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Are surgical nurses ready for artificial intelligence? Attitudes toward artificial intelligence technologies in surgical units

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Abstract

Aim This study aimed to investigate the attitudes of surgical unit nurses towards the use of artificial intelligence (AI) technologies in nursing.

Method A descriptive and cross-sectional design was used. The study was conducted with 368 nurses working in surgical units of two hospitals located in eastern Turkey between July and October 2025. Data were collected using a Personal Information Form and the Attitude Scale for the Use of Artificial Intelligence Technologies in Nursing. Descriptive statistics, independent t-tests, one-way ANOVA, Welch tests, and post hoc analyses were applied using SPSS, with a significance level set at $p < 0.05$.

Results Nurses generally exhibited a moderately positive attitude towards the use of AI (48.32 ± 5.88). Nurses aged 18–25, female nurses, and those with 1–10 years of experience showed significantly more positive attitudes than other groups ($p < 0.05$). Nurses who had received AI training had lower negative attitude scores than those who had not received such training ($p < 0.05$). Among nurses with higher AI knowledge, more positive and fewer negative attitudes were observed ($p < 0.05$). No significant differences were found in the surgical units in which they worked ($p > 0.05$).

Conclusion Nurses' attitudes toward artificial intelligence technologies vary according to personal and professional characteristics, as well as education and knowledge levels. Expanding AI-related training programs and enhancing nurses' knowledge may promote more positive attitudes and facilitate the effective integration of AI technologies into surgical nursing practice.

Keywords Artificial intelligence, Artificial intelligence attitude, Surgical nursing, Care

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Introduction

New developments are constantly occurring in the field of health science. This situation has made it essential for health professionals to improve themselves, requiring them to adopt various methods to keep up with the advancements in the era. Artificial intelligence (AI), whose use in healthcare services is becoming increasingly widespread, is one such development. In recent years, AI has gained popularity and is present in almost every sector, with the potential to revolutionize the healthcare industry, offering great promise [1, 2].

Artificial intelligence is defined as the ability of computers to independently transform data into information and perform cognitive tasks unique to humans [3]. Artificial intelligence Technologies are rapidly developing in global healthcare systems and profoundly transforming the delivery of healthcare services [4]. Advances in artificial intelligence technology have significantly impacted the nursing profession by reshaping the roles, responsibilities, and patient care provided by nurses [3]. Moreover, the ability of artificial intelligence to increase diagnostic accuracy and enable the analysis of large-scale health data has created a new paradigm in the healthcare field [1].

AI is poised to redefine surgical practice by offering innovative solutions aimed at improving patient care and outcomes across the perioperative spectrum. The rising global demand for surgical procedures highlights the need for AI to address challenges of accessibility, precision, and efficiency [5]. In the case of surgical nurses, the use of artificial intelligence offers positive opportunities regarding patient safety, clinical decision-making, and the perioperative process, while nurses' attitudes toward AI Technologies play a role in achieving success. AI Technologies assume a supportive role during surgical procedures and in operating rooms [6]. For nurses to provide care to patients during operations using these Technologies, it is essential Technolo to have comprehensive knowledge about these Technologies. However, while there are opportunities for AI Technologies to be incorporated into nursing care practices, ethical concerns also exist. Issues such as data security, patient privacy, and concerns regarding the future of the nursing profession exist [7, 8]. According to 2023 data from McKinsey and the American Nurses Foundation, most nurses are positive toward the use of artificial intelligence but also Technol reservations about patient safety and ethical issues [9]. Therefore, an in-depth examination of surgical nurses' perceptions and experiences with AI Technologies is of great importance to ensure the effective and ethical integration of these Technologies into clinical practice [10, 11].

There are various studies in the literature that examine nurses' attitudes toward artificial intelligence

[11–13]. However, no studies have been found in the literature that specifically investigate the attitudes of surgical nurses toward artificial intelligence. In light of this information, this study was conducted in a descriptive manner to determine the attitudes of nurses working in surgical units towards the use of artificial intelligence technologies.

Methods

Research design

This descriptive and cross-sectional study aimed to examine the attitudes of surgical unit nurses towards the use of artificial intelligence technologies. In this study, the attitudes of nurses were identified, and comparisons were made based on demographic characteristics.

