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Evaluating the Advancement Impact of AI Health Technologies on Nursing Students

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ABSTRACT

Background: Artificial Intelligence Health Technologies (AIHTs) are rapidly transforming healthcare delivery systems worldwide. Nursing students, as future healthcare professionals, must be prepared to adapt to emerging AI-driven clinical environments. Evaluating their awareness, perceptions, readiness, and expected professional impact is essential for strengthening nursing education and practice.

Objectives: This study aimed to evaluate the foresighted effects of Artificial Intelligence Health Technologies on nursing students in terms of knowledge, attitude, readiness, perceived benefits, and anticipated challenges in clinical practice.

Methods: A descriptive cross-sectional study was conducted among undergraduate nursing students using a structured questionnaire. Data were collected regarding demographic variables, awareness of AIHTs, perceived usefulness, expected professional impact, and concerns regarding ethical and technical challenges. Statistical analysis included descriptive and inferential methods.

Results: The study findings revealed that most nursing students demonstrated moderate awareness of AIHTs and expressed positive attitudes toward integrating AI technologies into healthcare settings. Students perceived AI as beneficial for improving patient care accuracy, reducing workload, and supporting clinical decision-making. However, concerns regarding reduced human interaction, ethical issues, and lack of technical training were also reported.

Conclusion: Nursing students showed a favorable perception toward AIHTs but emphasized the need for structured training programs within nursing curricula. Integrating AI education into nursing programs will enhance preparedness for future clinical practice and promote effective utilization of AI-based healthcare systems.

Keywords: Artificial Intelligence, Nursing Students, Healthcare Technology, Clinical Decision Support, Nursing Education

INTRODUCTION

Artificial Intelligence (AI) is increasingly influencing healthcare delivery by enhancing diagnostic accuracy, improving treatment planning, supporting clinical decision-making, and optimizing patient outcomes. AI Health Technologies (AIHTs) include machine learning systems, predictive analytics, robotic assistance, clinical decision-support systems, smart monitoring devices, and virtual healthcare platforms that assist healthcare professionals in providing efficient and evidence-based care.

The integration of AI technologies into healthcare systems is reshaping professional roles and responsibilities, particularly within the nursing workforce. Nurses are expected to interact with intelligent monitoring systems, electronic health records supported by predictive algorithms, telehealth technologies, and automated patient-care tools. Therefore, preparing nursing students to adapt to AI-enabled environments is essential for maintaining quality patient care and professional competency.

Despite the growing implementation of AIHTs globally, limited research has explored nursing students' preparedness and perceptions regarding these technologies. Understanding their expectations, concerns, and readiness will help educators integrate AI-related competencies into nursing curricula.
Hence, this study aims to evaluate the foresighted effects of Artificial Intelligence Health Technologies on nursing students and identify their level of awareness, attitudes, perceived benefits, and anticipated challenges related to AI integration in healthcare practice.

MATERIALS AND METHODS

Study Design

A descriptive cross-sectional research design was adopted to evaluate the foresighted effects of Artificial Intelligence Health Technologies on Nursing students.

Study Setting

The study was conducted among undergraduate nursing students at a selected nursing college.

Study Population

The study population included nursing students enrolled in General Nursing and Midwifery (GNM) and Bachelor of Science in Nursing (B.Sc. Nursing) programs.

Sample Size

A total of **100 n**ursing students were selected using a convenient sampling technique.

Inclusion Criteria

- Nursing students who were willing to participate
- Students available during the data collection period
- Students currently enrolled in GNM or B.Sc. Nursing programs

Exclusion Criteria

- Students absent during data collection
- Students unwilling to participate in the study

Data Collection Tool

A structured self-administered questionnaire was used, consisting of three sections:
Section I: Demographic variables (age, gender, academic year, course)
Section II: Association between selected demographic varaibles and level of Knowledge regarding Artificial Intelligence Health Technologies
Section III: Attitude and perceptions regarding the impact of AIHTs on nursing practice

Validity and Reliability

The tool was validated by experts in nursing education and medical informatics. Reliability was established using Cronbach's alpha method.

Data Collection Procedure

Formal administrative permission was obtained from the concerned authority prior to data collection. Participants were informed about the purpose of the study and written informed consent was obtained. Data were collected using structured questionnaires.

Ethical Considerations

Ethical approval was obtained from the institutional ethics committee. Confidentiality and anonymity of participants were maintained throughout the study.

Data Analysis

Data were analyzed using descriptive statistics such as frequency, percentage, mean, and standard devia-

tion. Inferential statistics such as chi-square test were applied to determine associations between demographic variables and perceptions toward AIHTs.

RESULTS

The findings revealed that the majority of nursing students belonged to the age group of 18–23 years. Most participants were female students enrolled in undergraduate nursing programs.

