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ORIGINAL ARTICLE

Information and communication technologies and social media in nursing practice: From the perspective of nurses and patients.

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Abstract

OBJECTIVE: To identify and analyze differences in information and communication technology (ICT) knowledge and use between nurses and patients, and to examine how age and educational attainment are associated with these differences in the context of perioperative outpatient nursing care, based on data collected concurrently from both groups.

MATERIAL AND METHODS: The tested group consisted of 81 nurses and 209 patients. The average age of the nurses was 41 years, and the average age of the patients was 36 years. This was a cross sectional, prospectively planned quantitative study. A self constructed questionnaire was used to assess levels of ICT knowledge and use. Data were analyzed using descriptive statistics and inferential tests (Chi square, Mann–Whitney U, and Wilcoxon tests) with a significance level of $\alpha = 0.05$.

RESULTS OF THE RESEARCH: We found statistically significant differences in the level of knowledge about ICT and social media between nurses and patients. Both groups considered ICT knowledge important, but patients rated it as more important than nurses (M = 2.78 vs 2.69; $p < 0.001$). This indicates a discrepancy between patients' expectations and nurses' perceptions within the same perioperative outpatient services.

CONCLUSION OF THE RESEARCH: By comparing responses of nurses and patients within the same perioperative outpatient services, we showed that ICT and social media are perceived as important by both groups, but with different priorities. Education in the home environment using modern ICT, aligned with these distinct perspectives, has the potential to contribute to the prevention of postoperative complications.

INTRODUCTION

Nowadays, nurses are increasingly being educated to support and improve the quality of nursing care for patients, families and communities. Not only are opportunities being created, but threats are also emerging, mainly related to the introduction of new disruptive technologies in healthcare, which requires healthcare professionals to develop new digital skills (Isidori *et al.* 2022). Especially during the global COVID-19 pandemic, information and communication technologies began to be used extensively in nursing work to replace the traditional way of providing nursing and health care (Kord *et al.* 2021). Available technologies, such as mobile phones, computers and existing communication applications, can be used by nurses to continue providing care and services to patients. Nursing services may use pre-created e-learning programs or create training programs that can be installed on electronic devices.

Telenursing encompasses the use of technological tools and devices to provide health and nursing services remotely. It can support care for aging populations, reduce healthcare and nursing care costs, and increase patient comfort by enabling patients to remain in their home environment (Bachratá & Kristová, 2016). From an organizational perspective, telenursing may also contribute to more efficient use of human resources and facilitate the exchange of experience between nurses worldwide. Existing studies, however, tend to focus either on nurses' digital competencies or on patients' use of ICT and social media and rarely examine both groups simultaneously within the same perioperative outpatient care setting (Slezáková *et al.* 2022).

In remote patient care, nurses and patients use devices such as telephones, tablets, computers, and smartphones, as well as audio and video conferencing tools and specialized health applications. Common telecare services include teletherapy, teleconsultation, telemonitoring, and telephone triage (Poledníková *et al.* 2016). The nurse's role in telecare is to ensure high quality, continuous, and safe remote nursing care, including teleeducation focused on prevention, treatment, and care regimens while the patient remains in the home environment (Bachratá & Kristová, 2016). Such an approach can facilitate the sharing of information from the patient's home and enable earlier identification of relevant health issues. In obstetric care, telehealth has shown potential benefits in areas such as monitoring, education, remote data collection, nursing interventions, family support, and multidisciplinary collaboration (Libová *et al.* 2024).

AIM

The aim of this study was to identify and analyze differences in ICT knowledge and use between nurses and patients, and to examine how age and educational attainment are associated with these differences in the context of perioperative outpatient nursing care. By including both nurses and patients from the same perioperative outpatient services and using parallel questionnaires with identical content, this study provides a joint view of digital readiness across professional and patient roles that is rarely addressed in previous research.

MATERIAL AND METHODS

This study used a prospectively planned quantitative cross-sectional design. Data were collected between November 2022 and October 2023 in two healthcare facilities providing perioperative care. These facilities delivered outpatient and one-day surgical care, including preoperative patient preparation, postoperative follow-up, and perioperative nursing care. Patient education formed part of routine care and focused on regimen-related measures, prevention of postoperative complications, and subsequent home care.

