PERCEPTION OF NURSING STUDENTS ON ARTIFICIAL INTELLIGENCE AND ITS ROLE IN NURSING

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KEYWORDS
Artificial Intelligence; Nursing Education; Nursing Practice; Perceptions; Technology Integration; Socio-demographic Variables

ABSTRACT

Background: The integration of artificial intelligence (AI) in healthcare has garnered increasing attention, with implications for nursing education and practice.

Aim: This cross-sectional study aimed to explore the perceptions of nursing students at Northern Border University regarding AI and its role in nursing.

Methods: A cross-sectional approach was used among 202 nursing students from various academic levels. The data were collected through a self-structured survey questionnaire. The survey captured demographic information, AI usage, familiarity with AI tools, and perceptions related to AI in education and nursing practice. Statistical analyses, including Chi-square tests, and Pearson correlation coefficients test were employed to assess association and correlation respectively.

Results: Results revealed a diverse participant profile, with 44.6% of the samples were belongs to the age group of 17-20 years and 61.9% of the subjects were females. About 79.2% actively used AI technology in education, with 48.5% of the participants were expressing familiarity with AI tools. Challenges included 59.4% of the subjects found difficulties in using high-profile AI technology. Positive perceptions included 60% believing AI enhances learning experiences, while 55.4% agreed AI has low ability to assess emotional well-being. Significant associations existed between socio-demographic variables and perceptions. The study identified a nuanced correlation between socio-demographic variables and perceptions, emphasizing the importance of individual characteristics in shaping attitudes towards AI.

Conclusion: This study contributes valuable insights into the perceptions of nursing students regarding AI in nursing education and practice. This helps to digitally enable the nurses to provide safe and efficient health care services to the client and to attain Saudi mission 2030. The positive correlation suggests the need for targeted interventions to address challenges and capitalize on the potential benefits of AI in nursing. As the nursing profession plays a crucial role in the healthcare system, understanding how nursing students perceive and navigate this transformative wave of technology in their day to day practice is of utmost importance.

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1. Introduction

Background of the Study

The rapidly evolving landscapes of healthcare, technological advancements, particularly in the realm of Artificial Intelligence (AI), have become instrumental in shaping the future of patient care, diagnosis, and treatment (Jiang et. al 2017) [1]. As we stand on the cusp of a technological revolution, the integration of AI into various facets of healthcare has become a topic of profound interest and scrutiny (Bohr and Memarzadeh;2020) [2]. Robert's 2019) [3] study report shows the paradigm shift extends its influence beyond the clinic and into the educational sphere, challenging traditional pedagogical approaches, especially in disciplines like nursing.

Historically, nursing education has been rooted in a foundation of hands-on clinical training, emphasizing the development of compassionate care skills and clinical expertise. However, (Secinaro et al.;2021) [4] argue that the exponential growth of technology, particularly AI, has prompted a re-evaluation of these traditional educational paradigms. The integration of AI in healthcare introduces a myriad of possibilities, from enhancing diagnostic accuracy to streamlining administrative tasks, ultimately contributing to improved patient outcomes Amann et al.;2020 [5].

In this context, nursing education is at a crossroads, compelled to adapt to the changing landscape of healthcare delivery. Clancy's 2020; [6] report shows the traditional roles of nurses, once defined primarily by direct patient care, and are expanding to encompass proficiency in leveraging AI technologies. As per the report of Ronquillo et al; (2021) [7], nurses are expected to not only understand the intricacies of AI applications but also seamlessly integrate them into their daily practice to optimize patient care.

Internationally, the infusion of AI into nursing practice is gaining momentum. Studies conducted across diverse healthcare systems have revealed a spectrum of perceptions among nursing professionals (Van Bulck et al;2023) [8]. Some embrace the potential of AI to augment their roles, recognizing its capacity to improve efficiency and accuracy in diagnostics, treatment planning, and patient monitoring. Secinaro et al.(2021 [4] their study reports state that, conversely, concerns linger regarding the potential erosion of the human touch in patient care, job security, and ethical considerations surrounding the use of AI in sensitive healthcare contexts.

Saudi Arabia, with its ambitious Vision 2030 initiative, is positioned at the forefront of technological adoption and innovation in various sectors, including healthcare (Bakken, S., & Dreisbach;2022) [9]. The Kingdom's commitment to leveraging AI to enhance healthcare services aligns with global trends. As the nursing profession plays a pivotal role in the healthcare ecosystem, understanding how nursing students perceive and navigate this transformative wave of technology is of paramount importance.

Against the backdrop of a rich cultural heritage, Saudi Arabia is undergoing significant socio-economic transformations. The cultural fabric of the nation, with its emphasis on human connection and empathy, adds a unique layer to the integration of AI in healthcare, particularly in the nursing domain (Chikhaoui et al; 2022) [10]. As the nation endeavours to balance its cultural values with technological progress, it becomes imperative to explore how nursing

students at Northern Border University, situated in Arar, Saudi Arabia, navigate this intersection (Chen et al; 2022) [11].

