stratified random sampling was used in this study. Studying in nursing or midwifery, having at least one semester of clinical internship, and

willingness to participate in the study were the inclusion criteria. Lack of complete response to the questionnaire was the exclusion criterion.

The study questionnaire consisted of two parts: demographic information form and Information Technology Attitude Scales for Health (ITASH). The demographic form included age, gender, semester, the field of study, and previous semester grade point average. The ITASH tool was used to determine the attitude of nursing and midwifery students.

The ITASH was originally developed in English, and after obtaining permission from the original author, it was translated into Persian using a forward-backward method and used in the current study. The ITASH includes 19 items and four subscales: "Care value of ICT" (4 items), "Training of ICT skills" (6 items), "ICT Confidence" (4 items), and "Workload value of ICT" (5 items). Items were ranked on a Likert scale with four options (1 = strongly disagree), (2 = disagree), (3 = agree) and (4 = strongly agree). Scores ranged from 19 to 76 on this scale. This tool has shown good validity and reliability (3). In this study, the Cronbach's alpha reliability coefficient of the tool was 0.86. Participants who answered agree or strongly agree to the attitude questions were considered as having a positive attitude toward information and communication technology. Data were analyzed using SPSS software version 16, and descriptive and inferential statistics were performed.

The mean score of each subscale was compared according to the demographic variables of the participants using Kruskal-Wallis, Mann-Whitney, and independent t-tests. Spearman rank correlation coefficient test was used to determine the relationships between two continuous quantitative variables. This study was approved by the Biomedical Ethics Committee of Torbat Heydariyeh University of Medical Sciences with the ethics code IR.THUMS.REC.1396.52. Data were collected after informing the eligible participants about the objectives of the study and the research method as well as signing the informed consent form. Participants were told that the information would be confidential and that they would have the right to leave the study at any time during the study.

Results and Discussion

One hundred eighty people participated in the study (100% response rate). The mean age of participants was 21.27 ± 2.02 years. The majority of participants (128, 71.1%) were female, and 112 (62.2%) were nursing students. The largest groups of participants (40, 22.2%) were studying in the second semester. The great majority of participants (127; 96.6%) had a positive attitude toward Information Technology. The mean scores of the four dimensions of the questionnaire were between 55.3 and 84.68 on a 100-point scale. The highest score (84.72 ± 16.22) was related to the Care Value of ICT, followed by Training of ICT skills (75.85 ± 16.04), ICT Confidence (69.68 ± 11.00), and the amount of Workload value of ICT (55.30 ± 13.84).

Table 1 shows the comparison in the subscales of the ITASH tool according to the demographic characteristics of the participants.

Based on the findings, students with a higher average (GPA), had higher scores for the Care Value of ICT ($p < 0.001$) and Training of ICT skills ($p = 0.007$) subscales. There was a statistically significant difference between students' scores in terms of the semester in the two subscales of Care Value of ICT ($p = 0.016$) and Training of ICT skills ($p < 0.001$). There was no statistically significant difference between students' attitude scores in all instrument subscales by age, gender, and field of study ($p > 0.05$).

This study aimed at determining the attitudes of nursing and midwifery students toward Health Information and Communication Technology. The majority of participants had a positive attitude toward Health Information and Communication Technology. This finding is consistent with the results of previous research among nursing students (4, 10, 11). In this study, midwifery students scored slightly higher on all subscales of the tool than nursing students. Female students also scored higher than males in all subscales, except the "ICT Confidence" subscale, although these differences were not statistically significant, probably due to the small number of male participants.

This lack of major differences seems to be related to the curriculum planning of these students. In the curriculum of nursing and midwifery students in Iran, one course in health informatics is included in the form of 0.5 theoretical units (9 hours) and 0.5 practical units (17 hours) and these students often become familiar with the basics of information technology in nursing as well as midwifery in the second semester (14).