Sample and setting

Power analysis was conducted under the assumption that artificial intelligence attitude scores, the primary outcome variable of the study, would be compared according to binary demographic variables (e.g., gender, status of receiving artificial intelligence training). In this context, the two-tailed independent samples t-test scenario in the G*Power 3.1 program was used. For effect size, a medium effect ($d = 0.50$) as recommended by Cohen for social and behavioral sciences was preferred; this value was deemed appropriate as it both reflects clinically significant differences and is commonly used in similar scale studies. Under these assumptions, the minimum required sample size to meet a 95% confidence level, 5% significance level, and 80% power was calculated to be 204.

Determination and selection of participants This study aimed to include all nurses working in surgical units ($N = 435$; a full census), and no specific sampling method was employed. Suitable participants were identified through staff lists obtained from hospital administrations and unit supervisors after obtaining all ethical and legal permissions from the relevant institutions. All identified nurses were visited by the researchers in their workplaces and invited to participate in the study. However, because personnel who were on leave, had medical reports, or were temporarily assigned elsewhere were not present in their units and thus excluded, the study, although initially designed to reach the entire population, was practically carried out as a “voluntary response” approach during the implementation phase.

Response rate and representativeness Although the study initially aimed to collect data from a total of 435 nurses, it was completed with 368 nurses who voluntarily agreed to participate and completed the questionnaire. This indicates that the research was completed with a response rate of 84.6% (368/435). Since the final sample

size ($n = 368$) significantly exceeded the minimum number predicted in the power analysis ($n = 204$), the statistical power of the study and its ability to represent the population were considered sufficient.

Inclusion criteria

- Actively working as a nurse in surgical units (clinics, operating room, etc.).
- Willing to participate in the study.

Exclusion criteria

- Individuals who wish to withdraw from the study of their own accord.

Data collection

Data were collected between July 2025 and October 2025. Researchers gathered data through face-to-face interviews with participants in their work environments. Before administering the data collection tools, participants were provided with detailed information about the purpose of the study, the methodology, and the confidentiality of the data. Participation was entirely voluntary, and participants had the right to withdraw from the study at any stage without any penalty. Both verbal and written consent were obtained. Paper-based survey forms were used during the data collection process. To ensure that participants could answer the questions independently, more objectively, and without feeling pressured by the presence of researchers, the researchers were not present with the participants while the forms were being completed. The forms, which did not request any personal identification information, were filled out individually by the participants. Sufficient time was provided to complete the forms; after the process, which took approximately 5–10 min, the forms were collected in person by the researchers. The collected forms were reviewed for completeness before analysis, and forms that were incomplete or filled out incorrectly were excluded. In this way, the study was conducted on a data set that did not contain any missing data.

Data collection tools

Two different measurement tools were used in the data collection process.

Personal information form

The questionnaire prepared by the researchers comprised eight questions covering participants' gender, age, marital status, educational background, years of professional experience, surgical unit worked in, status of receiving training related to artificial intelligence, and level of knowledge.

Attitude scale for the use of artificial intelligence technologies in nursing

Attitude Scale for the Use of Artificial Intelligence Technologies in Nursing: Developed by Yilmaz et al. (2025) [10] to assess nurses' cognitive and affective tendencies regarding the integration of artificial intelligence (AI) into professional practice. The scale aims to measure attitudes toward the role of AI in nursing care, its impact on the professional future, and its place in clinical decision-making processes. The scale consists of 15 items and is comprised of two sub-dimensions:

Negative attitude (Factor 1, Items 1–6) This sub-dimension encompasses “barrier”-focused attitudes, including concerns that artificial intelligence may jeopardize patient safety, harm professional identity, and lead to ethical issues. The items probe individuals' feelings of discomfort toward these technologies and their perceptions of potential drawbacks.

Positive attitude (Factor 2, Items 7–15) This sub-dimension represents “acceptance-based” attitudes, such as the practical conveniences that artificial intelligence can offer in routine applications (vital signs, diagnosis, etc.), the new opportunities it presents, and its integration into the nursing education curriculum. It also reflects the participants' willingness to learn and use these technologies.