Northern Border University, as a key player in Saudi Arabia's higher education landscape, is entrusted with the responsibility of preparing the next generation of healthcare professionals. The nursing program at the university serves as a microcosm of the larger transformation occurring within the nursing profession globally. By exploring the perceptions of nursing students in this specific context, this study aims to contribute nuanced insights that can inform both educational strategies and healthcare policies in Saudi Arabia.

The Research Gap

While international literature provides a wealth of information on the global landscape of AI integration in nursing education and practice, there exists a noticeable gap in understanding how this phenomenon unfolds in the Saudi Arabian context, specifically among nursing students. This study seeks to address this gap by offering a localized perspective on the perceptions of nursing students at Northern Border University, shedding light on their expectations, concerns, and aspirations as they navigate the integration of AI into their future profession.

Problem Statement and Significance

Nursing education stands at a pivotal juncture, grappling with the imperative to incorporate AI technology into curricula while preserving the core tenets of compassionate patient care. The extent of exposure, perceptions, and influencing factors among nursing students at Northern Border University in Saudi Arabia regarding AI integration in their education and practice is an understudied area.

In the rapidly advancing landscape of healthcare, the integration of Artificial Intelligence (AI) has become a focal point, reshaping the roles and responsibilities of healthcare professionals, including nurses. As AI technology permeates the field, it is crucial to understand how nursing students, the future workforce, perceive and navigate this transformative shift. (Bakken, S., and Dreisbach;2022 [9] their study holds paramount significance. It addresses a critical gap in the literature by providing insights into how nursing students perceive and respond to the integration of AI in their educational journey, informing educational strategies for the future.

Research question

What are the perceptions of nursing students at Northern Border University in Saudi Arabia regarding artificial intelligence and its role in nursing education and practice?

Purpose of the study

The purpose of this study is to explore and analyze the perceptions of nursing students at Northern Border University in Saudi Arabia regarding artificial intelligence and its role in nursing.

Study Objectives

- Assess the Socio-demographic variables of Bachelor Nursing Science Students
- To Assess the Level of Exposure to Artificial Intelligence (AI) Technology
- To Explore Nursing Students' Perceptions of AI Integration in Nursing Practice
- To Examine Factors Influencing Perceptions
- Analyze the influence of Artificial Intelligence (AI) technology in nursing among nursing students of Northern Border University.

Research Hypothesis

H1: There will be a significant association between the socio-demographic variables and the level of perception of nursing student's on Artificial Intelligence (AI) and its role in nursing, $P<0.05$.

H2: There will be a significant correlation between socio-demographic variables and the level of perception of nursing student's on Artificial Intelligence (AI) and its role in nursing, $P<0.05$.

2. Methods

2.1 Research Design

This research adopted a cross-sectional design to capture a snapshot of nursing students' perceptions on Artificial Intelligence (AI) integration in education and practice. The cross-sectional approach facilitated the collection of data at a single point in time, offering insights into the prevailing attitudes and characteristics of the study population.

2.2 Setting and Participants

The study was conducted at Northern Border University, targeting nursing students enrolled in various academic years and semesters. The inclusion criteria comprised students currently pursuing nursing education, and participation was voluntary. A purposive sampling technique was employed to ensure representation across different academic levels.

2.3 Data Collection Process

Survey Instrument: A structured questionnaire was developed to gather quantitative data on participants' socio-demographic characteristics, AI usage, familiarity and challenges with AI, and perceptions related to AI in education and nursing practice. The survey instrument underwent a rigorous validation process, involving expert review and pilot testing to ensure clarity and relevance.

Demographic Information: Participants provided information on age, gender, academic year, semester, and the source of information regarding AI. These demographic variables were crucial for analyzing the association and correlation with perceptions.

AI Usage and Familiarity: Participants were queried on their utilization of AI technology in education. The survey assessed their familiarity with specific AI tools commonly used in nursing and their perceived difficulty in using high-profile AI technology.

Perceptions in Education and Nursing Practice: The questionnaire explored participants' perceptions of AI in education, focusing on its role in providing efficient learning experiences, improving understanding, and enhancing the overall level of education. In the context of nursing practice, perceptions were gauged regarding AI's potential in fast and accurate diagnosis, improving healthcare measures, and assisting rather than replacing critical thinking skills.

Challenges and Concerns: Participants were asked to express their concerns about AI, including its ability to assess the emotional well-being of patients, the maintenance of academic integrity, and the potential impact on traditional job opportunities among nurses.

2.4 Validity and reliability of the instrument:

The questionnaire was submitted to an expert panel to evaluate whether the questions agreed with the scope of the items, identify the extent to which these items reflect the concepts of the research problem and to judge whether the instrument is statistically valid and that the questionnaire is sufficiently well designed to provide relationships between the examined variables.

Reliability was measured through calculating Cronbach's alpha coefficient for the total questionnaire and the six subdomains. The total Cronbach's alpha coefficient of 0.853 was obtained from the reliability test.

2.5 Pilot study:

A pilot study was conducted on 10% of the gathered sample to test reliability and applicability of the study to ascertain the feasibility, applicability, and clarity of the tool, and no modification was done. Students in the pilot study were excluded from the study.

