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NURSES' PERCEPTIONS REGARDING THE INTEGRATION OF TECHNOLOGY IN NURSING CARE PRACTICES

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Abstract : This study assessed nurses' perceptions regarding the integration of technology in nursing care practices and examined associations between perception scores and selected demographic and professional characteristics. A descriptive study was conducted from November to December 2025 among 408 nurses working in selected Emirates Health Services (EHS) facilities in the United Arab Emirates. Participants were recruited using convenience sampling and completed a structured questionnaire containing positive and negative perception items measured on a 4-point Likert scale. Data were analyzed using Stata 14. Descriptive statistics, the Kruskal–Wallis test, and the Mann–Whitney U test were used as appropriate. The mean positive perception score was 33.71 (SD 4.75) out of 40, indicating a predominantly positive perception of technology. The mean negative perception score was 19.97 (SD 5.36) out of 32, indicating that some concern remained. There was no statistically significant difference in positive perception by age, gender, education, overall nursing experience, or experience in EHS. Negative perception differed significantly by age ($p = 0.0027$) and experience in EHS ($p = 0.0182$), while no significant differences were observed by gender, education, or overall nursing experience. The findings indicate that nurses generally recognize the value of technology in improving efficiency, monitoring, documentation, and patient care, while concerns related to the mechanization of care, device-related disturbances, and technology dependence remain. Targeted education, user-centered implementation, and supportive organizational policies may strengthen effective technology integration in nursing practice.

I. Introduction

In the rapidly evolving healthcare landscape, technology has emerged as a transformative force, reshaping how care is delivered, documented, and experienced. From electronic health records and telemedicine platforms to smart infusion pumps and wearable health monitors, digital innovations have permeated nearly every facet of clinical practice. Among the many professionals navigating this technological shift, nurses stand at the forefront serving as both caregivers and system users. Their perceptions of technology are not only critical to its successful implementation but also to the quality and safety of patient care. This study seeks to explore nurses' perceptions regarding the integration of technology in nursing care practices, shedding light on the opportunities, challenges, and implications of digital transformation in clinical settings.

II. Background

The integration of technology in nursing is not a monolithic experience; it varies across settings, specialties, and individual backgrounds. For example, nurses in intensive care units may rely heavily on monitoring systems and automated alerts, while those in community health may use mobile apps and telehealth platforms to connect with patients remotely. Similarly, younger nurses who grew up in the digital age may adapt more readily to new tools, whereas experienced practitioners may face steeper learning curves. These variations underscore the need for a nuanced understanding of how nurses perceive and interact with technology in their specific contexts.

Nurses expressed receptiveness to smart technologies including smart mattresses, recognizing their potential to enhance patient care and nursing efficiency. Perspectives varied by department, highlighting the need for tailored solutions. Prior experiences, both positive and negative, offered important insights into designing devices that are more compatible with clinical practice. Incorporating nurses' feedback and addressing educational needs are critical for successful adoption (Choi et al., 2025)

In a qualitative study done) using descriptive design and thematic analysis were used to evaluate participants logged reflections of their experiences and suggestions for improvements of health information technology. Findings indicate that nurses' experiences and perceptions regarding the use of various types of technology were positive (Gaughan et al., 2022)

As highlighted by existing research, nurses' perceptions are shaped by factors such as usability, training, trust, and institutional support that can either empower or inhibit their engagement with technology. By exploring these perceptions, this study seeks to illuminate the relationship between technological innovation and nurses' perception about it.

III. Research objectives

3.1 Primary objective:

1.To assess nurses' perceptions of the use of technology in nursing care.

3.2 Secondary objectives

1.To determine the association between nurses' age and their perceptions of technology use nursing care practice

2.To determine the association between nurses' years of experience and their perceptions of technology use nursing care practice

3.To determine the association between nurses' qualifications and their perceptions of technology use nursing care practice

3.3 **Hypotheses**

H1: Nurses perceive technology as useful in improving nursing care.

H2:There is a positive association between nurses' years of experience and positive perceptions of technology use.

H3: Higher education levels in nurses are associated with more favorable perceptions of technology.