In this study, students scored higher on the "Care Value of ICT" subscale than on other subscales. In support of this finding, Lee and Clarke tested the ITASH among nursing students and found that participants had a positive attitude towards the effects of health information and communication technology on improving and promoting patient care (3). Other researchers also reported that more than 80% of health care workers consider ICT as a way to provide better care, and 78% believe that ICT promotes greater patient participation in care (15).

In the present study, participants had high scores on the "Training of ICT skills" subscale, which indicated their desire to learn more about ICT. In this regard, one study was conducted to determine the knowledge, attitude, and practice of nursing students regarding the use of the Internet and found that although the majority of nursing students (77.1%) had little knowledge in the field of Internet search skills, most of them (92%) had a positive attitude towards using technology in learning (13). In another study, Tubaishat studied nursing students' attitudes and personal characteristics affecting technology acceptance. The findings of the study showed that nursing students who had a high level of technology skills also showed a more positive attitude towards technology (12).

In the present study, students had the lowest attitude scores under the "ICT Confidence" as well as "Workload value of ICT" subscales. Lee (2016) achieved the same results in his study. According to him, this issue is related to the limited use of information and communication technology in clinical settings, which in turn reduces the confidence of nursing students in the use of information and communication technology in their clinical practice.

On the other hand, nursing students have little chance of using information and communication technology due to their educational conditions in clinical settings, and therefore this issue undermines their confidence in using technology in clinical settings. Such conditions do not allow them to understand the "workload value of ITC" (16).

However, nurses, unlike students, are more aware of the value of using information and communication technology in their professional performance due to their work situation. In this regard, the systematic review by Rouleau et al. (2017) reported that many indicators of nursing care, including education of patients and their families, nurse-patient relationship, documentation, quality of information documentation, intra-professional and inter-professional cooperation, satisfaction and dissatisfaction of nurses and patients, duration of nursing care, time management, access to quality information, updating knowledge and applying it, skills and competence of nurses, assessment, planning and evaluation of nursing care, perspectives on the quality of services provided as well as the quality of life-related to the nursing care provided were influenced by the use of information and communication technology (17). In his study among postgraduate nursing students in South Korea, Lee found that nursing students used information and communication technology to quickly achieve the desired information in a short time, with high efficiency, easy access, and also access to a huge amount of information (16).

According to the findings of the present study, students with higher averages (GPA) had higher scores in the "Care Value of ICT" and "Training of ICT skills" subscales. In this regard, the results of a study showed that nursing students who used information and communication technology for learning, compared to those who do not use this technology, have more academic success and satisfaction (6).

In the present study, there was a significant difference between students' scores by semester in the two subscales "Care Value of ICT" and "Training of ICT skills" so that students in lower semesters had lower scores compared to those in higher semesters. In the study of Tubaishat et al.,

nursing students in higher academic years had a more positive attitude compared to other students. According to researchers, this situation can be due to the anxiety and low self-esteem of students in using technology in the lower levels of education (4).

Nkosi et al. (2011) also support this finding by stating that emotional reactions such as fear and distrust of technology are often observed in the early stages of academic education among students (18). An important and unique finding of the present study was the existence of a direct and strong relationship ($rs = 0.69$) between the "Care Value of ICT" subscale and the "Training of ICT skills". The relationship between these two subscales has also been reported strongly in the Lee (2016) study at 0.63 (16). There was also a direct and strong relationship between "Training of ICT skills" and "ICT confidence". In Lee's (2016) study, the relationship between these subscales has been reported at a moderate level (16). In nursing and midwifery education, information and communication technology has been widely considered by students because it allows them to easily access the information needed for care (5).

On the other hand, the use of information and communication technology by professors, educators, and managers of health service centers can increase students' interest and confidence in information and communication technology (19). Thus, training nursing and midwifery students should focus on strengthening students' attitudes toward ICT and applying it to learning and clinical practice.