2.6 Data Analysis

Quantitative data analysis was conducted using appropriate statistical methods. Descriptive statistics, including frequencies and percentages, were employed to summarize participants' socio-demographic characteristics and responses to survey items. Chi-square tests were utilized to examine associations between socio-demographic variables and perceptions of AI. Additionally, Pearson correlation coefficients were calculated to explore correlations between socio-demographic variables and participants' attitudes towards AI.

2.7 Ethical Considerations

This study adhered to ethical guidelines to ensure the well-being and confidentiality of participants. Informed consent was obtained from all participants before their inclusion in the study. The research protocol received approval from the relevant institutional ethical review board, and steps were taken to safeguard participants' privacy and anonymity throughout the study.

3. Results

Demographic Characteristics

Table 1 : Socio-demographic variables

N=202

Variables	Frequency	Percentage (%)
Age in years		
17-20	90	44.6
22-26	62	30.7
27-31	42	20.8
32-34	08	4.0
Gender		
Male	77	38.1
Female	125	61.9
Year of study		
First year	43	21.3
Second year	71	35.1
Third year	23	11.4
Fourth year	65	32.2
Source of information		
Mass media	86	42.6
Friends	41	20.3
Professionals	31	15.3
Health care Sittings	30	14.9
Others	14	6.9

A total of 202 nursing students participated in the study. Table 1 outlines the distribution of participants based on socio-demographic characteristics. The majority of participants (44.6%) were within the 17-20 age groups, with a higher representation of female students (61.9%). Regarding academic status, 35.1% of the participants were in their second year of study, and all respondents were in the second semester. Notably, 40% of participants received information on Artificial Intelligence (AI) through mass media, while 15.3% obtained information from professionals.

AI Usage and Familiarity

Figure1: Use of Artificial Intelligence (AI) Technology in – Classroom, Labs, and Hospitals

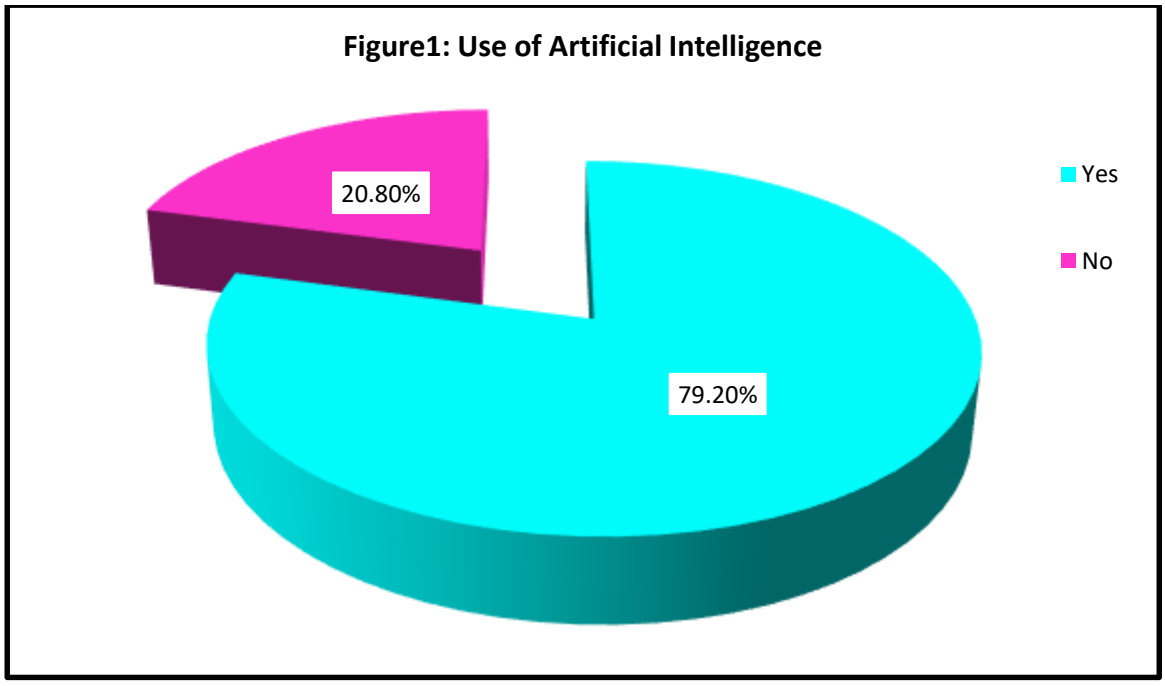

Figure 1 illustrates the utilization of AI technology among participants. A significant majority (79.2%) reported using AI in their education processes, emphasizing the integration of AI tools into the learning environment.