IV. Review of literature

Recent literature consistently highlights nurses' generally positive perceptions of technology in patient care. In a descriptive cross-sectional study involving 408 nurses in Turkey revealed that most participants agreed with the beneficial impact of technology on nursing practices, with minimal negative perceptions. Notably, gender differences influenced these perceptions, suggesting that demographic factors may shape the attitudes toward technological integration. The limitation of the study was that the results are valid only for nurses in the hospital where the study was conducted; they cannot be generalized to all the nurses. (Ozan & Duman, 2020)

A cross-sectional study conducted among 350 nurses in a teaching hospital reinforced the trend in their study on Electronic Medical Record (EMR) systems, where 98% of nurses expressed favorable views. However, satisfaction levels varied significantly based on work unit, device ownership, and time spent using the system. Importantly, nurses who received formal training reported higher satisfaction, underscoring the role of education and digital literacy in shaping user experience. Due to its cross-sectional design, it is not possible to ascertain the temporal relationship between the explanatory variables and the outcome variable. (Ramoo et al., 2023)

Nurses' perceptions of Internet of Things (IoT) applications in Indonesian healthcare settings. Their mixed-method approach uncovered both motivations and challenges, such as the potential for improved patient safety and reduced errors, alongside concerns about infrastructure and usability. This study emphasized the need for supportive environments to facilitate successful technology adoption. The limitation of this study is generalizability as it focuses on one hospital in Indonesia. (Lindayani et al., 2021)

In a mixed-method systematic review examining attitudes and beliefs among nurses and nursing students. Their findings revealed widespread use of smartphone apps and web-based resources, with nurses valuing these tools more than other healthcare professionals. The review highlighted the importance of reinforcing positive attitudes to enhance technology's clinical utility. While rigorous processes were used to screen and select studies, only eight studies were included in this systematic review. Therefore, review findings cannot be considered generalizable. (Saab et al., 2021)

V. Research methodology

5.1 Study Design:

A descriptive research study was conducted from November to December 2025 to understand the nurse's perception on the use of technology in nursing care practices. The participants were selected from EHS facilities (Al Kuwait hospital Dubai, Sharjah Kuwaiti hospital, Al Qassimi Hospital, Al Qasimi women and child hospital, Al Dhaid hospital, Al Amal hospital and Saqr Hospital) by using convenience sampling method. A total of 408 nurses participated in the study.

5.2 Population: Nurses working in hospitals in selected EHS facilities

5.3 Inclusion criteria

- Nurses involved in direct patient care
- Exclusion criteria
- Nurses in administrative roles
- New Nurse Graduate (Less than 6 months of experience)
- New employees having less than 6 months' experience

5.4 **Data collection instrument:**

A structured questionnaire was designed to collect responses from the participants. The questionnaire consisted of 3 sections

Section 1: Personal and Educational Background: This section of the questionnaire was designed to collect the demographic data of nurses. It included variables such as, age, gender, highest qualification in nursing obtained, years of nursing experience, years of experience working in EHS facilities.

Section 2: Positive perception of nurses in using technology

This section of the questionnaire was designed to measure the positive perception of nurses in the use of technology in nursing care practices. The responses were collected using a 4-point Likert scale to measure the perception of nurses. The scale included - Strongly agree, agree, disagree and strongly disagree.

The below are the criteria's used to measure positive perception.

Sl.No	Criteria's
1	Provides better patient outcomes.
2	Enables direct care through continuous physiological monitoring.
3	Ensure patient safety through prompt detection of complications using safety features
4	Streamline nursing tasks with less fatigue through continuous monitoring and automated documentation.
5	Saves nursing time by automating procedures and tasks.
6	Supports professional growth by offering updated knowledge and opportunities to learn new skills.
7	Tailors nursing care to individual patient needs.
8	Enhances the quality of nursing care practices
9	Facilitates record keeping for nursing care practices
10	Makes nursing care practices easier

Section 3: Negative perception of nurses in using technology

This section of the questionnaire was designed to measure the negative perception of nurses in the use of technology in nursing care practices. The responses were collected using a 4-point Likert scale to measure the perception of nurses. The scale included - Strongly agree, agree, disagree and strongly disagree.

Below are the criteria's used to measure the negative perception.

