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Research Article

AI-Enabled Wearable Devices Used in Clinical Nursing Practice Among Nursing Students

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A B S T R A C T

Introduction: Recent developments in technology have made AI more accessible and powerful, increasing the importance of health care in clinical nursing practice. Its application in healthcare and the required precautions have been the subject of intense discussion. Wearable technologies enable the continuous monitoring of human physical activities and behaviors, as well as physiological and biochemical parameters during daily life.

Objectives: The study aimed to assess the level of knowledge regarding AI-enabled wearable devices in clinical nursing practice among nursing students and to develop and disseminate an informational pamphlet regarding AI-enabled wearable devices in clinical nursing practice among nursing students at a selected college of nursing, New Delhi.

Methodology: The quantitative research approach was adopted for the study with a descriptive research design and purposive sampling technique. The sample of the present study comprised 133 nursing students from Rufaida College of Nursing, SNER, Jamia Hamdard. The data was collected through a structured knowledge questionnaire. Descriptive statistics were used to analyze the data.

Results: The study findings revealed that more than half of the nursing students, 68 (51%), had inadequate knowledge, and 65 (49%) had adequate knowledge regarding AI-enabled wearable devices used in clinical nursing practice.

Conclusion: The study concluded that increasing integration of AI-driven wearable technologies in healthcare is essential to provide structured training programs for nurses to enhance AI literacy and confidence in wearable device usage.

Keywords: AI-enabled wearable

Introduction

Artificial intelligence (AI) has revolutionized healthcare by bringing in cutting-edge solutions that enhance patient care, facilitate clinical decision-making, and simplify operational procedures. The application of AI in nursing, a profession based on comprehensive, patient-centered care, offers intriguing prospects and difficult problems. By allowing practitioners to concentrate more on patient care and less on administrative duties, emerging technologies like automated documentation systems, AI-assisted diagnostics,

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and predictive analytics have the potential to improve nursing practice.[1]

Recent developments in technology have made AI more accessible and powerful, increasing the importance of health care in clinical nursing practice. Its application in healthcare and the required precautions have been the subject of intense discussion. AI facilitates effective, individualized, and evidence-based nursing care. By improving job management, tailoring care delivery, and streamlining clinical decision-making, integrating generative AI into nursing processes has enormous potential to transform nursing care.[2]

Wearable technologies enable the continuous monitoring of human physical activities and behaviors, as well as physiological and biochemical parameters during daily life. The most commonly measured data include vital signs such as heart rate, blood pressure, and body temperature, as well as blood oxygen saturation, posture, and physical activities through the use of electrocardiograms (ECGs), ballistocardiograms (BCGs), and other devices.[3]

Wearable devices can be attached to shoes, eyeglasses, earrings, clothing, gloves, and watches. Wearable devices also may evolve to be skin-attachable devices. Sensors can be embedded into the environment, such as chairs, car seats, and mattresses. Wearable technology applications are designed for the prevention of diseases and maintenance of health, such as weight control and physical activity monitoring. Wearable devices are also used for patient management and disease management.[3]

Artificial intelligence technology has recently seen rapid advancement, with an expanding role and scope in nursing education and healthcare. According to Tang et al., AI can be used in education for analysis, prediction, guiding, assessment, and adaptive learning.[4]

Continuous monitoring of vital signs using wireless wearable sensors in nursing wards is a promising solution and may lead to earlier detection of deterioration in patients, early intervention, reduction in length of stay, and fewer ICU days. It may also contribute to patient safety, improve patient mobility, and reduce workload for nurses.[5]

In clinical nursing practice, AI wearable devices can assist nurses in continuously monitoring patients, reducing the workload of manual recording, and enhancing the accuracy of patient assessment. Nurses can receive real-time alerts about patient conditions, enabling timely interventions. For example, wearable devices can detect early signs of cardiac arrest, respiratory distress, or postoperative complications, allowing nurses to act immediately. However, the effective use of such technologies requires adequate knowledge and understanding among nurses.[6] Student nurses, as future healthcare professionals, must be equipped with the skills and confidence to use AI tools in patient care. Despite the growing use of AI wearables globally, there is limited awareness and training about these devices in nursing education in India. In India, the National Digital Health Mission (NDHM) and Ayushman Bharat Digital Mission (ABDM) are encouraging the adoption of AI and digital tools in healthcare settings. To align with these national initiatives, it becomes crucial that nursing students are prepared to handle technology-driven healthcare environments. Understanding their current level of knowledge regarding AI wearable devices is therefore essential for educators to design appropriate training programs, workshops, and curriculum updates.