This study had the following limitations: The study was conducted in one public university only, so the results may not be generalizable to students from other universities. The study was conducted only with the participation of undergraduate students (due to the lack of postgraduate students in this university). Therefore, the results may not be generalizable to postgraduate students.

Overall, despite the significant results of the present study, the following questions remain:

What is the attitude of nurses and clinical midwives in the field of information and communication technology? What is the

difference between the attitudes of students and nurses and clinical midwives? What is the difference between the attitudes of students at different levels of education (undergraduate and postgraduate)? Therefore, more research is needed to answer such questions in the context of Iran.

Spearman rank correlation coefficient showed a direct and strong relationship between Care

Value of ICT and Training of ICT skills subscales ($rs = 0.699$, $p < 0.001$). Figure 1.

Likewise, Training of ICT skills was significantly correlated with ICT confidence ($rs = 0.546$, $p < 0.001$). Figure 2. Moreover, there was a direct and moderate relationship between attitude score and students' average ($rs = 0.203$, $P = 0.006$).

Table.1: Comparison of the dimensions of information and communication technology tool according to the demographic characteristics of the participants

	N (%)	Care Value of ICT	Training of ICT skills	ICT Confidence	Workload value of ICT
Age (years)					
18-20	66(36.7)	13.42 \pm 2.56	13.42 \pm 2.56	13.42 \pm 2.56	13.42 \pm 2.56
21-23	102(56.7)	13.61 \pm 2.60	13.61 \pm 2.60	13.61 \pm 2.60	13.61 \pm 2.60
>24	12(6.7)	13.75 \pm 2.89	13.75 \pm 2.89	13.75 \pm 2.89	13.75 \pm 2.89
		*Chi =0.711, p=0.701	*Chi =5.489, p=0.064	*Chi=1.999, p=0.368	*Chi=1.854, p=0.396
Gender					
male	52(28.9)	13.25 \pm 2.98	17.86 \pm 3.99	11.26 \pm 1.75	10.67 \pm 2.41
Female	128(71.7)	13.67 \pm 2.42	18.34 \pm 3.79	11.10 \pm 1.76	11.21 \pm 2.89
		**Z=−0.55, p=0.58	**Z=−0.60, p=0.54	**Z=−0.46, p=0.64	**Z=−01.22, p=0.22
Field of Study					
nursing	112(62.2)	13.30 \pm 2.67	17.86 \pm 3.88	11.10 \pm 1.80	10.97 \pm 2.98
midwifery	68(37.8)	13.97 \pm 2.42	18.76 \pm 3.75	11.22 \pm 1.70	11.20 \pm 2.37
		**Z=−1.85, p=0.64	**Z=−1.56, p=0.11	**Z=−0.42, p=0.67	**Z=−1.09, p=0.27
GPA					
<17	100(55.6)	12.59 \pm 2.89	17.52 \pm 3.83	11.03 \pm 1.79	11.40 \pm 2.78
>17	80(44.4)	14.31 \pm 1.93	19.06 \pm 3.71	11.30 \pm 1.71	10.63 \pm 2.70
		^Y t=−3.61, p<0.001	^Y t=−2.71, p=0.007	^Y t=−1.02, p=0.30	^Y t=1.84, p=0.06
Semester					
Second	40(22.2)	13.22 \pm 2.68	16.75 \pm 3.40	10.72 \pm 1.69	10.80 \pm 2.68
Third	35(19.4)	12.60 \pm 3.23	16.82 \pm 3.83	11.11 \pm 1.69	11.40 \pm 3.36
Fourth	17(9.4)	14.00 \pm 2.06	19.11 \pm 3.63	12.17 \pm 1.70	12.17 \pm 2.57
Fifth	33(18.3)	13.84 \pm 2.58	19.42 \pm 3.83	11.24 \pm 1.90	11.00 \pm 2.44
Sixth	19(10.6)	13.94 \pm 2.27	19.42 \pm 3.79	10.94 \pm 1.47	10.78 \pm 2.55
Seventh	26(14.4)	13.57 \pm 1.98	18.03 \pm 4.02	11.07 \pm 2.03	10.88 \pm 2.94
Eighth	10(5.6)	15.70 \pm 0.67	21.40 \pm 1.26	11.50 \pm 1.17	10.20 \pm 2.04
		*Chi =15.544, p=0.016	*Chi =27.912, p<0.001	*Chi =8.763, p=0.187	*Chi =5.159, p=0.524