Table 2: General aspects of Artificial Intelligence Technology

	STRONGLY AGREE		AGREE		NEUTRAL		DISAGREE		STRONGLY DISAGREE	
	Frequency	Percentage (%)	Frequency	Percentage (%)	Frequency	Percentage (%)	Frequency	Percentage (%)	Frequency	Percentage (%)
1. I am familiar with specific Artificial Intelligence (AI) tools commonly used in nursing.	98	48.5	69	34.2	2	1.0	19	9.4	14	6.9
2. I feel it's difficult to use high profile AI technology	120	59.4	51	25.2	1	0.5	18	8.9	12	5.9
3. I feel the AI is safe and reliable	94	46.5	57	28.2	22	10.9	12	5.9	12	5.9
4. AI reduces emotional exhaustion or physical limitation	126	62.4	52	25.7	10	5.0	2	1.0	12	5.9

Table 2 provides insights into participants' familiarity and challenges with AI. Almost half of the participants (48.5%) strongly agreed that they were familiar with specific AI tools commonly used in nursing. However, 59.4% expressed difficulty in using high-profile AI technology. Concerns related to AI safety and reliability was mixed, with 46.5% feeling that AI is safe and reliable. On the emotional front, 62.4% believed that AI reduces emotional exhaustion or physical limitations.

Level of Perceptions of Nursing Students on Artificial Intelligence and its role in Nursing Practice

Table 3: Level of Perception of Nursing Student's on Artificial Intelligence (AI) and Its Role in Nursing

	STRONGLY AGREE		AGREE		NEUTRAL		DISAGREE		STRONGLY DISAGREE	
	Frequency	Percentage (%)	Frequency	Percentage (%)	Frequency	Percentage (%)	Frequency	Percentage (%)	Frequency	Percentage (%)
LEVEL OF PERCEPTION OF NURSING STUDENT'S ON ARTIFICIAL INTELLIGENCE (AI) AND ITS ROLE IN NURSING										
Education / Teaching 5. I feel Artificial Intelligence (AI) helps to provide efficient learning experiences for the students.	121	59.9	63	31.2	2	1.0	6	3.0	10	5.0
6. Artificial Intelligence (AI) will helps to improve level of understanding	115	56.9	74	36.6	11	5.4	1	0.5	1	0.5
7. I feel level of education will improve, if it is combined with Artificial Intelligence (AI) Technology	126	62.4	52	25.7	15	7.4	3	1.5	6	3.0
8. Use of Artificial Intelligence (AI) will enhance quality of work, productivity and my performance level	90	44.6	82	40.6	15	7.4	1	0.5	14	6.9
Nursing Practice **9.** Artificial intelligence comprises many health care technologies that transforms nurses' role and enhance to provide more personalized patient care.	74	36.6	82	40.6	44	21.8	2	1.0	0	0

10. AI tools helps in improving all levels of healthcare measures	98	48.5	59	29.2	44	21.8	1	0..5	0	0
11. Artificial Intelligence (AI) Technology will help in fast and accurate diagnosis among the patients	104	51.5	94	46.5	3	1.5	1	0.5	0	0
12. AI tools are intended to assist and not replace the critical thinking skills of the nurses	112	55.4	64	31.7	21	10.4	5	2.5	0	0
13. The Kingdom's Vision 2030 seeks to use artificial intelligence technologies to improve the health sector and make it better in the world by collecting data and using it to support decision-making and develop services provided to citizens	106	52.5	49	24.3	32	15.8	0	0	15	7.4
Communication 14. I feel use of Artificial Intelligence (AI) will help to improve easy and accurate communication among healthcare team members.	113	55.9	53	26.2	15	7.4	11	5.4	10	5.0
Evaluation 15. I feel AI based Evaluation process will reduce subjectivity	104	51.5	55	27.2	25	12.4	1	0.5	17	8.4
16. I feel AI can be used for creating test and examinations	99	49.0	52	25.7	7	3.5	10	5.0	34	16.8

Table 3 delves into participants' perceptions regarding AI in education and nursing practice. A notable 59.9% felt that AI helps provide efficient learning experiences, while 56.9% believed that AI improves the overall understanding of students. More than 60% (62.4%) thought that education would improve when combined with AI technology, and 44.6% asserted that AI enhances the quality of work, productivity, and performance. In the context of nursing practice, approximately 51.5% strongly agreed that AI technology aids in fast and accurate diagnosis, and 48.5% believed that AI tools contribute to improvements in healthcare measures. Significantly, 55.4% of participants strongly agreed that AI tools are intended to assist rather than replace critical thinking skills, emphasizing a supportive role in nursing.

Challenges and Concerns

Table 4: Challenges of Artificial Intelligence (AI) Applications

	STRONGLY AGREE		AGREE		NEUTRAL		DISAGREE		STRONGLY DISAGREE	
	Frequency	Percentage (%)	Frequency	Percentage (%)	Frequency	Percentage (%)	Frequency	Percentage (%)	Frequency	Percentage (%)
17. Technical malfunction of AI could results in a negative outcome	124	61.4	41	20.3	23	11.4	1	0.5	13	6.4
18. The use of AI reduces critical thinking, judgement and decision making skill among nurses.	133	65.8	30	14.9	29	14.4	2	1.0	8	4.0
19. AI has low ability to assess the emotional well-being of the patient	112	55.4	72	35.6	1	0.5	8	4.0	9	4.5
20. Lack of knowledge and confident in using AI become a challenge	117	57.9	27	13.4	40	19.8	7	3.5	11	5.4
21. AI may results in the loss of traditional job opportunities among the nurses	110	54.5	45	22.3	18	8.9	8	4.0	21	10.4
22. Breach of academic integrity and Ethical issue may be a concern.	96	47.5	48	23.8	28	13.9	12	5.9	18	8.9
23. The high cost is one of the disadvantages of using AI technology	115	56.9	12	5.9	47	23.3	2	1.0	26	12.9
24. Total reliance on technology in care may marginalize	105	52.0	50	24.8	21	10.4	17	8.4	9	4.5

