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An Exploratory Cross-Sectional Study to Analyze the Implications of Artificial Intelligence in Nursing Education

Bindu Bharathi[1*] and Ibrahim Naif Alenezi[2]
[1,2]Department of Public Health Nursing, College of Nursing, Northern Border University, Arar, Kingdom of Saudi Arabia

Author Designation: [1]Assistant Professor, [2]Dean

*Corresponding author: Bindu Bharathi (e-mail: binduvyshnavam@gmail.com).

Abstract **Background:** Artificial Intelligence (AI) is rapidly transforming education and healthcare, offering opportunities to enhance learning and practice in nursing. However, its integration into nursing education raises questions about its effectiveness and impact on students and educators. **Aim:** This study explores the role of AI in nursing education, focusing on its benefits, challenges and implications for students and faculty at a nursing college in Saudi Arabia. **Methods:** Using an exploratory cross-sectional design, data were collected from 235 participants, including nursing students across all academic levels and faculty members, through a structured online survey. This study was conducted at selected nursing college of Saudi Arabia. The analysis involved descriptive and inferential statistical techniques using SPSS to identify trends and correlations related to AI knowledge, practices and perceptions. **Results:** Knowledge and skills on AI were assessed separately with four-point scale ranging from strongly agree to strongly disagree. The findings reveal that 70% of the participants displayed sufficient knowledge of AI, knowledge questions are related to information on computer operations and how AI technology helps to make decisions and judgements. About 75% of the subjects reported limited skills in using AI technologies. This finding shows that skill gaps in the application of AI tools. It was analyzed by how much the participants are able to use AI tools. This study was strongly agreed that the participants have less skills in handling AI tools and there was a wide gap between knowledge and skills. Strong statements about AI improving learning are not balanced against the reported skill gaps and difficulties. About 82% of them experienced challenges in managing high- profile AI tools. Despite these obstacles, 77% of the respondents strongly agreed that AI significantly enhances learning by personalizing and streamlining educational experiences. Popular tools, such as ChatGPT and AI-assisted presentations, were identified as practical resources. However, concerns about reduced critical thinking and social interaction skills were prominent, emphasizing the need for balanced AI integration. This results analysis showed significant associations between socio-demographic factors and perceptions of AI's role in nursing education. **Conclusion:** AI offers significant promise in revolutionizing nursing education and equipping students and educators with innovative teaching and learning AI tools. Nevertheless, these advancements must be paired with comprehensive training, ethical safeguards and strategies to address challenges like overreliance on AI and skill erosion. By thoughtfully integrating AI, nursing education can achieve a balance between technological innovation and the preservation of essential human- centric skills.

Key Words Artificial Intelligence (AI), Implications of AI in Nursing Education, Effects of AI, Consequences of AI, Impacts of AI, Nursing Students, Faculty Perceptions, Technology Integration, Saudi Arabia, Academic Innovation, Cross Sectional Study

INTRODUCTION

Artificial Intelligence (AI) is technology that enables computers and machines to simulate human learning, comprehension, problem solving, decision making, creativity and autonomy. One area of computer science is artificial intelligence (IBM2026). Its main goal is to build machines that are capable of carrying out tasks that typically need human intelligence. Reasoning, learning, problem-solving and language comprehension are among these tasks. One subset of AI is called generative AI or GenAI. It focuses on using user input to create new material, including text, photos, music, video and software code. Artificial Intelligence (AI) technology typically has a positive, transformative effect on academic achievement. It aids in time management, comprehension of difficult ideas and academic improvement. The relationship is supporting that AI which helps in improving academic outcomes of the students. It pertains to the intelligence demonstrated by

machines or software, forming a branch of computer science focused on developing and researching intelligent devices. AI enables systems to learn from new inputs and perform tasks traditionally done by humans [1]. This technology holds vast potential, particularly in creating advanced simulations to aid nursing students in enhancing their critical thinking abilities and preparing them for real-world patient care scenarios [2]. Additionally, AI encompasses numerous healthcare technologies that reshape nursing and improve patient care. In healthcare, AI often refers to the capability of computers to autonomously process data into actionable insights, supporting decision-making or independent actions [3].

Background of the Study

AI technology has also been included into nursing, a vital component of healthcare delivery. AI helps nurses in their work by providing tools for patient monitoring, predictive analytics, administrative work automation and patient decline.

Virtual assistants with AI capabilities can manage scheduling and paperwork, freeing up nurses to concentrate more on providing direct patient care. Furthermore, by offering evidence-based suggestions, AI supports clinical decision-making and raises the standard of care. Artificial Intelligence (AI) in education has revolutionized academic learning, presenting students with both opportunities and difficulties for growth. With an emphasis on students' views and the difficulties in adopting AI, this study explores how AI technologies affect students' learning processes and academic achievement.

The twenty-first century is the era of digitalization and almost all sectors, including the nursing sector, are in the digitalization process. The nursing profession is a fast-growing sector and consistently uses all technological advancements in nursing practice. So, nursing students must know the computer applications in nursing and the specialization of artificial intelligence. After COVID 19 Pandemic, use of AI technology was very wide and innovative applications were developed in the field of Nursing education and nursing practice. The COVID-19 pandemic has expedited the application of Artificial Intelligence (AI) in health care. This research critically analyzes AI's effects on society and individuals during the pandemic, AI's dualistic role-its potential advantages as well as new issues with privacy, security, autonomy and freedom [4]. The health services team is discovering new uses for Artificial Intelligence (AI), which is proliferating. While some professionals have expressed worries about using AI, others anticipate more work opportunities in the future. Integrating AI into practice will directly impact nursing practice; hence, more research is needed to analyze the implications of Artificial Intelligence in nursing. It will help to provide quality nursing care to the patients and also help to improve the academic skills of the students.

REVIEW OF LITERATURE

A systematic review report of Ruksakulpiwat *et al.* [5], shows that, no previous review has thoroughly evaluated AI's function in nursing research, a gap that this work aims to fill. Systematic review [5] report of AI's use in nursing research is still somewhat lacking, despite the technology's increasing incorporation in healthcare. Although AI in nursing education, clinical practice and care delivery has been studied in the past survey [6], surveys of the literature may not adequately reflect the rate of development in nursing research settings today. Their earlier systematic review [5] only looked at AI in nursing care.

The Role of AI in Nursing Education and Practice: Umbrella Review report shows that AI has the potential to completely transform nursing education and practice. A deliberate approach that tackles ethical issues, incorporates AI literacy into nursing courses and guarantees fair access to AI technologies is necessary to realize this potential. These results highlight the necessity of revised nursing curriculum to incorporate AI literacy and ethical training, thorough ethical frameworks and regulatory norms specific to nursing applications and infrastructure expenditures to support fair access to AI. Future studies should concentrate on creating uniform implementation plans and assessing how integrating AI will affect nursing practice and patient outcomes over the long run [7].