Rating and reliability Each item is rated on a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). The total score ranges from 15 to 75, with higher scores indicating a stronger attitude in the relevant dimension (a high score in the negative attitude dimension indicates a high level of negative perception towards the use of AI). There are no reverse-scored items on the scale.

Cronbach's alpha values in the original study of the scale were reported as 0.910 for the total scale, 0.933 for Factor 1, and 0.917 for Factor 2. In the present study, Cronbach's alpha coefficients were found to be 0.850 for negative attitude, 0.835 for positive attitude, and 0.830 for the entire scale. These values indicate that the scale has a high level of internal consistency within the sample group in this study.

Data analysis

The normality of continuous measurements (scale scores) was evaluated by examining the Kolmogorov–Smirnov test, Skewness, and Kurtosis coefficients. Descriptive statistics (mean, standard deviation, minimum, and maximum) were reported for continuous variables and numbers and percentages were reported for categorical variables. Cronbach's alpha coefficients were calculated as a part of the reliability analysis of the scale questions.

Table 1 Tests of normality

	Kolmogorov-Smirnov			Shapiro-Wilk			Skewness	Kurtosis
	Statistic	df	p.	Statistic	df	p	Statistic	Statistic
Negative attitude	,079	368	,001	,982	368	,001	,293	-,271
Positive attitude	,120	368	,001	,950	368	,001	-,846	,926
Total	,077	368	,001	,975	368	,001	-,396	1,339

Table 2 General descriptive statistics of demographic data (n = 368)

		n	%
Sex	Female	225	61,1%
	Male	143	38,9%
Age	18–25	61	16,6%
	26–35	235	63,9%
	36–45	45	12,2%
	46+	27	7,3%
Marital status	Married	186	50,5%
	Unmarried	182	49,5%
Education status	High school	13	3,6%
	Associate Degree	52	14,1%
	License	278	75,5%
	Graduate	25	6,8%
Years of professional experience (year)	1–5	164	44,6%
	6–10	112	30,4%
	11–15	35	9,5%
	16+	57	15,5%
The surgical unit where he/she works	Intensive Care	99	26,9%
	Operating room	55	14,9%
	Emergency	68	18,5%
	Surgical services	146	39,7%
Have you received any training related to artificial intelligence in nursing?	Yes	22	6,0%
	No	346	94,0%
Artificial intelligence knowledge level	None	54	14,7%
	Low	153	41,6%
	Moderate	152	41,3%
	High	9	2,4%

For comparison of scale scores according to categorical groups, the Independent T-test and One-Way Analysis of Variance (ANOVA) were used for groups with normal distribution, whereas the Welch test was applied for groups with unequal variances. Tukey's test was used to identify different groups after ANOVA. The level of statistical significance was set at 5%, and the analyses were conducted using SPSS (IBM SPSS for Windows, ver.22).

Limitations

This study is limited to surgical unit nurses in two hospitals located in the eastern region of Turkey, which restricts the generalizability of the findings. The use of self-report methods to collect data introduces the possibility of response bias, which could affect the accuracy of responses. Additionally, the cross-sectional design of the

Table 3 General descriptive statistics of the total scale scores

	N	$\bar{X} \pm SS$	Min.	Max.
Negative attitude	368	16,24 ± 5,42	6,00	30,00
Positive attitude	368	32,08 ± 6,98	9,00	45,00
Total	368	48,32 ± 5,88	26,00	65,00

study does not allow for the establishment of causal relationships between variables. Although the study aimed to reach the entire population, in practice, data collection was carried out through voluntary participation. There is a potential for self-selection bias due to possible systematic differences between nurses who chose to participate and those who did not. This is considered another factor that may limit the generalizability of the findings to the entire population.

Results

Although the scales did not exhibit a normal distribution according to the results of the Kolmogorov-Smirnov and Shapiro-Wilk tests ($p < 0.05$), it was observed that, when looking at the skewness and kurtosis coefficients for all scales, the coefficients were within the range of ± 1 or ± 1.5 , and therefore, the data were considered to be normally distributed (Table 1).