the role of health care providers or reduce job opportunities										

Table 4 highlights participants' concerns and challenges related to AI. More than half (55.4%) of the participants strongly agreed that AI has a low ability to assess the emotional well-being of patients. Additionally, 47.5% expressed concern about maintaining the breach of academic integrity and ethics.

Figure 2: Challenges of Artificial Intelligence Application

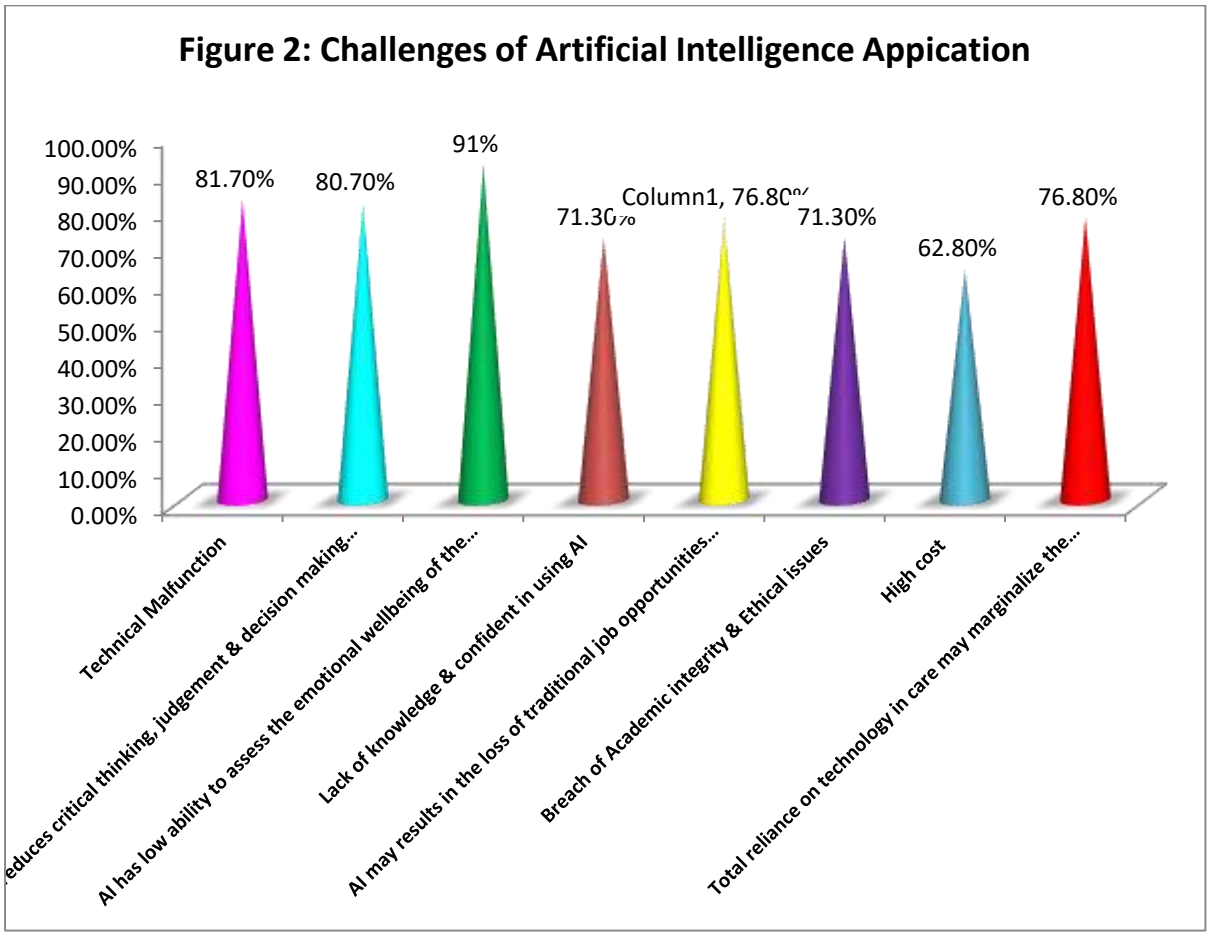

Figure 2 reinforces these findings, with 81.7% strongly agreeing that AI has a low ability to assess patient emotional well-being, and 71.3% expressing concerns about academic integrity and ethics. Furthermore, over 90% of participants believed that AI has a low ability to assess patient emotional well-being, while 76.8% were concerned about potential job losses among nurses due to AI.