Sl.No	Criteria's
1	Wastes patients' time by focusing more on medical devices than on patient care.
2	Decreased decision-making ability caused by greater dependence on technology
3	Nurses may feel less confident and have low self-esteem due to inexperience with using devices.
4	Learning to use technical devices is challenging and time consuming
5	Technology can make nursing care practices more mechanical
6	Reduces communication between patients and nurses.
7	Sounds from machines and devices cause disturbance in nursing care practices.
8	Excessive dependence on technology can weaken critical thinking skills

5.5 Questionnaire validity and reliability

A pilot study was conducted with 30 respondents to examine the clarity, relevance, and reliability of the questionnaire before final data collection. Necessary modifications were made based on the feedback received from respondents and subject experts to improve the validity and consistency of the research instrument. The developed questionnaire was sent to five experts and their valid suggestions were incorporated the reliability of the questionnaire was examined using Cronbach's Alpha method to ensure internal consistency and reliability of the measurement scale. The reliability coefficient (0.76) was found to be acceptable for conducting the study.

VI. Ethical considerations

The study proposal was presented to Ministry of health and prevention and approved by the research ethics committee MOHAP/**DXB-REC/S.O.O /No.197 / 2025.** Informed consent was obtained electronically prior to participants beginning the survey. Questionnaires were distributed online through datahub with informed consent. Confidentiality was affirmed by using a unique code for each participant. Participants were provided with a clear explanation of the study's objectives during data collection using simple and accessible language to ensure understanding. Emphasis was placed on maintaining anonymity.

VII. Data Analysis and interpretation

Data from 408 nurses were analyzed using Stata 14.

Table 1: Demographic data of nurses

Characteristics	Categories	n	%
Age	20 – 30	52	12.75
	31 – 40	164	40.20
	41 – 50	134	32.84
	51 and above	58	14.22
Gender	Male	58	14.22
	Female	350	85.78
Nationality	GCC	12	2.94
	UAE National	39	9.56
	Other expatriate	357	87.50
Education	Diploma in nursing	76	18.63
	Bachelor's in nursing	260	63.73
	Post basic BSc nursing	46	11.27
	Master's in nursing	26	6.37
Experience in total	6 Months to 1 year	4	0.98
	1 – 5 years	53	12.99
	6 – 10 years	72	17.65
	11 – 15 years	111	27.21
	16 and above	168	41.18
Experience in EHS	6 Months to 1 year	13	3.19
	1 – 5 years	128	31.37
	6 – 10 years	95	23.28
	11 – 15 years	61	14.95
	16 and above	111	27.21
Work area	Ambulatory unit	42	10.29
	Emergency unit	42	10.29
	General unit (Adult/Pediatric unit/Medical & surgical etc.)	56	13.73
	General unit (Adult/Pediatric/Med/surg/psychiatric/Obs etc.)	157	38.48
	Labour And Delivery	5	1.23
	Operation Room/PACU	33	8.09
	Specialty critical care unit (Adult/Pediatric/neonate unit)	73	17.89

Note: n indicates the frequencies and % indicates the percentages

This table reveals that most of the nurses participated in the study belong to the age group 31-40 yrs (40.2%).85.78% were females. 63.73% had qualification of bachelor's in nursing. Majority of the nurses (41.18%) had experience of 16 years and above in nursing.

Table 2: Frequency distribution for positive and negative perception of using technology

Sl.No	Criteria's	Strongly Agree n (%)	Agree n (%)	Disagree n (%)	Strongly disagree n (%)
Positive effects of using technology					
1	Provides better patient outcomes.	187 (45.83)	216 (52.94)	3 (0.74)	2 (0.49)
2	Enables direct care through continuous physiological monitoring.	170 (41.67)	229 (56.13)	7 (1.72)	2 (0.49)
3	Ensure patient safety through prompt detection of complications using safety features	188 (46.08)	214 (52.45)	5 (1.23)	1 (0.25)
4	Streamline nursing tasks with less fatigue through continuous monitoring and automated documentation.	149 (36.52)	237 (58.09)	19 (4.66)	3 (0.74)