* Kruskal-Wallis. ** Mann-Whitney U. ^Y Independent t-test. ^YGPA (Grade Point Average)

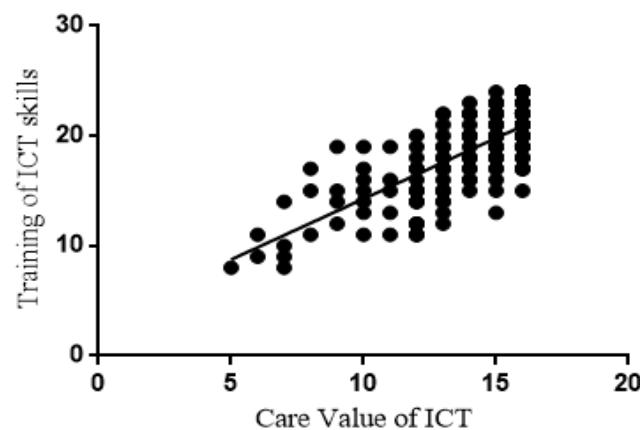


fig 1. Correlation between Care Value and Training of ICT skills.

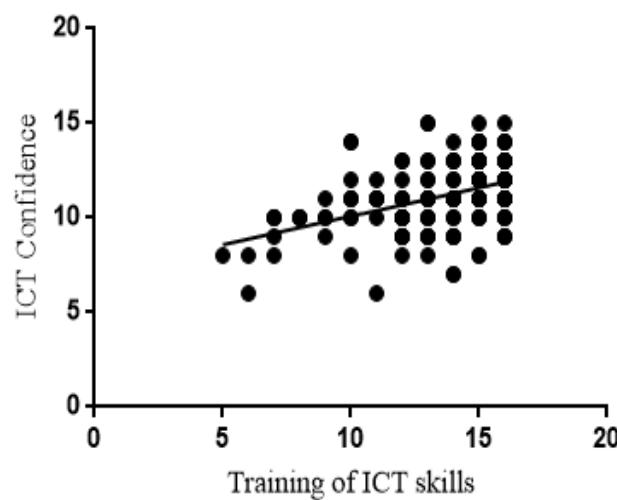


fig 2. Correlation between Training of ICT skills and ICT confidence.

Conclusion

This study showed evidence of a positive attitude of nursing and midwifery students towards health information and communication technology. Students' scores varied according to the ICT tool subscales. The highest score was related to the "Care Value of ICT" subscale, and the lowest was related to the "Workload value of ICT". Students' scores varied by average and semester under the "Care Value of ICT" and "Training of ICT skills" subscales. The findings also showed a direct and strong relationship between the "Care Value of ICT" subscales with

"Training of ICT skills" and "Training of ICT skills" with "ICT confidence". Therefore, nursing and midwifery educators should focus on strengthening students' attitudes toward ICT and applying it to learning and clinical practice.