The study population comprised two groups of respondents: nurses and patients. The first group consisted of 81 nurses providing perioperative care in surgical specialties. Nurses were recruited using convenience sampling. The inclusion criteria were completed nursing education, specialization in adult care or surgical nursing, provision of nursing care in perioperative or outpatient surgical settings, and provision of informed consent. Of 98 questionnaires distributed to nurses, 86 were returned, corresponding to a response rate of 91.5%. Five questionnaires were excluded because of incomplete completion; therefore, 81 questionnaires were included in the final analysis.

The second group consisted of 209 patients in the perioperative period. Patients were recruited using purposive sampling. The inclusion criteria were age ≥18 years, undergoing or preparing for a surgical procedure, receiving perioperative or outpatient nursing care, ability to complete the questionnaire independently, and provision of informed consent. Patients with severe cognitive impairment that could affect their ability to understand the questionnaire or complete it independently were excluded. Eligibility was assessed individually on the basis of the patient's ability to understand instructions, communicate, and respond appropriately during questionnaire distribution. No standardized cognitive screening tool was used. Of 254 questionnaires distributed to patients, 221 were returned, corresponding to a response rate of 87.1%. Twelve questionnaires were excluded because of incomplete completion; therefore, 209 patient questionnaires were included in the final analysis.

Data were collected using a non-standardized self-constructed questionnaire developed separately for nurses and patients. The questionnaire was created on the basis of an analysis of relevant professional literature concerning the use of information and

Tab. 1. Level of knowledge about ICT and social media used by nurses and patients

Knowledge	Nurses					Patients					In total M
	1	2	3	4	M	1	2	3	4	M	
Level of knowledge	9	0	63	9	**2.69**	29	27	114	39	**2.78**	**2.73**
	Chi-Square					Sig.					
	17.977					< 0.001					

Legend: Comparison of nurses' (n = 81) and patients' (n = 209) ratings of the importance of knowledge about information and communication technologies (ICT) and social media in healthcare. Responses were recorded on a 4-point Likert scale, where 1 = least important and 4 = most important. M = arithmetic mean; Chi-square = chi-square test statistic; Sig. = *p*-value for the comparison between nurses and patients.

communication technologies in nursing. In terms of content, the questionnaire items were identical for both respondent groups; only the wording was adapted to reflect the specific characteristics of nurses and patients, which enabled direct comparison of their responses to the same ICT-related topics. The questionnaire consisted of 18 closed-ended items focused on respondents' opinions regarding the use of information and communication technologies in the provision and receipt of nursing care. Individual items were evaluated using a 4-point Likert scale without a neutral response option, ranging from 1 = least important to 4 = most important. This response format was selected to encourage respondents to express a preference or attitude toward the use of ICT in perioperative education and to reduce the tendency to select neutral responses.

The questionnaire also included demographic and professional characteristics. Among nurses, data were collected on age, sex, educational attainment, specialization, type of workplace, and length of professional experience. Among patients, data were collected on age, sex, and educational attainment. Questionnaires were distributed in printed form and completed anonymously without the presence of the researcher.

The face validity of the instrument was assessed by experts in nursing and perioperative care, who evaluated the clarity, relevance, and wording of individual questionnaire items. Based on their feedback, selected items were revised to improve comprehensibility and appropriateness. The content validity of the questionnaire was established through a series of steps. Items were developed based on relevant professional literature and existing theoretical models that define the construct under investigation. These item proposals were then evaluated by a panel of four nursing experts, who assessed their relevance, clarity, and appropriateness. Based on the panel's feedback, several items were revised or removed. Before final data collection, the questionnaire was pilot-tested with 5 nurses and 5 patients to identify unclear or ambiguous items. Questionnaires completed during pilot testing were not included in the final analysis.

The study was conducted in accordance with the principles of the Declaration of Helsinki and was approved by the ethics committee of the University Hospital in

Tab. 2. Applications and social media used by nurses and patients

Application	Nurses	Patients		
	M	M	U	*p*
E-mail	**2.89**	1.94	6126.0	< 0.001
Youtube	1.26	2.30	4330.5	< 0.001
Blog	1.63	**2.81**	5897.5	< 0.001
Twitter	1.12	2.56	2917.5	< 0.001
WhatsApp	1.79	1.28	5712.0	< 0.001
Messenger	1.40	1.47	7931.5	0.335
Teams	1.80	2.40	6232.5	< 0.001
Instagram	1.12	2.40	2589.5	< 0.001
FB	1.12	1.41	6701.5	< 0.001
Other	0.0	0.0	-	-

Legend: Comparison of the reported use of selected applications and social media in free time among nurses (n = 81) and patients (n = 209). Higher mean scores indicate more frequent or more important use of the application, according to the questionnaire scale. M = arithmetic mean; U = Mann-Whitney U test statistic; *p* = *p*-value for the difference between nurses and patients.