5	Saves nursing time by automating procedures and tasks.	138 (33.82)	246 (60.29)	20 (4.90)	4 (0.98)
6	Supports professional growth by offering updated knowledge and opportunities to learn new skills.	171 (41.91)	232 (56.86)	4 (0.98)	1 (0.25)
7	Tailors nursing care to individual patient needs.	152 (37.25)	247 (60.54)	6 (1.47)	3 (0.74)
8	Enhances the quality of nursing care practices	167 (40.93)	230 (56.37)	10 (2.45)	1 (0.25)
9	Facilitates record keeping for nursing care practices	170 (41.67)	232 (56.86)	5 (1.23)	1 (0.25)
10	Makes nursing care practices easier	161 (39.46)	227 (55.64)	16 (3.92)	4 (0.98)
Negative effects of using technology					
1	Wastes patients' time by focusing more on medical devices than on patient care.	52 (12.75)	151 (37.01)	167 (40.93)	38 (9.31)
2	Decreased decision-making ability caused by greater dependence on technology	37 (9.07)	158 (38.73)	178 (43.63)	35 (8.58)
3	Nurses may feel less confident and have low self-esteem due to inexperience with using devices.	28 (6.86)	130 (31.86)	202 (49.51)	48 (11.76)
4	Learning to use technical devices is challenging and time consuming	30 (7.35)	169 (41.42)	168 (41.18)	41 (10.05)
5	Technology can make nursing care practices more mechanical	50 (12.25)	199 (48.77)	119 (29.17)	40 (9.80)
6	Reduces communication between patients and nurses.	41 (10.05)	150 (36.76)	166 (40.69)	51 (12.50)
7	Sounds from machines and devices cause disturbance in nursing care practices.	50 (12.25)	175 (42.89)	147 (36.03)	36 (8.82)
8	Excessive dependence on technology can weaken critical thinking skills	36 (8.82)	185 (45.34)	152 (37.25)	35 (8.58)

Note: n indicates the frequencies and % indicates the percentages

In the above table positive perception on technology the data reveals that 33.82% and 60.29% of nurses strongly agree and agree that use of technology saves nurses time by automating the procedures and tasks. 41.67% and 56.13% of nurses strongly agree and agree that responded that technology is enabling us to continuously monitor the physiological condition of the patient.

Based on the negative perception on technology 12.25% and 48.77% of nurses strongly agree and agree that the technology makes nursing care practices more mechanical .12.50% and 40.69% of nurses strongly disagree and disagree that technology reduces communication between patient patient and nurses.

Table 3: Description about the positive and negative perception

Perception	N	Mean (SD)	Min	Max
Positive	408	33.71 (4.75)	10	40
Negative	408	19.97 (5.36)	8	32

The mean (SD) of positive effects in 4-point likert scale measuring was 33.71(4.75)
The mean (SD) of negative effects in 4-point likert scale measuring was 19.97 (5.36)

Respondents showed high positive perception. and moderate level of negative perception. Participants demonstrated a predominantly positive perception, as reflected by a mean score of 33.71 (SD = 4.75) out of a maximum of 40. Negative perception scores were comparatively lower, with a mean of 19.97 (SD = 5.36) out of 32. This pattern indicates that although positive perceptions were generally high, a moderate level of negative perception was also present among respondents. Together, these results suggest that although participants generally viewed the subject positively, notable negative perceptions still exist.

Table 4: Comparison between age and positive / negative perception

Age	n	Positive perception		Negative perception	
		Median (IQR)	P-value*	Median (IQR)	P-value*
20-30	52	31 (30 – 38)	0.4871 (NS)	16 (15.5 - 21)	0.0027 (S)
31-40	164	32 (30- 38.5)		20 (16 - 24)	
41-50	134	33.5 (30 – 40)		20.5 (16 - 24)	
51 and Above	58	32 (30 - 39)		19.5 (16 - 24)	
Total	**408**	**32 (30 - 39)**		**20 (16 - 24)**	

*- Kruskal-wallis test (non-parametric test of ANOVA)
n- frequency
NS – Non-Significant
S –Significant

Median scores across age groups are very similar (31–33.5). Comparison of perception scores across age groups using the Kruskal–Wallis test revealed no significant difference in positive perception (p = 0.4871), indicating that positive attitudes were consistent across age categories. However, negative perception showed a statistically significant difference (p = 0.0027). The 41–50 age group demonstrated the highest median negative perception score (20.5, IQR = 16–24), suggesting that individuals in this age range may experience more negative perceptions compared to other age groups.