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References

1. Sajeesh K, Helen S. Telenursing: Springer-Verlag London; 2011. 202 p.
2. Todhunter F. Using principal components analysis to explore competence and confidence in student nurses as users of information and communication technologies. *Nursing open*. 2015;2(2):72-84.
3. Lee JJ, Clarke CL. Nursing students' attitudes towards information and communication technology: an exploratory and confirmatory factor analytic approach. *Journal of advanced nursing*. 2015;71(5):1181-93.
4. Tubaishat A, Aljezawi Me, Al-Rawajfah OM, Habiballah L, Akhu-Zaheya LM. Exploring changes in nursing students' attitudes towards the use of technology: A four-wave longitudinal panel study. *Nurse Education Today*. 2016;100(38):101-6.
5. Lee JJ, Carson MN, Clarke CL, Yang SC, Nam SJ. Nursing students' learning dynamics with clinical information and communication technology: A constructive grounded theory approach. *Nurse Education Today*. 2019;73:41-7.
6. González VS, Manzanares MTL, Peinado JAA. Nursing Students' Satisfaction during their First Year of Study in a Private University as regards the Integration of ICTs. *International Journal*. 2017;3(2):35-74.
7. Nwozichi CU, Marcial DE, Farotimi AA, Escabarte ABS, Madu AM. Integration of information and communication technology in nursing education in Southeast Asia: A systematic literature review. *Journal of Education and Health Promotion*. 2019;8(1):141.
8. Sadoughi F, Hemmat M, Valinejadi A, Mohammadi A, Majdabadi HA. Assessment of health information technology knowledge, attitude, and practice among healthcare activists in Tehran hospitals. *International Journal of Computer Science and Network Security (IJCSNS)*. 2017;17(1):155.
9. Honey M, Skiba DJ, Procter P, Foster J, Kouri P, Nagle LM. Nursing informatics competencies for entry to practice: the perspective of six countries. *Stud Health Technol Inform*. 2017;232:51-61.
10. Warshawski S, Itzhaki M, Barnoy S. Nurse and Nurse Student Attitudes and Perceived Self-efficacy in Use of Information and Communication Technologies: Professional and Cultural Differences. *CIN: Computers, Informatics, Nursing*. 2019;37(1):20-8.
11. Terkes N, Celik F, Bektas H. Determination of nursing students' attitudes towards the use of technology. *Japan Journal of Nursing Science*. 2019;16(1):17-24.
12. Tubaishat A. An investigation into the attitudes of nursing students toward technology. *Journal of Nursing Research*. 2014;22(2):119-25.
13. Danesh-Kohan A, Hosseinzadeh M, Abolfathi R, Hekmatifar A, Bajalanlou F. Study of Knowledge, Attitudes and Practice towards the Internet among BSc Students of School of Public Health, Shahid Beheshti University of Medical Sciences. *Journal of Medical Education*. 2015;14(3):101-6.
14. Ministry of Health and Medical Education. Secretariat of the Council for Education in Medical Basic Sciences Public Health and Post Graduate. 2014. [cited 28/3/2020]. Available from: <http://hcmep.behdasht.gov.ir/index.aspx?siteid=369&pageid=59284>.
15. Gund A, Lindecrantz K, Schaufelberger M, Patel H, Sjöqvist BA. Attitudes among healthcare professionals towards ICT and home follow-up in chronic heart failure care. *BMC medical informatics and decision making*. 2012;12(1):138.

16. Lee JJ. Undergraduate nursing students' learning dynamics and their use of information and communications technology in clinical environments in South Korea: University of Edinburgh; 2016.
17. Rouleau G, Gagnon M-P, Côté J, Payne-Gagnon J, Hudson E, Dubois C-A. Impact of information and communication technologies on nursing care: results of an overview of systematic reviews. *Journal of medical Internet research*. 2017;19(4):e122.
18. Nkosi ZZ, Asah F, Pillay P. Post-basic nursing students' access to and attitudes toward the use of information technology in practice: a descriptive analysis. *Journal of Nursing Management*. 2011;19(7):876-82.
19. Huang K, Abdullah AS, Ma Z, Urmi DS, He H, Quintiliani L, et al. Attitudes of Chinese health sciences postgraduate students' to the use of information and communication technology in global health research. *BMC medical education*. 2019;19(1):367.