Tab. 3. Information about ICT and social media considering nurses´ education

Education	Nurses	
	n	%
SZS	9	11.10
Bc.	**63**	77.80
Mgr.	9	11.10
In total	**81**	**100.00**
Chi-Square		**Sig.**
7.747		0.101

Legend: Distribution of nurses' self-reported information about ICT and social media in healthcare according to educational attainment (n = 81). SZS = secondary medical school; Bc. = bachelor's degree; Mgr. = master's degree; n = absolute frequency; % = relative frequency; Chi-square = chi-square test statistic; Sig. = *p*-value.

Nitra (FNNR-ZS-01/2022-43). Participation was voluntary and anonymous, and all respondents provided informed consent before inclusion in the study.

Statistical analysis was performed using IBM SPSS Statistics, version 25.0. Data were analysed using descriptive statistics, including absolute and relative frequencies, means, and standard deviations. Inferential statistical methods were used to test differences between groups. The chi-square test was applied to nominal variables, while the Mann–Whitney U test and Kruskal–Wallis test were used for ordinal variables. These tests were applied to compare the opinions of nurses and patients and to conduct additional analyses according to selected sociodemographic and professional characteristics, including age and educational attainment. The use of non-parametric statistical methods was justified by the ordinal nature of the analysed variables and the absence of a normal distribution. The internal consistency of the questionnaire was assessed using Cronbach's alpha coefficient, which reached 0.873 in this study, indicating good internal consistency. The level of statistical significance was set at $\alpha = 0.05$.

RESULTS

When assessing differences between nurses and patients in the level of knowledge about ICT and social media in healthcare, we found statistically significant differences that consistently favoured patients' ratings of ICT importance. Both groups considered ICT knowledge important, but patients rated it as more important than nurses (M = 2.78; $p < 0.001$); (Table 1).

Nurses reported using e-mail most frequently in their free time (M = 2.89), whereas patients reported blogs as the most frequently used application (M = 2.81), indicating that the two groups rely on different ICT and social media platforms in their everyday lives. Statistically significant differences between nurses and patients were found for all selected applications ($p < 0.001$), except for Messenger (Table 2).

With regard to nurses' educational attainment, no statistically significant difference was found in information about ICT and social media in healthcare ($p = 0.101$) (Table 3). Similarly, although nurses across educational groups considered e-mail to be the most important application (M = 2.89), no statistically significant differences were found in the use of selected applications and social media according to educational attainment (Table 4).

Among patients, a statistically significant difference was found in information about ICT and social media in healthcare according to age ($p = 0.020$) (Table 5). Regarding the use of selected applications in free time, a statistically significant age-related difference was found only for Teams ($p = 0.037$) (Table 6).

Tab. 4. Usage of selected applications and social media in free time based on nurses education

Applications	Nurses education					
	SZS	Bc.	Mgr.	In total M	Chi-Square	Sig.
E-mail	2.92	2.82	2.92	2.89	0.143	0.931
Youtube	1.24	1.50	1.15	1.26	4.725	0.094
Blog	1.77	1.61	1.58	1.63	0.474	0.789
Twitter	1.11	1.14	1.12	1.12	0.068	0.966
WhatsApp	1.92	1.94	1.64	1.79	1.012	0.603
Messenger	1.26	1.33	1.56	1.40	2.692	0.260
Teams	2.09	1.75	1.71	1.80	1.326	0.515
Instagram	1.00	1.13	1.18	1.12	3.504	0.173
FB	1.21	1.17	1.09	1.12	0.947	0.623
Other	0	0	0	0	0	-

Legend: Use of selected applications and social media in free time among nurses according to educational attainment (n = 81). SZS = secondary medical school; Bc. = bachelor's degree; Mgr. = master's degree; M = arithmetic mean; Chi-square = chi-square test statistic; Sig. = *p*-value for differences among education groups.