These findings suggest that while positive perceptions are stable across age groups, negative perceptions are more sensitive to age differences. The higher negative perception among participants aged 41–50 may reflect greater concerns, responsibilities, or experiences influencing their views.

Table 5: Comparison between gender and positive/ negative perception

Gender	n	**Positive perception**		**Negative perception**	
		Median (IQR)	**P-value***	**Median (IQR)**	**P-value***
Male	58	34 (30 - 40)	0.0667 (NS)	21 (16 – 24)	0.1548 (NS)
Female	350	31 (30 – 39)		20 (16 – 23)	
Total	**408**	**32 (30 – 39)**		**20 (16 - 24)**	

*-Two-sample Wilcoxon rank-sum (Mann-Whitney) test
n- frequency
NS – Non-Significant

There is no significant difference between the gender in both positive and negative perception, since the p-value is 0.0667 and 0.1548 respectively, which is non-significant.

Table 6: Comparison between education and positive/ negative perception

Education	n	**Positive perception**		**Negative perception**	
		Median (IQR)	**P-value***	**Median (IQR)**	**P-value***
Diploma in nursing	76	32.5 (30 - 39)	0.2102 (NS)	20 (17 - 24)	0.4687 (NS)
Bachelor's in nursing	260	32 (30 - 39)		20 (16 - 23)	
Post Basic BSc Nursing	46	34 (30 - 39)		19.5 (16 - 24)	
Master's in nursing	26	30 (30 - 33)		20 (16 - 23)	
Total	**408**	**32 (30 - 39)**		**20 (16 - 24)**	

*- Kruskal-wallis test (non-parametric test of ANOVA)
n- frequency
NS – Non-Significant

There is no significant difference between the education categories in both positive and negative perception, since the p-value is 0.2102 and 0.4687 respectively, which is non-significant.

Table 7: Comparison between overall experience and positive/ negative perception

Overall experience	n	**Positive perception**		**Negative perception**	
		Median (IQR)	**P-value***	**Median (IQR)**	**P-value***
6 months to 1 year	4	30.5 (29.5 - 31)	0.1454 (NS)	19.5 (12.5 - 26)	0.0938 (NS)
1-5 years	53	31 (30 - 3)		17 (16 - 22)	
6-10 years	72	31 (30 – 38.5)		18 (16 - 24)	
11-15 years	111	35 (30 - 40)		21 (17 - 23)	
16 and above	168	31 (30 - 39)		20 (16 - 24)	
Total	**408**	**32 (30 - 39)**		**20 (16 - 24)**	

*- Kruskal-wallis test (non-parametric test of ANOVA)
n- frequency
NS – non-significant

There is no significant difference between the overall experience in both positive and negative perception, since the p-value is 0.1454 and 0.0938 respectively, which is non-significant.

Table 8: Comparison between experience in EHS and positive/negative perception

Experience in EHS	n	Positive perception		Negative perception	
		Median (IQR)	P-value*	Median (IQR)	P-value*
6 months to 1 year	13	37 (31 - 40)	0.1236 (NS)	17 (16 - 24)	0.0182 (S)
1-5 years	128	30.5 (30 - 38)		17.5 (16 - 23)	
6-10 years	95	32 (30 - 38)		21 (16 - 24)	
11-15 years	61	34 (30 - 40)		21 (16 - 24)	
16 and above	111	33 (30 -39)		20 (16 - 24)	
Total	**408**	**32 (30 - 39)**		**20 (16 - 24)**	

*- Kruskal-wallis test (non-parametric test of ANOVA)
n- frequency
NS – Non-Significant
S - Significant

There is no significant difference between the experiences in EHS categories in positive perception. Since the p-value is 0.1236, which is non-significant. There is a significant difference between the experiences in EHS categories in negative perception. Since the p-value is 0.0182, which is statistically significant. Here the highest median (IQR) is in 6 – 10 years and 11 – 15 years of experience in EHS, which is 21 (16 – 24) for both the categories.