Association and Correlation Analysis

Table 5: Association between the Socio-demographic Variables and the Level of Perception of Nursing Student's on Artificial Intelligence (AI) and its role in nursing

Variables	Chi-Square (χ)	Degree of Freedom (df)	Level of Significance (P value)
Age	70.713	3	.000***
Gender	11.406	1	.001**
Year of study:	. 28.574	3	000***
Semester of study	53.545	1	000***
Source of Information	73.594	4	000***
Use of AI	208.644	4	000***
Familiar with (AI) tools used in nursing.	167.455	4	000***
Difficult to use high profile AI	230.426	4	000***
AI is safe and reliable	119.832	4	000***
AI reduces emotional exhaustion or physical limitation	264.040	4	000***
Education / Teaching AI helps to provide efficient learning experiences for the students.	262.109	4	000***
AI will helps to improve level of understanding	263.941	4	000***
level of education will improve, it is combined with Artificial Intelligence (AI) Technology	264.584	4	000***
AI will enhance quality of work, productivity and my performance level	175.376	4	000***
Nursing Practice Artificial intelligence comprises many health care technologies	78.000	3	000***
AI tools helps in improving all levels of healthcare measures	95.465	3	000***
AI Technology will help in fast and accurate diagnosis	187.347	3	000***
AI tools are intended to assist and not replace the critical thinking skills of the nurses	136.733	3	000***
The Kingdom's Vision 2030 seeks to use artificial intelligence technologies to improve the health sector	92.772	3	000***
Communication Use of AI will help to improve easy and accurate communication	194.634	4	000***

Evaluation AI based Evaluation process will reduce subjectivity	163.248	4	000***
AI can be used for creating test and examinations	139.832	4	000***
Challenges of AI Application Technical malfunction in AI could results in a negative outcome	237.505	4	000***
AI reduces critical thinking, judgement and decision making skill among nurses	280.624	4	000***
AI has low ability to assess the emotional well-being of the patient	240.426	4	000***
Lack of knowledge and confident in using AI become a challenge	198.693	4	000***
AI may results in the loss of traditional job opportunities among the nurses	168.149	4	000***
Breach of academic integrity and Ethical issue may be a concern.	114.139	4	000***
The high cost is one of the disadvantages of using AI technology	200.426	4	000***
Total reliance on technology in care may marginalize the role of health care providers or reduce job opportunities	152.851	4	000***

Table 5, depicts, the association between the socio-demographic variables and the level of perception of nursing student's on Artificial Intelligence (AI) and its role in nursing. This study hypothesis was tested through association Hypothesis 1, predicting a significant association between socio-demographic variables and the influence of AI technology in nursing. There was a significant association between the socio-demographic variables and the level of perception of nursing student's on Artificial Intelligence (AI) and its role in nursing, P<0.05, so Hypothesis H1 was accepted.

Table 6: Correlation between Socio-demographic Variables and the Level of Perception of Nursing Student's on Artificial Intelligence (AI) and its Role in Nursing

Variables	Pearson Correlation Coefficient (r)	Level of Significance (P value)
Gender	-.083	.242
Year of study:	.342**	000***
Semester of study	-.114	.106
Source of Information	.146*	039*
Use of AI	.205**	.003**
Familiar with (AI) tools used in nursing.	.217**	002**
Difficult to use high profile AI	-.081	.250

AI is safe and reliable	-.167*	.017
AI reduces emotional exhaustion or physical limitation	.117	.099
Education / Teaching AI helps to provide efficient learning experiences for the students.	.021	.768
AI will helps to improve level of understanding	.228**	001**
level of education will improve, it is combined with Artificial Intelligence (AI) Technology	.020	.782
AI will enhance quality of work, productivity and my performance level	.178*	.011*
Nursing Practice Artificial intelligence comprises many health care technologies	-.001	.990
AI tools helps in improving all levels of healthcare measures	.047	.509
AI Technology will help in fast and accurate diagnosis	.063	.370
AI tools are intended to assist and not replace the critical thinking skills of the nurses	.149*	.034*
The Kingdom's Vision 2030 seeks to use artificial intelligence technologies to improve the health sector	.2623**	.000***
Communication Use of AI will help to improve easy and accurate communication	-.086	.221
Evaluation AI based Evaluation process will reduce subjectivity	.146	.039
AI can be used for creating test and examinations	.475**	.000**
Challenges of AI Application technical malfunction in AI could results in a negative outcome	0.018	.804
AI reduces critical thinking, judgement and decision making skill among nurses.	.076	.284
AI has low ability to assess the emotional well-being of the patient	.057	.421
Lack of knowledge and confident in using AI become a challenge	.072	.306
AI may results in the loss of traditional job opportunities among the nurses	.144*	.040*
Breach of academic integrity and Ethical issue may be a concern.	.150*	.033*
The high cost is one of the disadvantages of using AI technology	.210**	003**
Total reliance on technology in care may marginalize the role of health care providers or reduce job opportunities	-.067	.390

**Correlation is significant at the 0.01 level (2-tailed).

*Correlation is significant at the 0.05 level (2-tailed).