Tab. 5. Information about ICT and social media based on patients´ age

Likert scale	Patients´ age			
	18 – 39 years old		40 and over	
	n	%	n	%
1 – the least important	23	16.90	6	8.20
2	11	8.10	16	21.90
3	76	55.90	38	52.10
4 – the most important	26	19.10	13	17.80
In total	**136**	**100.00**	**73**	**100.00**
Chi-Square			**Sig.**	
9.791			0.020	

Legend: Comparison of patients' ratings of information about ICT and social media in healthcare by age group: 18–39 years (n = 136) and 40 years and older (n = 73). Responses were rated on a 4-point Likert scale, where 1 = least important and 4 = most important. n = absolute frequency; % = relative frequency; Chi-square = chi-square test statistic; Sig. = *p*-value.

DISCUSSION

Our analysis showed statistically significant differences between nurses and patients in their level of knowledge about ICT and social media in healthcare. Both groups considered ICT knowledge important, but patients rated it as more important than nurses, which points to a gap between patients' expectations regarding ICT and the emphasis that nurses currently place on it in perioperative outpatient practice. This finding may indicate that patients increasingly perceive ICT as a relevant source of health-related information and as a tool that can support communication with healthcare professionals.

In the context of outpatient and perioperative care, this is particularly important because patients often continue their recovery in the home environment and may need accessible information about postoperative care, warning signs, and recommended regimen measures. In a previous study, Zare and Jebraeily (Zare & Jebraeily, 2018) reported that patients showed the greatest interest in using social media (34%), followed by computers (25%), which supports the importance of ICT tools for patient engagement. The most represented areas for education through ICT were patient education (34%) and availability of information about the patient's health status (23%). These findings suggest that patients may be willing to use ICT not only for general information seeking, but also for obtaining education related to their health condition and care.

From the nursing perspective, this emphasizes the need to provide patients with reliable, understandable, and professionally verified digital information. When using applications in their free time, nurses reported e mail as the most important application, whereas

Tab. 6. Statistical processing of the use of selected applications in free time based on age of patients

Application	Patient age			
	Mann-Whitney U	Wilcoxon W	Z	Sig.
E-mail	4689	7390	-0.691	0.490
Youtube	4588	13904	-0.937	0.349
Blog	4353.5	7054.4	-1.543	0.123
Twitter	4443	13759	-1.296	0.195
WhatsApp	4904	7605	-0.190	0.849
Messenger	4693.5	7394.5	-0.744	0.457
Teams	4126	13442	-2.085	0.037
Instagram	4773	7474	0.480	0.631
FB	4577	13893	-1.126	0.260
Other	4964	7665	0	1

Legend: Comparison of the use of selected applications in free time among patients by age group: 18–39 years (n = 136) and 40 years and older (n = 73). Mann-Whitney U = Mann-Whitney U test statistic; Wilcoxon W = Wilcoxon rank-sum statistic; Z = standardized test statistic; Sig. = *p*-value.

patients most frequently used blogs. This difference reflects distinct patterns of technology use between healthcare professionals and patients and suggests that ICT based education strategies relying primarily on e mail may not fully match patients' preferred platforms.

For nurses, e-mail may represent a familiar and practical communication tool connected with professional communication and information exchange. In contrast, patients' preference for blogs may indicate that they often search for easily accessible, experience-based, or narrative forms of information. However, information obtained from blogs may vary in quality and accuracy; therefore, nurses should support patients in critically evaluating online sources and direct them toward trustworthy health-related information.

In a study focusing on nurses' use of mobile applications, approximately 48.6% of respondents had applications for healthcare professionals installed on their mobile devices. The most commonly used and installed applications were those providing information about medicines, health calculators, and clinical instructions (Mayer *et al.* 2019). This indicates that nurses may use digital technologies primarily as practical tools supporting clinical decision-making, access to professional information, and patient care. In comparison with patients, nurses' use of ICT may therefore be more professionally oriented, while patients may use ICT more frequently for information seeking and personal communication.

Out of all 81 nurses, the most nurses with a first degree of education 77.80% and 11.10% with a second degree of education reported that they had sufficient knowledge of ICT. On the contrary, 11.10% of nurses with a second university degree education reported that they did not have sufficient knowledge of ICT. Although differences in ICT knowledge according to educational attainment were observed descriptively, they were not statistically significant in our study. This suggests that ICT knowledge among nurses may not depend exclusively on formal education.