VIII. Discussion:

Nurses' perceptions of the use of technology in nursing care.

In this study 94 % of nurses expressed that use of technology saves nursing time by automating the procedures and tasks. this finding is persistent with the previous studies that use of technology in nursing care practices resulted in the reduction of repetitive task and also saved the time for core nursing care activities (Jang & Yang, 2025) . technologies can minimize unnecessary task and optimize the use of their valuable nursing time (Choi et al., 2025).

In this study 51% of the nurses disagreed that learning to use technology is time consuming and challenging in contrast to the previous study that most of the nurses agreed that learning how to use technological device is difficult and time consuming (Ozan & Duman, 2020).In this study 55% of nurses agreed that sounds from machines and medical devices disturb nursing care is consistent with previous research. Excessive alarm sounds and frequent device notifications have been reported to interrupt nurses' workflow, increase stress, contribute to alarm fatigue, and reduce attention to patient care (Chen et al., 2023; Choi et al., 2025; Ozan & Duman, 2020).

Association between nurses' age and their perceptions of technology

In this study negative perception showed a statistically significant difference ($p = 0.0027$). The 41–50 age group demonstrated the highest median negative perception score (20.5, IQR = 16–24), suggesting that individuals in this age range may experience more negative perceptions compared to other age groups. This finding is consistent with the previous study stating statistically significant difference by age group of the participants was found regarding the perceptions that the Use of technology dehumanises or mechanises nursing care practices or disrupts patient and nurse communication ($p<0.05$) (Ozan & Duman, 2020).

Association between nurses' years of experience and their perceptions of technology

In this study there is no significant difference between the nurses' years of experience and their positive and negative perception on use of technology, since the p-value is 0.1454 and 0.0938 respectively, which is non-significant. There is no significant difference between the experiences in EHS categories in positive perception. Since the p-value is 0.1236. whereas in the nurses currently working in EHS facilities demonstrated is a significant negative perception (p-value is 0.0182). Here the highest median (IQR) is in 6 – 10 years and 11 – 15 years of experience in EHS, which is 21 (16 – 24) for both the categories in contrast to the previous study by Nurses with less than five years of experience showed a positive but nonsignificant trend toward higher perceived usefulness of virtual nursing technology. (Olubajo, 2026)

Association between nurses' qualifications and their perceptions of technology

In this study there was no significant difference between the education categories in both positive and negative perception, (p-value is 0.2102 and 0.4687 respectively) this finding is consistent to the previous study that was no statistically significant difference in using technology to provide care in terms of the clinics where the nurses work or of their educational levels. (p|>0.05 (Ozan & Duman, 2020).

IX. Limitations

This study may face several limitations. First, perceptions are inherently subjective and may vary widely based on individual experience, age, education level, and clinical setting. Second, the study's findings may be context specific and not fully generalizable to all healthcare environments, particularly across different institutions with varying levels of technological infrastructure. Third, self-reported data may be influenced by social desirability bias, where participants provide responses, they believe are expected rather than their true opinions. Fourth, as convenient sampling was used the study may be fully gen

X. Implication for Practice

Understanding nurses' perceptions is critical for designing and implementing technology that aligns with clinical realities. Insights from this study can inform targeted training programs, user-centered system design, and supportive policies that enhance

nurses' engagement with technology. By addressing concerns and leveraging positive attitudes, healthcare organizations can foster a culture of innovation that improves both nursing satisfaction and patient outcomes.

XI. Recommendation for Further Study

Future research should explore longitudinal changes in nurses' perceptions as technology continues to evolve. Comparative studies across different healthcare systems and specialties could offer deeper insights into contextual factors influencing adoption. Additionally, investigating the impact of specific technologies such as AI-driven decision support or remote monitoring tools on nursing workflows and patient care would be valuable**.**

XII. Conclusion

This study aims to illuminate the perceptions nurses hold toward technology integration in their practice. By capturing their voices, the research will contribute to a more empathetic and effective approach to digital transformation in healthcare. Ultimately, aligning technological advancement with the values and needs of nursing professionals is essential for delivering high-quality, compassionate, and future-ready care.

XIII. References

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