As shown in Tables 2 and 61.1% of the participants were women, and 63.9% were between the ages of 26 and 35. Of the nurses, 50.5% were married and 75.5% were university graduates. Of the participant, 44.6% been worked in the profession for 1–5 years and 39.7% worked in surgical units. Only 6.0% of the nurses stated that they had received any training on artificial intelligence in nursing, while 41.6% described their knowledge level as “low,” and 41.3% as “moderate.”

When Table 3 is examined, looking at the descriptive statistics values of the scale measuring attitudes towards the use of artificial intelligence technologies in nursing, while the highest possible score on the scale is 75 and the lowest is 15, in this study the highest score was found to be 65 and the lowest 26. The mean score for negative attitudes towards the use of artificial intelligence technologies in nursing was 16.24 ± 5.42 , the mean score for positive attitudes was 32.08 ± 6.98 , and the total mean score of the scale was found to be 48.32 ± 5.88 .

When Table 4 was examined, it was determined that the scores obtained from the Attitude Scale Towards the Use of Artificial Intelligence Technologies in Nursing

Table 4 Comparison of demographic characteristics and attitude scale scores regarding the use of artificial intelligence technologies in nursing
Attitude Scale Towards the Use of Artificial Intelligence Technologies in Nursing

		Negative			Positive			Total		
		n	$\bar{X} \pm SS$	Test value	p	$\bar{X} \pm SS$	Test value	p	$\bar{X} \pm SS$	p
Age	18–25	61	15,688 ± 4,660	F = 1,318	0,268	34,180 ± 5,216 ^A	F = 4,077^t (df=80,344)	0,010	49,868 ± 5,554	F = 1,762
	26–35	235	16,042 ± 5,576			32,008 ± 7,124 ^B			48,051 ± 6,084	0,154
	36–45	45	17,355 ± 5,283			30,333 ± 7,286 ^C			47,688 ± 5,806	
	46+	27	17,333 ± 5,791			30,888 ± 7,821 ^C			48,222 ± 4,396	
	Total	368	16,239 ± 5,423			32,081 ± 6,980			48,320 ± 5,878	
Sex	Female	225	16,373 ± 5,366	t = -0,595	0,552	32,475 ± 6,773	t = -1,360	0,175	48,848 ± 6,158	t = -2,173
	Male	143	16,028 ± 5,524			31,461 ± 7,276			47,489 ± 5,323	0,030
Education	High School	13	13,846 ± 6,025 ^C	F = 3,040	0,029	35,384 ± 7,217	F = 1,853	0,137	49,230 ± 4,833	F = 1,037
	Associate Degree	52	17,903 ± 5,299 ^A			31,500 ± 6,515			49,403 ± 5,595	0,376
	License	278	16,158 ± 5,282 ^A			31,859 ± 7,035			48,018 ± 6,072	
	Graduate	25	14,920 ± 6,237 ^B			34,040 ± 6,809			48,960 ± 4,485	
	Total	368	16,239 ± 5,423			32,081 ± 6,980			48,320 ± 5,878	
Length of Service in the Profession (Year)	1–5	164	16,220 ± 5,206	F = 2,905	0,035	32,756 ± 7,029 ^A	F = 2,629	0,049	48,976 ± 6,047	F = 1,254
	6–10	112	15,268 ± 5,451			32,527 ± 6,225 ^A			47,795 ± 5,400	0,290
	11–15	35	17,029 ± 5,210			30,543 ± 6,303 ^B			47,571 ± 6,590	
	16+	57	17,719 ± 5,830			30,211 ± 8,235 ^B			47,930 ± 5,794	
	Total	368	16,239 ± 5,423			32,082 ± 6,981			48,321 ± 5,878	
Unit of Assignment	Intensive Care	99	15,626 ± 5,742	F = 1,355	0,256	32,272 ± 7,185	F = 0,903	0,440	47,899 ± 5,994	F = 1,346
	operating room	55	17,127 ± 4,929			30,709 ± 5,880			47,836 ± 4,446	0,259
	Emergency	68	16,911 ± 5,279			32,661 ± 7,856			49,573 ± 5,973	
	Surgical wards	146	16,006 ± 5,423			32,198 ± 6,792			48,205 ± 6,194	
	Total	368	16,239 ± 5,423			32,081 ± 6,980			48,320 ± 5,878	
Education status related to AI	Yes	22	12,500 ± 4,262	t = -3,368	0,001	34,136 ± 8,305	t = 1,430	0,154	46,636 ± 7,358	t = -1,368
	No	345	16,455 ± 5,399			31,942 ± 6,889			48,397 ± 5,748	0,172
Knowledge Level About AI	None	54	18,630 ± 5,944 ^A	F = 3,700^t (df=35,633)	0,020	29,000 ± 7,274 ^C	F = 3,790^t (df=35,480)	0,019	47,630 ± 5,979	F = 0,524
	Low	153	15,608 ± 4,708 ^C			32,595 ± 5,777 ^B			48,203 ± 4,975	0,666
	Moderate	152	16,066 ± 5,652 ^B			32,546 ± 7,583 ^B			48,612 ± 6,647	
	High	9	15,556 ± 6,635 ^C			34,000 ± 9,381 ^A			49,556 ± 6,106	
	Total	368	16,239 ± 5,423			32,082 ± 6,981			48,321 ± 5,878	