In contrast, among patients we found a statistically significant difference in information about ICT and social media according to age, which indicates that determinants of digital readiness differ between professional and patient groups. According to the findings of the author (Adeleke *et al.* 2015), the use of ICT by healthcare professionals was in different categories according to the level of education. They found that in terms of knowledge, up to 78.90% knew how to use a computer and the Internet. Only when using selected applications (Microsoft Word, Excel) did knowledge differ between healthcare professionals with higher education and other healthcare professionals with lower education.

We found that based on education, nurses considered the use of e-mail to be the most important. The absence of statistically significant differences according to education in our study may also reflect the fact that basic digital tools, such as e-mail and commonly used applications, have become widely used across different educational groups. Therefore, future research should distinguish between basic ICT use and more advanced digital competencies, such as the use of specialized health applications, telemonitoring systems, electronic documentation, and digital patient education platforms.

Applications used by nurses were compared (Mayer *et al.* 2019) based on different specializations. The research found out, that 53% nurses used particular applications most and a notable finding was that nurses with surgery specialization used them the least. This finding is relevant to the present study, as perioperative and surgical nursing care may be associated with specific organizational conditions, time pressure, and a strong focus on direct clinical tasks. These factors may limit the routine use of digital applications during clinical practice.

Nevertheless, ICT may have important potential in surgical and perioperative settings, particularly in patient education, discharge planning, postoperative monitoring, and communication with patients after discharge.

Patients aged 18–39 years (75%) more often reported that they had sufficient information about ICT than patients aged 40 years and older (69.9%). This age-related difference may reflect greater everyday exposure to digital technologies among younger patients. However, it should not be interpreted as unwillingness or inability among older patients to use ICT. Rather, older patients may require more structured support, clearer instructions, and individualized guidance when using digital tools for health-related purposes. Patients aged 18–39 considered using a blog in their free time to be important and patients aged over 40 considered using Twitter to be important.

Patients aged 18–39 considered using WhatsApp to be least important, as did patients aged 40 and over. These findings point to differences in preferred digital platforms across age groups, which may be important when planning patient education. Digital education should therefore not rely on a single communication channel, but should be adapted to patients' age, preferences, digital skills, and access to technology.

According to findings (Jasper *et al.* 2018) of the devices used for patient education, smartphones were the most used by patients (79%) for the use of multiple applications. Other devices were used to a lesser extent than PCs (52%). The high use of smartphones is particularly important for nursing practice, as mobile devices allow patients to access educational materials repeatedly and directly in the home environment. In perioperative care, this may support continuity of information after discharge and may help patients follow recommendations related to wound care, medication use, physical activity, and identification of postoperative warning signs. However, ICT-based education should be consid-

ered a complementary approach and should not replace direct communication between nurses and patients.

The findings of our study suggest that ICT and social media are perceived as important by both nurses and patients, although their patterns of use differ. Patients may place greater emphasis on ICT because they need accessible information and support outside healthcare facilities, whereas nurses may use ICT more selectively and primarily for professional communication or practical information. These results highlight the importance of strengthening digital competencies among nurses and developing patient-oriented digital education strategies.

This study has several limitations. Its cross sectional design does not allow for causal inferences, and the findings are based on self reported data. The non standardized questionnaire, the absence of standardized cognitive screening in patient recruitment, and the inclusion of only two facilities in a single country limit generalizability. Future studies using standardized instruments, larger and more diverse samples, and longitudinal or interventional designs are needed.

CONCLUSION

This study showed that both nurses and patients perceive ICT and social media as important in outpatient and perioperative nursing care, but patients rate ICT knowledge as more important than nurses. Nurses most frequently reported using e mail, whereas patients most often used blogs, and patients' age, but not nurses' educational attainment, was associated with perceived ICT knowledge and application use.

These findings highlight a mismatch between professional and patient preferences and underscore the need for accessible, reliable, and patient oriented digital education that complements direct nurse–patient interaction. Future longitudinal and interventional research should examine whether ICT supported education improves patient understanding, adherence to postoperative recommendations, satisfaction with care, and clinical outcomes.

CONFLICT OF INTEREST STATEMENT

The authors declare that there are no conflicts of interest.

DECLARATION OF INFORMED CONSENT

The authors declare that the published data are true and authentic, respecting ethical principles. Respondents participated in the research voluntarily.

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