Rony *et al.* [8] conducted study to examine how AI is improving nursing practice with an emphasis on how it affects future preparation. The results demonstrate how AI is revolutionizing nursing practice and preparing nurses for the future. This includes using AI to improve nursing practice, preparing nurses for the future through AI education and training and addressing related ethical issues. By enhancing accessibility to healthcare services and enabling remote monitoring of patients' health problems, AI-enabled robotics and telehealth systems broaden the scope of nursing care.

The role of artificial intelligence in shaping nursing education: A comprehensive systematic review students were found to benefit from artificial intelligence on three levels: learning effectiveness, learning attitude and psychological effects and comprehensive clinical nursing abilities. AI has a favorable impact on nursing education but further research is needed to fill in the gaps and guarantee privacy protection and long-term efficacy [9].

Al-Tkhayneh *et al.* [10] their study aimed to identify the advantages and disadvantages of using artificial intelligence in education from the students' perspective. According to the findings, most students believe that AI can enhance learning experiences and task management. Meanwhile, Divergent viewpoints exist about artificial intelligence's capacity to regulate student conduct and learning, boost the educational system's effectiveness, offer notes and evaluations, lessen reliance on teachers and promote social interaction. In addition, many students voiced their worries about the potential loss of conventional teaching positions, the expenses associated with deploying AI systems, programming and error-processing mistakes and the absence of interpersonal interactions in the classroom.

Dieterle *et al.* [11] conducted a study on the cyclical ethical effects of using artificial intelligence in education; it reveals five qualitatively distinct and interrelated divides

associated with access, representation, algorithms, interpretations and citizenship. Nevertheless, enhancing human accountability and mastery over these divisions can establish a positive feedback loop that enhances diversity, equity and inclusion in education.

Based on systemic reviews and studies related to AI in nursing education was identified that still it has gap in the integration and application of AI tools in nursing education and nursing practice. so, the researchers would like to explore the implications of Artificial Intelligence in nursing education by means of its effects, impacts, consequences, suggestions and its inferences in nursing education and practice. This study aimed to analyze the implications of artificial intelligence in nursing education among undergraduate nursing students and faculty members at a selected university in Saudi Arabia.

Aim

This study aimed to explores the role of Artificial Intelligence (AI) in nursing education, focusing on its benefits, challenges and implications for students and faculty at a nursing college in Saudi Arabia.

Objectives Related to the Study

- Examine the socio-demographic characteristics of nursing students and faculty members at a university in Saudi Arabia
- Evaluate the implications of AI in nursing education, including its effects, consequences, suggestions, inferences and impacts, among nursing students and faculty members at a university in Saudi Arabia

Hypothesis

- **H1:** There is a significant association between socio-demographic variables and the implications of Artificial Intelligence in nursing education among nursing students and faculty members at a selected university in Saudi Arabia ($p<0.05$)
- **H2:** There is a significant correlation between socio-demographic variables and the implications of Artificial Intelligence in nursing education among nursing students and faculty members at a university in Saudi Arabia ($p<0.05$)

METHODOS

This study used a quantitative research approach with an exploratory cross-sectional survey design. The researchers employed an exploratory cross-sectional research strategy since it facilitates the rapid collection of data at a single point in time. It enables the researchers to find associations and generate hypotheses for this study. Assessing several variables has advantages as well. This assisted in the in-depth exploration of the implications of Artificial Intelligence (AI) in the context of nursing education in a nursing college at a Saudi university. The researchers explored the effects, consequences, suggestions, inferences and impacts of AI in nursing education. Moreover, in this study, the researchers assessed how AI will help us to provide quality nursing education, where AI can be used and what type of AI can be helpful to improve the academic skills of nursing students.

Population and Sample Size and Characters

This study's population comprised Bachelor of Nursing Science (B N Sc) students and the College of Nursing faculty members.

Sample Size

Factor analysis is a statistical data reduction technique used to simplify complex datasets by grouping highly correlated variables into fewer, underlying, unobserved variables called "factors". It is used to identify hidden patterns, validate construct and refine scales in research.

Key aspects of factor analysis in research is to reduce a large number of variables to a smaller, manageable set of dimensions (data reduction). Exploratory Factor Analysis (EFA): Explores data to discover underlying structures without predefined assumptions.

The researchers used Exploratory Factor Analysis (EFA), according to EFA, N = 50. A sample size of 50 will be reasonable for the exploratory cross-sectional study. However, the benefits of a large sample size for interpreting significant results include a more accurate estimation of the treatment impact, as well as the ability to more easily evaluate the sample's representativeness and generalize the findings.

The targeted sample size for this research was 230, which included samples from first, second, third and fourth-year students and faculty members of the College of Nursing.

Setting of the Study

This study was conducted at the selected Nursing College of Saudi Arabia. Which included male and female sections of Bachelor of Nursing Science (B N Sc) students and their faculty members.

Recruitment Process

After obtaining ethical approval from the Local Committee of Bioethics and University Review Board of Northern Border University, researchers emailed potential participants and explained the study's aim and objectives. They assured them that participating in this study would not affect the students' and faculty members' regular academic activities. Therefore, participating in this study will be voluntary and throughout the study, the researchers maintained the anonymity and confidentiality of the subjects.

Study Sampling

Inclusion Criteria: This study included male and female nursing science students and male and female faculty members from the College of Nursing at the selected university. Participation was open to all students and faculty members willing to take part in this study.

Exclusion Criteria

The study excluded students continuously absent for two weeks and faculty members on higher education leave. Because the researchers done their data collection during three semester plan, with the duration of 2 months.

Study Sample

The study sample consisted of Bachelor Nursing Science students (B N Sc) from all levels and faculty members of College of Nursing.

Sampling Technique

Stratified Random Sampling Technique: The researchers mainly divided the sample in to two strata i.e., students and faculty members. B.Sc Nursing students strata was again divided in to first, second, third and fourth year. Faculty members strata was again divided in to lectures, assistant professors, associate professors and professors of the College of Nursing. The investigators proportionally selected the participants from each stratum. 70 students from the first year, 60 from the second year, 55 from the third year and 55 participants from the fourth year. Also, same method was followed for faculty members. Only 19 faculty members were available during the data collection period. Few of them were on scholarship leave for doing their Ph.D. About 23 faculty members was working during our data collection period, out of that 19 faculty members (83%) were participated in the study. Different cadre of the staffs were participated in the study like Lecturer (9), Assistant Professor (7), Associate Professor (2) and Professor (1). Remaining staffs were on education leave to complete their Ph.D. program.