Table 6 depicts that, there was a positive correlation between socio-demographic variables like year of study, source of information, use of AI, familiar with AI tools, level of understanding, quality of work, critical thinking skills, Saudi vision, evaluation, loos of traditional job opportunities, high cost, integrity and ethical issues. There was a negative correlation between socio-demographic variables like gender and semester with difficulty in using high profile, safe and reliable, health care technologies and communication. Significant correlations were found between variables such as academic year, source of information, use of AI, familiarity with AI tools, level of understanding, quality of work, critical thinking skills, Saudi Vision, evaluation, loss of traditional job opportunities, high cost, integrity, and ethical issues. There was a significant correlation between socio-demographic variables and the level of perception of nursing student's on Artificial Intelligence (AI) and its role in nursing, $P<0.05$, so hypothesis 2 (H2) was accepted.

4. Discussion

As the field of healthcare rapidly embraces technological advancements, the integration of Artificial Intelligence (AI) has become a subject of paramount importance (Buchanan et al; 2020 [12]; and Clancy; 2020) [6].

The primary goal of this research was to comprehensively explore and analyze the perceptions of nursing students concerning AI and its role in nursing at Northern Border University. The study aimed to ascertain the influence of socio-demographic variables on these perceptions, contributing valuable insights to the ongoing discourse on the integration of AI in nursing education and practice.

A significant proportion of participants (79.2%) actively engaged with AI technology in their education process. This finding suggests a considerable level of integration and acceptance of AI tools among nursing students, reflecting the evolving landscape of technology in education Sapci & Sapci; 2020)[13]. This positive attitude towards AI aligns with the global trend of technology-driven education, emphasizing the need for nursing curricula to incorporate these advancements, Lukić et al; 2023 [14].

Almost half of the participants (48.5%) expressed familiarity with specific AI tools commonly used in nursing. However, challenges were evident, with 59.4% finding high-profile AI technology difficult to use. This dual perspective underscores the importance of not only fostering familiarity but also addressing usability issues Jung; 2023 [15]. Nursing education programs should incorporate training modules to enhance students' proficiency in utilizing AI tools effectively, thus minimizing barriers to adoption, Chan and Zary; 2019 [16] and Teng et al; 2022 [17].

The study explored various facets of participants' perceptions regarding AI in both education and nursing practice. Over half of the participants believed that AI helps provide efficient learning experiences (59.9%) and improves the level of understanding (56.9%). Moreover, a significant majority (62.4%) envisioned an improvement in the overall level of education with the integration of AI technology. These positive perceptions align with the potential benefits of AI in enhancing educational outcomes, suggesting a receptiveness among

nursing students towards technology-enabled learning experiences Labrague et.al; 2023 [18] and Buabbas et.al; 2023 [19].

In the realm of nursing practice, positive perceptions continued, with more than half strongly agreeing that AI tools are intended to assist, not replace, critical thinking skills (55.4%). This nuanced understanding of AI's role in augmenting rather than supplanting human skills reflects a balanced perspective among nursing students Li et.al; 2022 [20]. The acknowledgment that AI can contribute to improving communication among healthcare team members (55.9%) further reinforces its potential as a collaborative tool in clinical settings Teng et.al; 2022 [17].

Despite the positive perceptions, participants raised concerns and identified challenges associated with AI applications in nursing. A notable finding was that 55.4% strongly agreed that AI has a low ability to assess the emotional well-being of patients. This apprehension underscores the importance of preserving the human touch in healthcare, an aspect that AI may struggle to emulate. Additionally, 47.5% expressed concern about maintaining academic integrity and ethical standards, reflecting the need for careful consideration and ethical guidelines in AI integration within nursing education Kwak et.al; 2022.[21]and Ahmad et.al; 2023 [22].

The study's hypotheses sought to explore the association and correlation between socio-demographic variables and nursing students' perceptions of AI. The results revealed significant associations, affirming Hypothesis 1. For instance, age, gender, year of study, and source of information demonstrated notable associations with participants' perceptions, emphasizing the multifaceted nature of factors influencing attitudes towards AI Labrague et.al; 2023 [18] and Buabbas et. al; 2023 [19].

Furthermore, Hypothesis 2, which posited a significant correlation between socio-demographic variables and perceptions, was accepted. This indicates that individual characteristics such as age, gender, and academic progression play a crucial role in shaping nursing students' attitudes towards AI. Understanding these correlations provides valuable insights for educators and policymakers aiming to tailor AI integration strategies to the specific needs and expectations of diverse student populations Teng et al., and Abdelaliem et al; 2023 [23]. These findings are aligned with the results of AI study conducted at Nepal among undergraduate medical students and interns. The score of was higher among final year students ($p = 0.006$) and among those with additional training in AI ($p = 0.040$). Jha N et.al 2022 [24]

The nursing profession as a whole does not fully comprehend the fundamentals of artificial intelligence. To ensure a smooth and secure integration of AI into nursing practice, more education and training are needed. Abuzaid, M.M et.al 2022 [25] study results revealed 75% of all respondents agreed that the nursing curriculum should include some basic knowledge of AI.