*Comparison results of One-Way ANOVA (F) test and Welch (t) test, $\bar{X}$: Mean, SS : Standard Deviation, (A, B,C)= Tukey test result

and its sub-dimensions differed according to the demographic characteristics of the participants.

In the evaluation based on age, a significant difference was found only in the Positive Attitude sub-dimension ($F=4.077$; $p<0.05$). According to the results of the post-hoc Tukey test, it was determined that nurses in the 18–25 age group had significantly higher positive attitude scores compared to other age groups. This finding suggests that younger nurses display a more open and positive approach towards artificial intelligence applications.

In the analysis conducted according to gender, a statistically significant difference was found in terms of the total scale score ($t = -2.173$; $p<0.05$). When the average scores were examined, it was found that female nurses ($\bar{X}=48.848 \pm 6.158$) scored higher than male nurses ($\bar{X}=47.489 \pm 5.323$). This result indicates that female nurses have a more positive attitude towards artificial intelligence technologies than male nurses.

In the analysis conducted according to gender, a statistically significant difference was found in terms of the total scale score ($t = -2.173$; $p<0.05$). When the average scores were examined, it was found that female nurses ($\bar{X}=48.848 \pm 6.158$) scored higher than male nurses ($\bar{X}=47.489 \pm 5.323$). This result indicates that female nurses have a more positive attitude towards artificial intelligence technologies than male nurses.

When the variable of years worked in the profession was examined, a significant difference was found in the Positive Attitude subdimension ($F=2.629$; $p<0.05$). When the average scores were analyzed, it was determined that nurses with 1–10 years of experience had higher levels of positive attitudes than those who had worked 11 years or more. This result indicates that nurses

who are new to the profession are more open to technological innovation.

In analyses conducted according to the variables of the surgical unit worked in, no significant difference was found in terms of any scale or sub-dimension ($p>0.05$). This finding indicates that the unit worked in does not have a determining effect on attitudes toward artificial intelligence.

In comparisons based on the variable of receiving education about artificial intelligence in nursing, a significant difference was found in the Negative Attitude subscale ($t = -3.368$; $p<0.05$). It was determined that the scores of nurses who did not receive education ($\bar{X}=16.455 \pm 5.399$) were higher than those who did ($\bar{X}=12.500 \pm 4.262$). This result indicates that negative attitudes decrease among nurses who have received artificial intelligence education.

Finally, statistically significant differences were found in both the positive ($p=0.019$) and Negative Attitude ($p=0.020$) sub-dimensions according to the level of knowledge about artificial intelligence. According to the results of the post hoc analysis, nurses with a higher level of knowledge had higher positive attitude scores and lower negative attitude scores. This finding indicates that an increase in knowledge about artificial intelligence has a positive effect on attitudes.