Data collection process and duration

The researchers collected the data using an online survey. They prepared a structured questionnaire. After assessing the questionnaire's validity and reliability, it was administered through a Google form. A link for the questionnaire was created and shared with the participants through the university email. The participants opened the link and completed their data collection process. Thus, the responses were directly recorded in the Google data sheet. Data were collected during the period of 2 months during the academic year of 2023-2024. Local Committee of Bioethics (HAP-09-A-043) Institutional Review Board (IRB) of Northern Border University given 2 months period for our data collection with the agreement of not affecting regular academic activities of the participants (students and faculty members). It was started from 25/2/2024 to 20/4/2024.

Ethical Consideration

Obtained Local Committee of Bioethics (HAP-09-A-043) and Institutional Review Board (IRB) of Northern Border University's approval. The researchers' contact information was given to all the participants to clarify their concerns before data collection. The participants were assured that participating in the study would not involve any physical harm and that their rights and privacy would be protected by maintaining the confidentiality and anonymity of the subjects. Informed consent was obtained from all the participants prior to collecting the data.

Data Analysis

Research Tool: The data collection was conducted by using a structured questionnaire, which was divided into three sections:

- **Section I**: Socio-demographic data of Bachelor of Nursing Science students and faculty members
- **Section II**: Knowledge and practice related to Artificial Intelligence (AI)
- **Section III**: Implications of artificial intelligence in nursing education, including its effects, consequences, suggestions, inferences and impacts

Validity and Reliability

To ensure the research instrument was appropriate and accurate, experienced nursing researchers carefully reviewed its validity. These experts assessed the instrument for external and internal validity, focusing on whether it effectively captured the concepts it was designed to measure. Reliability was then evaluated using Cronbach's Alpha, which yielded a coefficient of 0.8. Cronbach's alpha for knowledge score was 0.78 and for practice score was 0.8. There were no separate questions for attitude. This result reflects a high degree of internal consistency, meaning the items in the instrument work well together to measure the intended construct. Combining expert evaluation with robust statistical testing confirmed the instrument as a reliable and valid tool for this study.

Content Validity Index (CVI) is 0.89, it shows that the tool is highly relevant. The mean of Content Validity Ratio (CVR) is 0.8, it means all experts were agreed that all the items in the tool is good.

Statistical Methods

The collected data were analyzed by using the Statistical Package for Social Sciences (SPSS), version 23. Both descriptive and inferential statistical methods were employed for the analysis.

- Descriptive Statistics were used to summarize and describe the socio-demographic characteristics and responses related to knowledge, practice and implications of AI
- Inferential Statistics were applied to test the study's hypotheses, including:
  - Chi-Square Tests are used to examine relationships between categorical variables
  - Pearson Correlation Coefficient measures the strength and direction of relationships between continuous variables

RESULTS

Section I: Socio-Demographic Characteristics of the Subjects

As presented in Table 1, most participants (77%) were aged 18-25 years, with a smaller percentage (5.5%) in the 42-49 age group. Most participants (92.3%) were students and Saudi nationals, while 8% were faculty members, predominantly expatriates. Female participants accounted for over 60% of the sample and 75.7% were single. Among the students, 29.3% were in their first year and 23% were in their final year. Regarding faculty members, 3.8% were lecturers and most of them were married.

Section II: Analyze the Implications of Artificial Intelligence (AI)

Knowledge and Practice Related to Artificial Intelligence: Table 2 depicts that more than 70% of the participants have adequate knowledge on Artificial Intelligence (AI) and 6% have inadequate knowledge of AI. Most participants (80%) strongly agreed that AI can make decisions and judge like humans. More than 50% of the participants practiced AI technology in their day-to-day activities. The majority (75.3%) of them have no skill in using AI technology and they are not familiar with high-profile AI tools (80.4%). Most of them have difficulties in using high-profile AI technology (81.7%), Because 3 questions were included in the knowledge part, more questions were related to practical skills, the participants have to use the AI based technologies in their day-to-day activities.

Implications of AI in Nursing Education

Table 3 shows that the majority (77.5%) of the subjects strongly agreed that AI helps transform education by providing students with more personalized and efficient learning experiences. Around sixty percent (58.7%) of the subjects strongly agreed that AI could be used in classrooms, labs and hospitals, so it has implications for nursing education. Regarding the type of AI technology, 34.5% of the subjects used Chat GPT and 18.7% and 14.9% used AI-assisted presentations and AI-assisted assignments, respectively. Regarding high-profile AI, more than fifty percent (56.6%) of them were using advanced web search engines (e.g., Google Search) and 15.3% of them were using recommendation systems (YouTube, Amazon and Netflix).

Concerns and Challenges Associated with AI

Figure 1 shows that more than twenty (22.54%) percent of them state that critical thinking skills, social interaction and communication skills (29.4%) will be reduced due to overexposure to AI. Exploiting personal content (14.5%) and incidents of cyberbullying and excessive online use (13.2%) will be the most significant concerns and consequences of AI in nursing education.

Benefits and Risks of AI

Table 4 demonstrated that more than 25% (26.4%) of the participants reported that AI would help increase students' attention and interest. About 25.1% support the idea that it will help them gain additional knowledge. Risks associated with using AI: More than 25.1% state that sharing

Table 1: Socio-Demographic Characteristics of the Subjects (N = 235)

Variables	Frequency (N)	Percentage (%)
Age		
18-25 Years	181	77.0
26-33 Years	35	14.9
34-41Years	3	1.3
42-49 Years	13	5.5
50-57 Years	2	0.9
More 58 Years	1	0.4
Gender		
Male	95	40
Female	140	60
Category		
Student	216	91.9
Faculty member	19	8.1
Year of Study		
First Year	69	29.3
Second Year	38	16.2
Third Year	55	23.4
Fourth Year	54	23.0
Faculty Member		
Lecturer	9	3.8
Assistant Professor	7	3
Associate Professor	2	0.9
Professor	1	0.4
Marital Status		
Married	53	22.6
Single	178	75.7
Divorced	4	1.7
Residence		
Saudi	217	92.3
Non-Saudi	18	7.7

Table 2: Level of Knowledge and Practice on Artificial Intelligence (AI) Among the Subjects (N = 235)