Objectives

- To assess the level of knowledge regarding AI enabled wearable devices used in clinical nursing practice among student nurses at a selected college of nursing, New Delhi.
- To develop & disseminate information pamphlets regarding AI enabled wearable devices used in clinical nursing practice among student nurses at a selected college of nursing, New Delhi.

Methodology

The study used a quantitative approach and descriptive survey design. The setting of the study was Rufaida College of Nursing, Jamia Hamdard. The present study sample included 133 nursing students studying in B.Sc. (Hons.) 2nd year, DGNM 2nd year, Post Basic B.Sc. Nursing 1st year and 2nd year students selected through the purposive sampling technique. Administrative approval was obtained from the authority of the School of Nursing Education and Research, Rufaida College of Nursing, Jamia Hamdard, to conduct the study. A written informed consent was taken from each participant. They were assured anonymity and confidentiality of the information provided by them during the study. The data collection tool used in this survey was organised into two sections. Section A included the demographic profile of nursing students. Section B includes the Structured Knowledge questionnaire to assess the level of knowledge regarding AI-enabled wearable devices used in clinical nursing practice among student nurses. The structured knowledge questionnaire was developed by the researcher, and it consists of 20 questions, and 1 score is provided for each corrected response. The instrument demonstrated good internal consistency with Cronbach's alpha formula**.** The reliability was found to be 0.74; the tool was found to be reliable for the study. The data were analysed using descriptive statistics.

Result of the study

The data presented in Table -1 shows the frequency and percentage distribution of the demographic profile of the

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nursing students by their age, gender, course of study, religion, and whether they have handled any AI-enabled wearable devices.

The findings related to the sample characteristics revealed that, with regard to age, nearly half of the nursing students, 63 (47.4%), were in the age group of 21–23 years, followed by 45 (33.8%) students in the age group of 17–20 years. About 19 (14.3%) students belonged to the age group of 24–26 years, while only 6 (4.5%) students were aged above 26 years. In terms of gender, the majority of the nursing students were female, 100 (75.2%), whereas 33 (24.8%) were male. Regarding the course of study, the largest proportion of students, 51 (38.3%), were enrolled in DGNM 2nd year, followed by 36 (27.1%) students pursuing B.Sc. (Hons.) Nursing 2nd year. Further, 24 (18.1%) students were enrolled in Post Basic B.Sc. Nursing 2nd year, while 22 (16.5%) were studying in Post Basic B.Sc. Nursing 1st year. With regard to religion, more than half of the Participants, 70 (52.6%), were Muslim, followed by 42 (31.6%) who belonged to Hinduism and 18 (13.5%) who were Christian; only 3 (2.3%) students belonged to other religions. Regarding previous experience with AI-enabled wearable devices, more than half of the nursing students, 77 (57.9%), reported having handled or used AI-enabled wearable devices, whereas 56 (42.1%) had no prior experience handling such devices. Overall, the sample comprised predominantly young female nursing students, with the largest proportion enrolled in DGNM 2nd year, and more than half reporting previous exposure to AI-enabled wearable devices.

The data presented in Table-2 shows that the possible range of scores of knowledge regarding AI-enabled wearable devices used in clinical nursing practice was 10-20; the range of obtained scores was 2-18 with a mean of 10.6, a median of 10, and a standard deviation of 3.4.

The data presented in Table-3 and Figure-1 shows the frequency and percentage distribution of nursing students by their level of knowledge regarding AI-enabled wearable devices used in clinical nursing practice**.** The data shows that the majority of nursing students, i.e., more than half of the nursing students (68, 51%), had inadequate knowledge, and 65 (49%) had adequate knowledge regarding AI-enabled wearable devices used in clinical nursing practice**.**

Table 1.Frequency and percentage distribution of nursing students by their demographic profile

n=133

S.NO	SAMPLE CHARACTERISTICS	FREQUENCY (f)	PERCENTAGE (%)
Age (in years)			
1.	a)17-20	45	33.8
	b)21-23	63	47.4
	c)24-26	19	14.3
	d)Above 26	6	4.5
Gender			
2.	a) Male	33	24.8
	b) Female	100	75.2
	c) Other	0	0
Course of study			
3.	a) DGNM IInd Year	51	38.3
	b) B.Sc. IInd Year	36	27.1
	c) Post basic B.Sc. Ist Year	22	16.5
	d) Post basic B.Sc. II nd Year	24	18
Religion			
4.	a) Islam	70	52.6
	b) Hinduism	42	31.6
	c) Christianity	18	13.5
	d) Other	3	2.3
Have you handle any AI wearable devices?			
5.	a)Yes	77	57.9
	B) No	56	42.1