The configuration of the participants' work units, length of employment, gender, educational background, level of artificial intelligence knowledge, and age categories in two-dimensional space are presented in Fig. 1. This graph is the result of a multiple correspondence analysis and displays the relationships among different categorical variables across two axes/factors. The first dimension accounted for 34.774% of the total variance, while



Fig. 1 The configuration of the relationship structure between the categories of variables in two-dimensional space

Table 5 Regression result of total artificial intelligence scale score and nurses' level of knowledge about artificial intelligence

Model	Unstandardized Coefficients(B)	Standard Error	Standardized Coefficients(β)	t	p	%95 Confidence Interval (Lower Bound)	%95 Confidence Interval (Upper Limit)
(Fixed)	47,151	0,997	-	47,290	,001	45,190	49,111
AI Knowledge Level	0,505	0,410	0,064	1,233	,218	-0,301	1,311

Table 6 Model summary (simple linear regression)

R	R ²	Adjusted R ²	Standard error of the estimate	Durbin-Watson
,064 ^a	,004	,001	5,87430	0,195

the vertical axis, or the second dimension, explained 30.216%. Together, these two dimensions represent approximately 64.99% (34.774 + 30.216) of the relationships between the variables. Upon examining the graph, it can be seen that the strongest relationship on the positive side of the first dimension is between the operating room work unit and the categories of age 46 and over, length of employment 16 years and over, and those aged 36–45; this suggests that employees working in operating rooms tend to represent more senior and older groups than other units. On the negative side of the first dimension, the youngest age group (18–25), surgical units, and the low seniority category of 1–5 years were clustered together. Among the artificial intelligence knowledge level categories, “very much” is positioned on the positive side (to the right) of the first dimension and rather low on the second dimension, while “none” and “little” are closer to the central line. The categories of gender and educational status are spread closer to the center of the axes, indicating that these two main dimensions do not create a distinct separation among these categories, as seen in the other groups.

The p-value of the artificial intelligence knowledge level variable in the regression analysis was found to be 0.218. This finding indicates that the artificial intelligence knowledge level does not have a statistically significant effect on the dependent variable, which is the total scale score (Table 5). If the model had been significant, it would have been stated that a one-unit increase in artificial intelligence knowledge level could lead to a 0.505-unit increase in the total scale score; however, the high p-value reveals that this relationship is not scientifically supported.

The R² value for the regression model was calculated as 0.004. This value indicates that only 0.4 per thousand of the variance in the “Scale Total” score related to artificial intelligence knowledge level is explained by the model, and that 99.6% of the factors affecting the dependent variable fall outside the model (Table 6). When these two results are evaluated together, it is concluded that the

knowledge level of artificial intelligence has neither a statistical nor a practical effect on the “Scale Total” variable.

Discussion

In this section, the findings regarding the attitudes of surgical unit nurses towards the use of artificial intelligence technologies in nursing are discussed and compared with studies found in the literature.

The findings of this study indicate that surgical nurses generally have a positive attitude towards the use of artificial intelligence in nursing. While nurses do not completely reject technology, they have some concerns about ethical issues, changes in professional roles, and patient safety. However, it is also evident that they are aware of the potential of artificial in facilitating care processes and enhancing professional efficiency. Overall, nurses' attitudes are at a moderate level, can develop positively, and are open to improvement. These findings are consistent with those of previous studies. Nurses have a positive attitude towards artificial intelligence in terms of early diagnosis and patient safety; however, risks such as data privacy, confidentiality, and lack of accountability cause concern about artificial intelligence among nurses [14–18].

Additionally, it has been reported in the literature that nurses view artificial intelligence positively because it offers innovative approaches in workload distribution, efficiency, and nursing education, but they remain hesitant due to risks such as the weakening of clinical judgment and human relationships [14, 15, 17–22].

The findings of this study indicate that surgical unit nurses between the ages of 18 and 25 years exhibit a more positive attitude toward artificial intelligence. However, when evaluated according to educational level, associate and bachelor's degree graduates had higher negative attitude scores than high school and postgraduate graduates. The fact that the vast majority of high school graduates were older (there were only three high school graduates in the 18–25 age group) shows that this difference cannot be explained solely by age. Therefore, educational level and professional experience may have a decisive impact on attitudes independent of age. Additionally, the more positive attitudes of nurses with 1–10 years of experience are consistent with the tendency of the younger, actively working group to be more open to innovation. This can be explained by the fact that younger generations raised

in the digital age (Generation Y and Z) can adapt more quickly to technology and have higher levels of digital literacy [23–25]. The literature supports these findings. It has been reported that younger nurses have more positive attitudes toward artificial intelligence, and that negative attitudes and anxiety increase with age [12, 26–28]. However, a study conducted in India found no significant relationship between age and attitudes toward artificial intelligence [29]. These differing findings suggest that attitudes toward artificial intelligence are influenced by cultural, institutional, and educational contexts and that the impact of age is not universal.