Variables	Frequency (N)	Percentage
Level of Knowledge on Artificial Intelligence		
A computer is a machine that can be programmed to carry out logical operations		
Strongly Agree	148	63
Agree	71	30.2
Disagree	12	5.1
Strongly Disagree	4	1.7
AI is the intelligence of machines/software		
Strongly Agree	157	66.80
Agree	68	28.9
Disagree	7	3
Strongly Disagree	3	1.3
AI is to be able to make decisions and judge like humans		
Strongly Agree	192	81.7
Agree	28	11.9
Disagree	9	3.8
Strongly Disagree	6	2.6
Practice of Artificial Intelligence		
How often you are using AI technology		
Every day	122	51.9
2-3 times/ week	61	26.0
2-4 times/month	47	20.0
Never	5	2.1
Do you have skills in using AI technology?		
Yes	58	24.7
No	177	75.3
Are you familiar with high-profile AI technology?		
Yes	46	19.6
No	189	80.4
Do you have any difficulties using high-profile AI technology?		
Yes	192	81.7
No	43	18.3

Table 3: Implications of Artificial Intelligence in Nursing Education (N = 235)

Variables	Frequency (N)	Percentage
Implications of Artificial Intelligence		
AI helps to transform education		
Strongly Agree	182	77.5
Agree	29	12.3
Disagree	13	5.5
Strongly Disagree	11	4.7
AI can be used in all areas, such as classrooms, labs and hospitals		
Strongly Agree	138	58.7
Agree	74	31.5
Disagree	17	7.2
Strongly Disagree	6	2.6
Type of AI technologies used in the classrooms/labs		
AI-assisted presentations	44	18.7
AI-assisted assignments	35	14.9
Simulators	27	11.5
Chat GPT	81	34.5
Never	48	20.4
Type of high-profile AI technologies are used in the education process		
Advanced web search engines (e.g., Google Search)	133	56.6
Recommendation systems (YouTube, Amazon and Netflix)	36	15.3
Virtual assistants or for understanding human speech machines (Siri and Alexa)	11	4.7
Generative or creative tools (Chat GPT and AI art)	41	17.4
No	14	6

photos/videos could be tampered with by artificial intelligence. More than twenty percent (21.7%) of the subjects encountered problems with the lack of credibility of the content and not using their critical thinking ability. Participants were suggested to conduct seminars/workshops (34.1%) and online training sessions (31.4%). About 26.8% of the subjects were requested to have hands-on training on using simulators, AI-assisted presentations and chat GPT.

Positive and Negative Impacts of AI

Figure 2 depicts overall positive impact of AI; more than 23.8% of the participants reported that AI would make

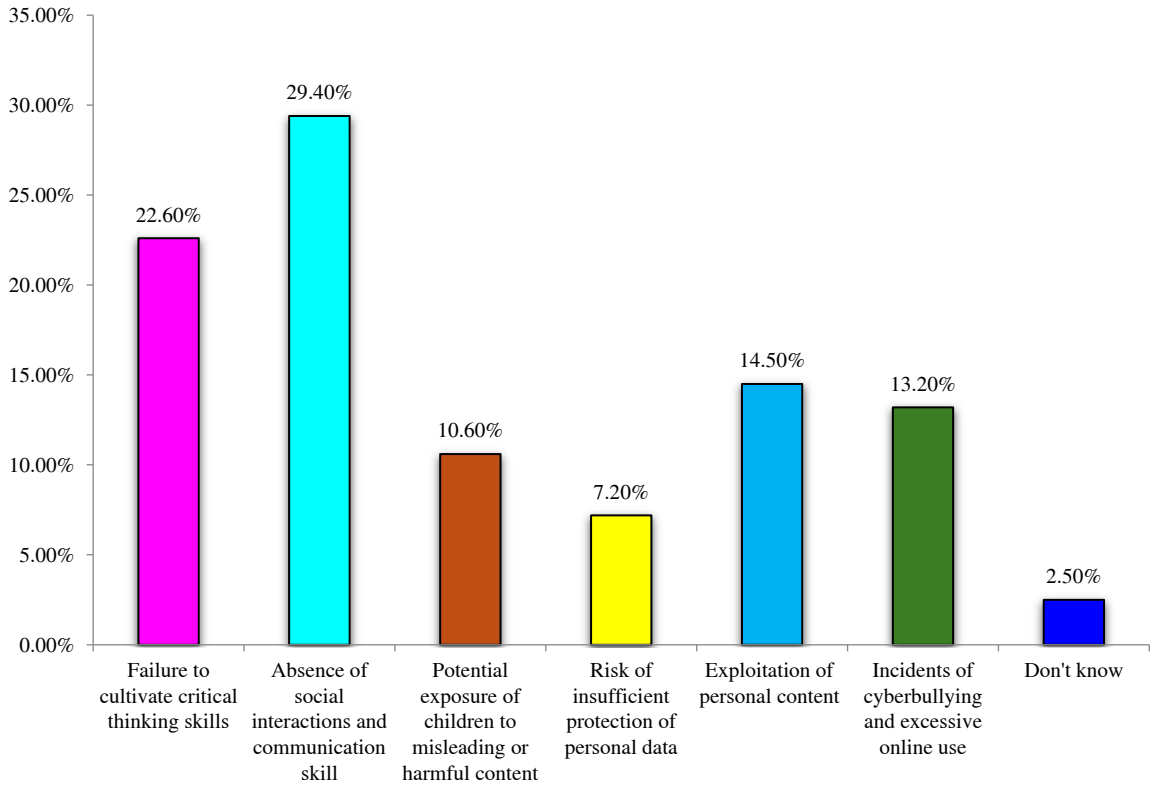

Figure 1: Consequences of Artificial Intelligence

Table 4: Inferences, Risks and Suggestions Related to AI (N = 235)

Variables	Frequency (N)	Percentage
Inferences of Artificial Intelligence (AI)		
Inferences of using AI		
For Increasing attention & interest	62	26.4
To get additional knowledge	59	25.1
To address the queries about the course	37	15.7
Making the study easy	45	19.1
Making entertainment	24	10.3
Other	5	2.1
Do not know	3	1.3
Types of risks associated with the use of AI		
The sharing of photos/videos possibly interfered with artificial intelligence	59	25.1
Encountered the problems of lack of credibility of the content and not using their critical thinking ability	51	21.7
Exposed to biased, incorrect or harmful content	19	8.1
Expose their own or others' personal data	43	18.3
They may develop emotional bonds by believing that this is real social interaction	39	16.6
Others	17	7.2
Do not know	7	3.0
Suggestions for improving AI in Nursing Education		
Organize Online Training sessions on AI	74	31.4
Conduct workshops & seminars	81	34.5
Provide hands-on training on using simulators, presentations, chat GPT	63	26.8
Training on creating YouTube content, blog	17	7.3

learning easier for vulnerable groups of students and 20.8% of them commented that AI provides great potential in educators' training.

Figure 3 depict the overall negative impact of AI; 30% of them reported that the use of AI could become an obstacle to the cultivation of students' critical thinking skills and also may lead to the exaggeration of plagiarism (20.43%). More than 34.3% of them commented that it also undermines the role of educators.