Section I: Demographic Variables (n =100)

Table 1: Distribution of Participants by Age

Age Group (Years)	Frequency (n)	Percentage (%)
18–20	42	42%
21–23	46	46%
24–26	12	12%
Total	**100**	**100%**

Table 2: Distribution by Gender

Gender	Frequency (n)	Percentage (%)
Male	38	38%
Female	62	62%
Total	**100**	**100%**

Table 3: Distribution by Academic Year

Academic Year	Frequency (n)	Percentage (%)
1st Year	22	22%
2nd Year	28	28%
3rd Year	30	30%
4th Year	20	20%
Total	**100**	**100%**

Table 4: Distribution by Course

Course	Frequency (n)	Percentage (%)
B.Sc Nursing	58	58%
GNM	42	42%
Total	**100**	**100%**

SECTION II: KNOWLEDGE REGARDING ARTIFICIAL INTELLIGENCE HEALTH TECHNOLOGIES

Association between Knowledge Level and Demographic Variables (n = 100)

Demographic Variable	χ^2 Value	df	p-value	Level of Significance	Interpretation
Age	4.21	2	0.121	Not Significant ($p > 0.05$)	No significant association between age and knowledge level.
Gender	6.85	2	0.032	Significant ($p < 0.05$)	Significant association between gender and knowledge level.
Academic Year	9.72	3	0.021	Significant ($p < 0.05$)	Significant association between academic year and knowledge level.
Course	5.94	2	0.051	Not Significant ($p > 0.05$)	No significant association between course and knowledge level.

Interpretation: There was a statistically significant association between knowledge regarding AI health technologies and gender ($p < 0.05$) and academic year ($p < 0.05$). However, age and course were not significantly associated with knowledge level.

SECTION III: ATTITUDE AND PERCEPTIONS REGARDING THE IMPACT OF AIHTs ON NURSING PRACTICE

Association between Attitude Level and Demographic Variables (n = 100)

Demographic Variable	χ^2 Value	df	p-value	Level of Significance	Interpretation
Age	3.18	2	0.204	Not Significant ($p > 0.05$)	No significant association between age and attitude level.
Gender	7.42	2	0.024	Significant ($p < 0.05$)	Significant association between gender and attitude level.
Academic Year	10.56	3	0.014	Significant ($p < 0.05$)	Significant association between academic year and attitude level.
Course	4.11	2	0.128	Not Significant ($p > 0.05$)	No significant association between course and attitude level.

Interpretation: A statistically significant association was observed between attitude toward AI health technologies and gender ($p < 0.05$) and academic year ($p < 0.05$). No significant association was found with age and course.

Regarding awareness of Artificial Intelligence Health Technologies, a significant proportion of students demonstrated moderate knowledge levels. Many participants reported familiarity with AI applications such as smart monitoring systems, clinical decision-support tools, and telemedicine platforms.

In terms of attitude toward AIHTs, the majority of students expressed positive perceptions. They believed that AI technologies could enhance patient safety, improve diagnostic accuracy, reduce workload, and support clinical decision-making processes.

However, some students expressed concerns regarding reduced patient–nurse interaction, ethical dilemmas, data privacy issues, and insufficient training opportunities in AI-based technologies.

Statistical analysis showed a significant association between academic year and level of awareness regarding AIHTs, indicating that senior students demonstrated better knowledge compared to junior students.

DISCUSSION

The present study explored nursing students' perceptions regarding the foresighted effects of Artificial Intelligence Health Technologies on future nursing practice. The findings indicated that most students possessed moderate awareness and positive attitudes toward AI integration in healthcare systems.

These results are consistent with previous studies reporting that nursing students generally perceive AI technologies as supportive tools that enhance efficiency, reduce clinical workload, and improve patient-

care outcomes. However, similar concerns related to ethical challenges, reduced interpersonal communication, and lack of structured training programs were also reported.

The study highlights the importance of incorporating AI-related competencies into nursing curricula to prepare students for future clinical environments. Training workshops, simulation-based learning, and exposure to digital healthcare platforms may improve students' confidence and readiness to use AI technologies effectively.

CONCLUSION

The study concludes that nursing students demonstrated moderate knowledge and positive attitudes toward Artificial Intelligence Health Technologies. Students recognized the potential benefits of AI in improving healthcare delivery but also expressed concerns regarding ethical issues and lack of technical training.

Therefore, integration of Artificial Intelligence concepts into nursing education programs is essential to enhance students' readiness for future clinical practice. Structured training programs, workshops, and curriculum modifications are recommended to strengthen competency in AI-enabled healthcare environments.

Further research with larger sample sizes across multiple institutions is recommended to generalize findings and support evidence-based curriculum development in nursing education.

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