O'Connore S et.al 2023 [26] emphasized that nurses' and midwives' involvement in AI varied with some taking an active role in testing, using or evaluating AI-based technologies; however, many studies did not include either profession. AI was mainly applied in clinical practice to direct patient care ($n = 115$, 82.14%), with fewer studies focusing on administration and management ($n = 21$, 15.00%), or education ($n = 4$, 2.85%). Benefits reported were primarily potential as most studies trained and tested AI algorithms. Only a handful ($n = 8$, 7.14%) reported actual benefits when AI techniques were applied in real-world settings. Risks and limitations included poor quality datasets that could introduce bias, the need for clinical

interpretation of AI-based results, privacy and trust issues, and inadequate AI expertise among the professions. The current study also underscore that 71.3% expressing concerns about academic integrity and ethics.

AI technology achievements varies according to countries. The study findings of Ajoor, Y et.al 2023 et.al [27] have revealed that Bahrain has an outstanding achievement in AI which will have the leverage to meet SDG goals 3 of "Good Health and Well-Being", 11 of "Sustainable Cities and Communities" .

Comparing these findings with existing literature reveals congruence with the global trajectory of technology integration in nursing education. The positive attitudes towards AI align with studies highlighting the benefits of technology in fostering active and personalized learning experiences Lukić et.al; 2023 [14]., and Ahmad et.al; 2023 [22]. Positive attitude towards AI and self-efficacy on AI was the significant highlight in study of Kwak, Y et.al 2022 [28] However, the identified challenges and concerns echo the cautionary notes present in literature, emphasizing the importance of addressing ethical considerations and preserving the humanistic aspects of nursing care Labrague et.al; 2023 [18].
AI study uncovered a significant degree of variability in understanding and comfort with AI, with many individuals gaining their knowledge through passive channels. Notably, educational level influenced nurses' attitudes toward AI, with those possessing higher educational qualifications tending to view AI more favorably. The findings underscore the need for more comprehensive and accessible AI education, particularly in the nursing practice. It is also crucial to address concerns or discomfort associated with AI to encourage its broader adoption across various fields in nursing. Proper training, transparent communication about AI's capabilities and limitations, and stringent ethical guidelines will be crucial in optimizing the integration of AI into nursing practice. Rawdhan Al-Sabawy M 2023 [29]

5. Implications and Limitations of the Study

This study's strength lies in its comprehensive exploration of nursing students' perceptions, considering socio-demographic variables and encompassing various aspects of AI in education and practice. The robust methodology, including a quantitative approach and statistical analyses, adds rigor to the findings. However, the study is not without limitations. The cross-sectional design limits the establishment of causality, and the reliance on self-reported data may introduce response bias.

Implications of the study

Nursing Education: AI can expedite the students to attain their educational objectives AI may significantly affect students' educational experiences by giving them access to the appropriate courses, enhancing contact with teachers, and facilitate personalized learning. Students can experience personalized learning, based on their own unique experiences and preferences.

Nursing Practice: Artificial Intelligence (AI) technology will help the nurses in clinical decision making, so the nurses can give quality care to the patients. AI can also enhance direct and remote patient care. Many Nursing applications are available for nursing care. Artificial intelligence (AI) comprises many healthcare technologies transforming nurses' roles and enhancing patient care.

Nursing Research: Nurse Researchers are exploring the potential influences of AI health technologies (AIHTs) on nursing in general and on nursing education more specifically. AI will help to synthesis knowledge through the literature review. AI played a primary role in describing and predicting quantitative nursing research.

Nursing Administration and Management: Artificial intelligence (AI) will transform nursing across all domains of nursing administration and management.

Recommendations:

Increase the coverage of AI and machine learning in nursing schools make students aware of AI's impact on individual patients and the healthcare system. There is a willingness among nursing students to learn about AI is a positive sign and a strong indicator of futuristic successful curricula changes. Systematic implementation of AI in the Saudi Arabian healthcare system can be a potential tool in addressing health-care challenges related to resource and manpower constraints. Incorporating topics related to AI and machine learning in nursing curricula to be the first step. More resources are required for students to develop a good understanding about artificial intelligence. Nursing education programs should strive to leverage the benefits of AI while addressing usability issues and ethical considerations. Further work is needed on how best to integrate artificial intelligence teaching into university curricula.

6. Conclusions

In conclusion, this study sheds light on the complex interplay between nursing students and AI technology, offering a nuanced understanding of their perceptions and challenges. The positive attitudes towards AI integration in education and practice, coupled with the identified concerns, necessitate a balanced and informed approach. Nursing education programs should strive to leverage the benefits of AI while addressing usability issues and ethical considerations. Future research could explore the long-term impact of AI integration on learning outcomes and nursing practice, contributing further to the evolving landscape of technology in healthcare education

Acknowledgement

The researchers would like to express their sincere gratitude to Dean, Vice-dean and all other administrators of Northern Border University to provide us to conduct this research projects. Also the researchers would like to appreciate all the nursing science students of Northern Border University to be the part of their research studies.

Conflict of Interest

There was no conflict of interest between the authors.

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