Correlation and Associations

Table 5 depicts that there was an association between the socio-demographic variables and implications (effects, consequences, suggestions, inferences and impacts) of Artificial Intelligence in nursing education among Bachelor Nursing Science students and faculty members of the selected University of Saudi Arabia, $p<0.05$. So, the research hypothesis (H1) was accepted.

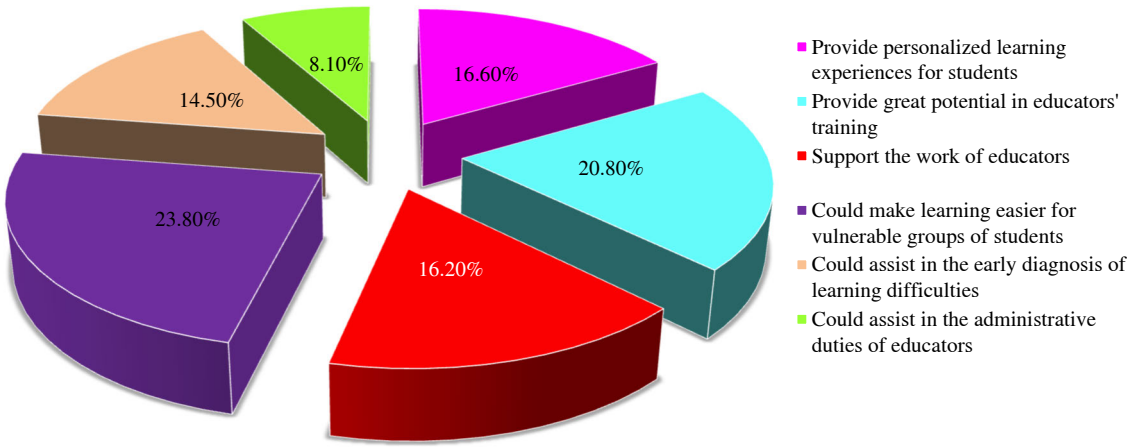

Figure 2: Overall Positive Impact of Artificial Intelligence (AI) in Nursing Education

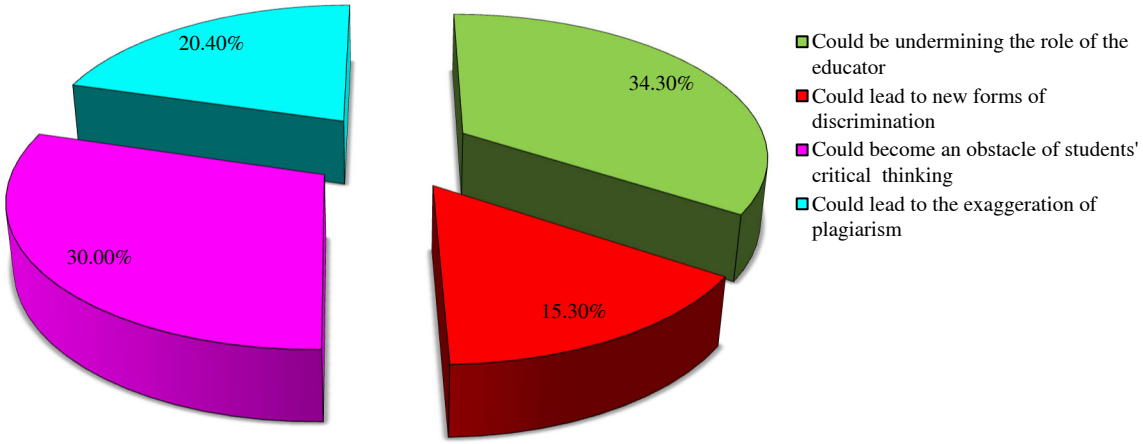

Figure 3: Overall Negative Impact of Artificial Intelligence (AI) in Nursing Education

Table 6 depicts correlation of sociodemographic variables and implications of AI. Positive correlation was seen in between the socio-demographic variables like age, gender, category of participants, marital status and implications of Artificial Intelligence. A negative correlation was seen in knowledge of AI, use of AI, skill in using AI, familiarity and purpose of using AI among Bachelor Nursing Science Students and faculty members of the selected University of Saudi Arabia, $p<0.05$. So, the research hypothesis (H2) was accepted.

DISCUSSION

The findings of this study revealed that majority of the participants (92.3%) were students and Saudi citizens, while only 8% were faculty members. This distribution mirrors the observations made by Sassis *et al.* [12], where 94.4% of respondents were students and a mere 5.6% were faculty members. This pattern may highlight the increasing interest in Artificial Intelligence (AI) among students compared to faculty, suggesting an opportunity to engage educators more actively in discussions and initiatives around AI to bridge the expertise gap.

Interestingly, more than 70% of the participants in the current study demonstrated adequate knowledge of AI and a remarkable 80% strongly agreed that AI has the potential to make decisions and judgments akin to humans. Over half of the participants reported integrating AI technologies into their daily routines. However, concerns persist: 22.54% felt that excessive reliance on AI could hinder critical thinking, while 29.4% were apprehensive about its impact on social interaction and communication skills. These concerns are consistent with the findings of Sassis *et al.* [12], where both students and faculty highlighted the risk of AI contributing to the dehumanization of medical practice. These findings underscore a pressing need to balance leveraging AI's potential and preserving human-centric skills and interactions, particularly in education and healthcare. Nurses' beliefs about the role of AI and trust in AI were found to predict intention to integrate AI significantly. Facilitating conditions influenced beliefs and familiarity with AI, which in turn shaped perceptions of AI's impact. The model explained 65% of the variance in behavioral intention. The findings highlight the importance of enhancing nurses' familiarity with AI and fostering positive beliefs and attitudes to promote effective integration.