The findings of this study indicate that female nurses have more positive attitude scores than male nurses, which is in contrast to the general findings in the literature, which suggest that male nurses tend to exhibit more positive attitudes toward artificial intelligence [12, 30, 31]. This situation can be explained by the fact that the nursing profession in Turkey is predominantly comprised of women, that female nurses play a more active role in clinical care processes, and that they are more likely to directly experience the contributions of artificial intelligence applications to patient care. This finding shows that attitudes toward artificial intelligence are closely related not only to gender but also to professional roles and cultural contexts.

In this study, it was determined that nurses who received artificial intelligence (AI) training exhibited fewer negative attitudes than those who did not, and that positive attitudes increased as knowledge levels rose. The fact that most nurses who received training had a “low” or “moderate” level of knowledge suggests that even limited awareness can positively influence attitudes. In the literature, it is noted that information and education about AI generally increases nurses’ tendency to adopt technology; however, it is emphasized that this relationship is not absolute and that various limiting factors are also influential. Several studies have shown that AI knowledge and education levels strengthen nurses’ positive attitudes toward AI and their intention to adopt it [32–34]. While technological competence and awareness facilitate viewing AI as an opportunity [34, 35], ethical concerns, data security, algorithmic bias, and job security anxiety can limit its adoption [1, 36–39]. In addition, the reduction in human touch and concerns about professional autonomy also lead to cautious approaches.

As a result, although having knowledge and education about AI increases the tendency to adopt technology, ethical, cultural, structural, and individual factors influence this process. Therefore, to effectively adopt AI in nursing, it is necessary to address ethical concerns along with education, provide infrastructure support, and develop strategies to adapt to change [1, 32–39].

Conclusion

The findings indicate that surgical unit nurses’ attitudes towards artificial intelligence technologies are influenced by demographic and professional factors, including age, gender, experience, AI training status, and knowledge level. Nurses generally show moderately positive attitudes toward AI, which strengthen with increased education and knowledge. Nurses who received AI training displayed lower negative attitudes, suggesting training positively impacts acceptance. Those with higher knowledge levels approached AI technologies more positively, highlighting knowledge’s role in adoption. Professional experience, demographics, and AI training facilitate nurses’ technology adaptation and shape positive attitudes. These results emphasize the importance of education in expanding AI implementation in healthcare services and guide future research.

Abbreviations

AI	Artificial Intelligence
F	F value
p	p value
t	t value
$\bar{X}$	Sample mean

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Author contributions

Ömer Taşçı: Conceptualization, Methodology, Investigation, Writing – Original Draft. İlknaz Kara: Conceptualization, Methodology, Investigation, Writing – Original Draft. Barış Özdemir: Conceptualization, Formal analysis, Writing – Original Draft. Nadiye Özer: Conceptualization, Methodology, Writing – Review & Editing.

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Data availability

The datasets generated and/or analyzed during the current study are available from the corresponding author upon reasonable request.

Declarations

Ethics approval and consent to participate

This study was conducted in full compliance with ethical standards governing research involving human participants. Prior to data collection, the necessary institutional ethical approval was obtained from the Scientific Research and Publication Ethics Committee of Muş Alparslan University (date: May 8, 2025; number: 193308). Participants were provided with detailed information about the purpose, scope, methodology, data collection procedures, and confidentiality principles of the study, and their voluntary participation was secured through both verbal and written consent. No personal identifying information was collected at any stage, and all data were recorded anonymously to ensure confidentiality. The research adhered to human rights principles and followed the ethical guidelines outlined in the Declaration of Helsinki.

Consent for publication

All authors have read and approved the final manuscript and consent to its publication.

Competing interests

The authors declare no competing interests.

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