Table 5: Association Between the Socio-Demographic Variables and Implications of Artificial Intelligence

Variable	Chi-Square (χ)	Degree of Freedom (df)	Level of Significance (p-value)
Age	336.694	3	0.000**
Gender	8.617	1	0.003**
Category	142.506	1	0.000**
Year of study	42.940	3	0.000**
Semester	620.234	3	0.000**
Faculty member	174.641	2	0.000**
Marital status	165.145	1	0.000**
Residence	335.638	3	0.000**
Knowledge on AI			
Knowledge of Computer is a machine	407.809	3	0.000**
AI is the intelligence of Machine	155.238	1	0.000**
AI is to be able to do the things	347.498	2	0.000**
Practice on AI			
Skill in using AI	200.587	2	0.000**
Familiar with high-profile AI	236.077	2	0.000**
Difficulties in using high- profile AI	232.487	2	0.000**
Use of AI	240.264	2	0.000**
Implications of AI			
Artificial Intelligence (AI) helps to transform education	32.209	1	0.000**
AI can be used in all areas like-Classroom, Lab, Hospitals	50.557	1	0.000**
Types of AI technology	199.923	2	0.000**
Type of AI technology used in classrooms/labs	255.226	2	0.000**
Inferences of AI			
High profile AI technology used in the education process	182.333	2	0.000**
Purpose for using AI	198.774	2	0.000**
Consequences and Risk of AI			
Concerns & consequences of AI	226.732	2	0.000**
Risk associated with AI	127.357	1	0.000**
Suggestions on AI	581.830	4	0.000**
Overall impact of AI			
Positive impact of AI	262.323	2	0.000**
Negative effects of AI	48.719	1	0.000**

Table 6: Correlation Between the Socio-Demographic Variables and Implications of Artificial Intelligence

Variables	Pearson Correlation (r)	Level of Significance (p-value)
Age	0.315**	0.000**
Gender	0.791**	0.000**
Category	0.282**	0.000**
Semester	0.503**	0.000**
Faculty member	-0.457**	0.000**
Marital status	0.844**	0.000**
Residence	-0.154*	0.019*
Knowledge on -A computer is a machine	-0.135*	0.039*
AI is the intelligence of Machine	-0.085	0.195
AI is to be able to do the things	-0.095	0.146
Artificial Intelligence (AI) helps to transform education	-0.018	0.789
AI can be used in all areas like - Classroom, Lab, Hospitals	0.081	0.216
Use of AI technology	-0.139*	0.033*
Skill in using AI technology	-0.026	0.688*
Types of AI technology	0.068	0.300
Familiar with high profile AI technology	-0.189**	0.004**
Type of AI technology used in classrooms/labs	-0.012	0.851
Difficulties in using high-profile AI technology	-0.009	0.893
High profile AI technology used in the education process	0.004	0.952
Purpose for using AI	-0.150*	0.021*
Risk associated with AI	-0.125	0.056
Concerns & consequences	-0.123	0.060
Effects of AI	0.114	0.082
Negative effects of AI	-0.015	0.815
Suggestions on AI	-0.022	0.737

**Correlation is significant at the0.01 level (2-tailed), *Correlation is significant at the 0.05 level (2-tailed)

Educational strategies targeting these beliefs can facilitate AI adoption in nursing. Pare [13].

Current study findings depict that majority (75.3%) of them have no skill in using AI technology and they are not familiar with high-profile AI tools (80.4%). Most of them have difficulties in using high-profile AI technology (81.7%), whereas 24.7% have skills in using AI. This study report was supported by the study report of

Almagharbeh *et al.* [14]; Application of artificial intelligence in nursing practice; This study examines nurses' opinions regarding the use of AI in nursing practice in Jordan, with an emphasis on the advantages and integration-related issues they see. Even though AI is thought to be a useful tool for increasing nursing output, there are still a number of issues that need to be resolved, especially with regard to ethical issues and inadequate training. Healthcare organizations must address these concerns by putting in place thorough training programs and adopting unambiguous ethical norms to guarantee AI enhances nursing without sacrificing the human aspect.

Present study findings depicts the positive and negative impact of AI, it shows that more than 23.8% of the participants reported that AI would make learning easier for vulnerable groups of students and 20.8% of them commented that AI provides great potential in educators' training. Whereas 30% of them reported that the use of AI could become an obstacle to the cultivation of students' critical thinking skills and also may lead to the exaggeration of plagiarism (20.43%). More than 34.3% of them commented that it also undermines the role of educators. 22.54% of them state that critical thinking skills, social interaction and communication skills (29.4%) will be reduced due to overexposure to AI. Exploiting personal content (14.5%) and incidents of cyberbullying and excessive online use (13.2%) will be the most significant concerns and consequences of AI in nursing education. This findings was supported by Bodur *et al.* [15] study report showed that nurses knew the basics of artificial intelligence and what it meant. They admitted that AI technologies have both beneficial and detrimental effects on their work. It may increase productivity, improve patient care and lessen workload. They did, however, also highlight some serious risks, such as worries about dehumanizing the healthcare setting, emotional detachment in caregiving, professional redundancy and de-skilling. Ethical and psychological issues also surfaced, including unclear responsibility, dangers to patient safety and data security, inappropriateness in psychiatric care settings.

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The study also highlighted AI's transformative potential in education. More than 23.8% of participants noted its ability to support learning among vulnerable student groups, while 20.8% acknowledged its role in enhancing educators' training. Nevertheless, a substantial proportion of respondents voiced concerns about AI's unintended consequences. For instance, 30% believed it could hinder the cultivation of critical thinking skills and 20.43% associated AI with an increased risk of plagiarism. Additionally, 34.3% of participants argued that AI might undermine the role of educators. These concerns are supported by Chuyin Xie *et al.*, who found that AI negatively impacts adolescents' social adaptability and familial support structures. Collectively, these insights call for a more intentional and structured integration of AI into education systems, ensuring it enhances rather than replaces the vital roles played by human educators. Adiguzel *et al.* [16] claimed that new tools brought about by artificial intelligence could revolutionize

traditional teaching and learning methods in the classroom. This paper thoroughly analyzes Artificial Intelligence (AI) technologies, their possible uses in education and the challenges they provide. Chatbots and associated algorithms that can mimic human communication and produce text that sounds human using natural language input. Modern chatbots like ChatGPT have many benefits but their application in the classroom presents significant moral and practical issues. In addition to encouraging responsible and ethical use, the authors hope to offer useful information on how AI may be successfully integrated into the classroom to benefit both instructors and students.

Ethical considerations and risks associated with AI also emerged as prominent themes. For instance, 25.1% of participants expressed concerns about the manipulation of photos and videos through AI, aligning with the study by Boillat *et al.* [17], which emphasized the need for targeted AI education and training to mitigate risks and optimize outcomes in healthcare. Participants also identified challenges such as the credibility of AI-generated content (21.7%), overreliance on AI diminishing critical thinking (22.54%) and incidents of cyberbullying (13.2%).

These findings are consistent with integrative review report of Hassanein *et al.* [6] highlights the transformative potential of AI integration in nursing practice, improving both clinical outcomes and operational efficiency. To fully harness these benefits, it is crucial to establish strong ethical frameworks, embed comprehensive AI literacy training within nursing education and promote interdisciplinary collaboration. Future longitudinal research in diverse clinical settings is necessary to confirm these findings and ensure sustainable, equitable AI implementation in nursing. Policymakers and healthcare leaders should focus on investing in AI solutions that enhance nursing expertise while addressing ethical concerns.

Kasula [18] also reported that the ethical ramifications and potential applications of incorporating Artificial Intelligence (AI) into healthcare systems are examined in this research synthesis. The study critically evaluates ethical issues pertaining to privacy, prejudice and decision-making transparency while examining the developing field of AI applications in patient care, diagnosis and treatment. It also explores the possible societal effects of healthcare innovations powered by AI.

On a more positive note, the transformative impact of AI in education was broadly acknowledged. An overwhelming 77.5% of participants strongly agreed that AI enables more personalized and efficient learning experiences. Approximately 58.7% supported using AI in classrooms, laboratories and hospitals, underscoring its implications for nursing education. Regarding specific AI tools, 34.5% of participants reported using ChatGPT, while others relied on AI-assisted presentations (18.7%) and assignments (14.9%). Popular applications also included advanced web search engines (56.6%) and recommendation systems (15.3%). These findings align with Wang [19], who explored AI's potential in Chinese education and Tilak [20], who underscored its role in supporting the sustainable development of educational systems through adaptive learning strategies. Although digital health has significantly transformed healthcare, its integration into nursing education remains limited. This challenge is becoming increasingly urgent with the rise of Artificial Intelligence (AI) in healthcare-a prime example of digitalization-leading to a paradigm shift in nurses' education. Traditionally, nursing education followed a structured process where experimental findings evolved into established standards and were incorporated into curricula [21]. However, this model is becoming less viable in today's fast-changing healthcare landscape. AI technologies are developing rapidly, often entering clinical practice before being widely studied or universally accepted. As a result, nurses must be prepared to work with new techniques that have not yet become part of an established body of knowledge [22].

Nursing education must adopt more flexible and agile teaching methods to navigate this evolving landscape. Nurses need to critically assess emerging technologies and make informed decisions about their application in patient care [23]. Instead of merely reacting to AI-driven changes, nurses should be empowered to take an active role in shaping how these innovations are integrated into healthcare practice.

In summary, while the findings emphasize the positive contributions of AI in enhancing education and professional practices, they also highlight critical concerns about its broader implications for human interaction, ethical integrity and the development of essential skills like critical thinking. These insights advocate for a balanced approach to AI adoption that integrates human-centric methodologies and safeguards alongside AI technologies. Further research and practical interventions will ensure that AI is employed as a complementary tool to enhance, rather than replace, the vital human elements in education and healthcare. New technologies based on automation, artificial intelligence and digitization have drastically changed our lives and society. By fostering innovation and advancement, these technologies contribute to human prosperity and well-being but they also risk undermining democracy, the rule of law and human rights.

Implications of This Study

This study helps us understand the knowledge and practice of AI and its implications in nursing education. Appropriate knowledge and skills on Artificial Intelligence and its implications in nursing education help us determine the types of AI tools we use in nursing education and whether artificial intelligence-based education impacts nursing education. Thus, the students and faculty members must understand the key concepts behind artificial intelligence.

This study provides structured information regarding the use of AI-based technologies by academicians and nurse managers. The application of AI can improve nursing management, nursing quality, safety management and communication, as well as encourage future international collaboration. This study can lighten the lamp on innovative strategies and methods in Artificial intelligence. Education

and training is required to enable a continuous and safe integration of AI into nursing practice. AI has the potential to assist nurses in making clinical decisions in challenging care scenarios and in carrying out patient care. Research and development of AI applications for nursing care have increased but a comprehensive overview of the body of evidence for prospective application scenarios is still missing. In order to support practice, nurses should also interact with the most recent research and promote current understanding of the evidence.

Recommendations

The findings of this study offer significant implications for integrating Artificial Intelligence (AI) into nursing education in Saudi Arabia, with broader relevance to the global context. The following recommendations are proposed:

- **Integration of AI into Undergraduate Nursing Curricula in Saudi Arabia:** Nursing colleges in Saudi Arabia are encouraged to include AI in their undergraduate curricula to align with the Kingdom's Vision 2030 goals for healthcare and education innovation. This integration should focus on practical applications relevant to the Saudi healthcare system, including AI's role in clinical decision-making, patient care and administrative efficiency
- **Localized Hands-On Training for Faculty and Students:** Collaborative training programs should be organized within Saudi institutions to enhance familiarity with AI tools such as clinical simulators and platforms like ChatGPT. Partnerships with the Ministry of Education and Saudi IT departments can help contextualize AI use within the region's cultural and professional frameworks while offering global best practices to enhance relevance
- **Addressing Learning Barriers in the Saudi Context:** AI technologies should be utilized to support students facing language barriers or other challenges unique to the Saudi context. For instance, adaptive learning tools can help Arabic-speaking students better engage with English-based nursing content, making education more accessible and reducing disparities
- **Promoting Critical Thinking and Decision-Making Skills Globally:** AI tools, such as case simulations, should be used worldwide to promote critical thinking and decision-making among nursing students. In Saudi Arabia, these tools can be tailored to reflect scenarios specific to local healthcare settings, enhancing the relevance and application of skills in practice
- **Enhancing Social Interaction and Communication Skills within Saudi Culture:** In Saudi Arabia, where teamwork and interpersonal skills are crucial in healthcare, AI-driven collaborative platforms should be used to support the development of social and communication skills. This could be achieved through AI-enabled virtual environments that mimic real-life healthcare scenarios while fostering interaction in culturally appropriate ways
- **Personalized Learning for Vulnerable Groups:** AI tools should be deployed to provide customized learning experiences for students with diverse needs, including those in remote or underserved regions of Saudi Arabia. This aligns with global trends, where personalized education has effectively bridged gaps in access and equity
- **Cybersecurity and Ethical Guidelines for AI in Saudi Nursing Education:** Saudi nursing institutions should establish robust cybersecurity measures and ethical guidelines tailored to the regional context to address cyberbullying, privacy breaches and excessive online use concerns. Awareness campaigns and faculty training on responsible AI use can ensure these technologies are implemented safely and effectively
- **Global Collaboration on AI in Nursing Education:** Saudi institutions should actively collaborate internationally to exchange knowledge and best practices in AI integration. By participating in global research initiatives, Saudi nursing educators can contribute to and benefit from worldwide advancements, ensuring that AI adoption in the Kingdom aligns with international standards while addressing local priorities

These recommendations are tailored to the Saudi context, reflecting its unique cultural, educational and healthcare landscape while incorporating insights from global trends. By taking a localized yet globally informed approach, nursing education in Saudi Arabia can leverage AI to achieve transformative outcomes supporting national and international goals.

Delimitations of the Study

Artificial intelligence technology is an innovative technology that is used in nursing education. Through this study, the researchers would like to explore the implications of artificial intelligence in nursing education for bachelor nursing science students and faculty members. Through the structured questionnaire, the researchers collected data on the knowledge and practice of AI and its impacts, consequences and inferences in nursing education. The most important part was the research methodology adopted for this study's adequate sample size. Data was analyzed with the help of SPSS package version number 23. An inference of the study was to help integrate AI technologies in nursing education, enhancing the outcome of nursing education and patient care. Because of the research methodology, large sample size, sampling technique, statistical analysis, all these aspects are very strong for this study. So, the findings of this study can be generalize.

CONCLUSIONS

Over the past five to ten years, artificial intelligence has grown more beneficial to the healthcare sector and in the education system and it has had a significant impact on nursing education. AI-assisted teaching simulations and presentations are common. Integrating AI into nursing

practice will directly impact nursing practice, so it will help provide quality nursing care to patients and improve students' academic skills. AI will help increase attention, additional knowledge and interest among students. Researchers recommended that online seminars, workshops and conferences are more effective strategies for providing training courses on artificial intelligence systems and AI to make learning easier for vulnerable groups of students. Artificial intelligence has several uses in the modern world. It is becoming increasingly important in the modern world because it can effectively handle complicated problems in various areas, including healthcare, education, etc. AI is speeding up and improving the comfort of our daily lives.

Limitations

This study was done only at one setting. Most of the participants in this study were bachelor's nursing students but the representation of teaching faculty was less. Because of the shortage of time the researchers were unable to include more nursing faculty members and different settings. So these are the possible limitations faced by the researchers.

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REFERENCES

[1] Judijanto, L. *et al.* "Trends in the Development of Artificial Intelligence-Based Technology in Education." *International Journal of Teaching and Learning*, vol. 2, no. 6, 2024, pp. 1722-1733.

[2] De Gagne, J.C. "The State of Artificial Intelligence in Nursing Education: Past, Present and Future Directions." *International Journal of Environmental Research and Public Health*, vol. 20, no. 6, 2023. https://doi.org/10.3390/ijerph20064884.

[3] Douthit, B.J. *et al.* "American Nurse Journal." *Journal of Nursing Management*, January 2022.

[4] Ding, X. *et al.* "Artificial Intelligence in the COVID-19 Pandemic: Balancing Benefits and Ethical Challenges in China's Response." *Humanities and Social Sciences Communications*, vol. 12, 2025. https://doi.org/10.1057/s41599-025-04564-x.

[5] Ruksakulpiwat, S. *et al.* "Artificial Intelligence in Nursing Research: A Systematic Review of Applications, Benefits and Challenges." *International Nursing Review*, 2025. https://doi.org/10.1111/inr.70080.

[6] Hassanein, S. *et al.* "Artificial Intelligence in Nursing: An Integrative Review of Clinical and Operational Impacts." *Frontiers in Digital Health*, vol. 7, 2025. https://doi.org/10.3389/fdgth.2025.1552372.

[7] Arab, R.A. *et al.* "The Role of AI in Nursing Education and Practice: Umbrella Review." *Journal of Medical Internet Research*, vol. 27, 2025. https://doi.org/10.2196/69881.

[8] Rony, M.K.K. *et al.* "Advancing Nursing Practice with Artificial Intelligence: Enhancing Preparedness for the Future." *Nursing Open*, vol. 11, no. 1, January 2024. https://doi.org/10.1002/nop2.2070.

[9] Ma, J. *et al.* "Artificial Intelligence in Nursing Education." *Nurse Education in Practice*, 2025. https://doi.org/10.1016/j.nepr.2025.104345.

[10] Al-Tkhayneh, K.M. *et al.* "The Advantages and Disadvantages of Using Artificial Intelligence in Education." *Journal of Educational and Social Research*, vol. 13, no. 4, 2023. https://doi.org/10.36941/jesr-2023-0094.

[11] Dieterle, E. *et al.* "The Cyclical Ethical Effects of Using Artificial Intelligence in Education." *AI & Society*, vol. 39, 2024, pp. 633-643. https://doi.org/10.1007/s00146-022-01497-w.

[12] Sassis, L. *et al.* "Exploring Medical Students' and Faculty's Perception on Artificial Intelligence and Robotics: A Questionnaire Survey." *Atlantis Press*, 2021.

[13] Pare, G. *et al.* "Nursing." *JMIR*, vol. 8, 2025. https://doi.org/10.2196/76795.

[14] Almagharbeh, W.T. *et al.* "Application of Artificial Intelligence in Nursing Practice: A Qualitative Study of Jordanian Nurses' Perspectives." *BMC Nursing*, vol. 24, 2025. https://doi.org/10.1186/s12912-024-02658-6.

[15] Bodur, G. *et al.* "Artificial Intelligence in Nursing Practice: A Qualitative Study of Nurses' Perspectives on Opportunities, Challenges and Ethical Implications." *BMC Nursing*, vol. 24, no. 1, October 2025. https://doi.org/10.1186/s12912-025-03775-6.

[16] Adiguzel, T. *et al.* "Contemporary Perspectives on Artificial Intelligence in Education." *Contemporary Educational Technology*, vol. 15, no. 3, 2023. https://doi.org/10.30935/cedtech/13152.

[17] Boillat, T. *et al.* "Readiness to Embrace Artificial Intelligence among Medical Doctors and Students: Questionnaire-Based Study." *JMIR Publications*, vol. 8, no. 2, 2022. https://preprints.jmir.org/preprint/34973.

[18] Kasula, B.Y. "Ethical Implications and Future Prospects of Artificial Intelligence in Healthcare: A Research Synthesis." *International Meridian Journal*, vol. 6, no. 6, 2024, pp. 1-7.

[19] Wang, Y. "Artificial Intelligence-Based Educational Application: A Survey of the Significance for Chinese Education." *International Journal of Smart Technology and Learning*, vol. 1, no. 4, 2020, pp. 295-309. https://doi.org/10.1504/IJSMARTTL.2019.106507.

[20] Tilak, G. "Artificial Intelligence: A Better and Innovative Technology for Enhancement and Sustainable Evolution in Education System." *International Journal of Disaster Recovery and Business Continuity*, vol. 11, no. 1, 2020, pp. 552-560.

[21] Pinto dos Santos, D. *et al.* "Artificial Intelligence in Nursing Education: A Cross-Sectional Needs Assessment Study." *Nursing & Health Informatics Journal*, vol. 45, no. 3, 2022, pp. 312-328.

[22] Chan, T. *et al.* "Integrating AI in Nursing Education: Embracing Ethical Usage and Preparing for the Future." *Journal of Nursing Education*, vol. 62, no. 4, 2023, pp. 210-225.

[23] Amisha, H. *et al.* "Artificial Intelligence in Healthcare and Nursing Education: Opportunities and Challenges." *Advances in Nursing Science*, vol. 47, no. 1, 2024, pp. 87-104.