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Table 2.Findings related to Possible range of score, Range of the obtained score, Mean, Median, and Standard Deviation of nursing students by their level of knowledge regarding AI enabled wearable devices used in clinical nursing practice

n=133

Possible range of score	Range of obtained score	Mean	Median	Standard deviation
10-20	2-18	10.6	10	3.4

Table 3.Frequency and percentage distribution of nursing students by their level of knowledge regarding AI enabled wearable devices used in clinical nursing practice

n=133

Range of score of knowledge	Level of Knowledge	Frequency (f)	Percentage (%)
0-10	Inadequate	68	51
11-20	Adequate	65	49

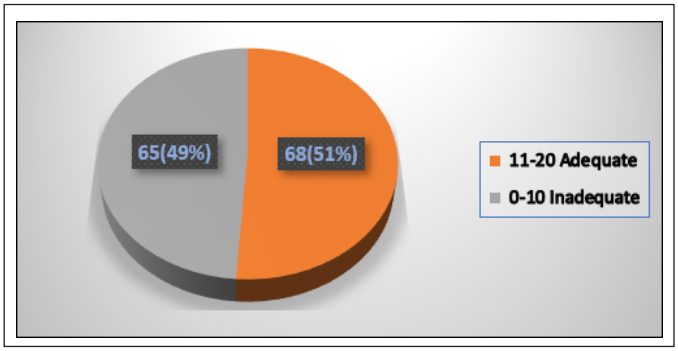


Figure 1.Pie chart depicting the frequency and percentage distribution of nursing students by their level of Knowledge regarding AI enabled wearable devices

Discussion

Artificial intelligence (AI) has revolutionized healthcare by bringing in cutting-edge solutions that enhance patient care, facilitate clinical decision-making, and simplify operational procedures. The application of AI in nursing, a profession based on comprehensive, patient-centered care, offers intriguing prospects and difficult problems. By allowing practitioners to concentrate more on patient care and less on administrative duties, emerging technologies like automated documentation systems, AI-assisted diagnostics, and predictive analytics have the potential to improve nursing practice.The present study revealed that more than half of the nursing students, 68 (51%), had inadequate knowledge, and 65 (49%) had adequate knowledge regarding AI-enabled wearable devices used in clinical nursing practice**.** With regard to some experience in handling AI wearable devices, 77 (57.9%) nursing students had some experience, and 56 (42.1%) nursing students had no experience.The current study's findings are consistent with M. Naureen, who conducted a descriptive cross-sectional study with the purpose of assessing the awareness of undergraduate student nurses regarding the role of AI devices in healthcare. A sample of 162 student nurses was selected. Data were collected using a pre-validated questionnaire comprising multiple-choice and Likert scale questions. The results revealed that 59.9% of students had heard of AI in healthcare, while only 43.8% had the requisite technical skills to understand AI literature. Additionally, 38.3% had never encountered AI applications in their profession.[6]The current study's findings are consistent with M. Mona Abd EL Maksoud's (2024) cross-sectional study, which explored the knowledge and attitude of nursing students regarding the integration of artificial intelligence in healthcare. A convenience sample of 220 nursing students was selected from the Nursing College at King Khalid University. The questionnaire link was emailed to nursing students. The study results stated that 68.2% of the nursing students had adequate knowledge about AI, 67.3% of students had a "positive" attitude towards AI, more than 38.6% of students said their source of knowledge about artificial intelligence was self-taught, while 36.6% had no knowledge about AI, and 40.8% of students described their knowledge about artificial intelligence as basic understanding. Thus, it is essential for integrating AI in the nursing curriculum to develop a good understanding of AI to enlighten its uses in their daily practice.[7]Given the increasing integration of AI-driven wearable technologies in healthcare, it is essential to provide structured training programs for nurses to enhance AI literacy and confidence in wearable device usage. Healthcare institutions should

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implement clear guidelines on the integration of wearable data into patient care, ensuring that AI-generated insights are used effectively while maintaining human oversight in clinical decision-making.Future research should explore strategies to address nurses' concerns regarding data privacy, AI reliability, and patient-provider communication. Investigating how wearable technology adoption varies across different healthcare settings and specializations would provide further insights into the barriers and facilitators of AI integration. Additionally, research on the long-term impact of AI-enabled wearables on patient health outcomes and healthcare efficiency would offer valuable evidence to inform policy and implementation strategies.

Nursing Implications

The findings of the present study have important implications for clinical nursing practice, nursing education, and nursing administration. In clinical practice, nurses should be encouraged and supported to utilize AI-enabled wearable devices for continuous patient monitoring, early identification of clinical deterioration and complications, and enhancement of timely and evidence-based clinical decision-making. In nursing education, curriculum revisions are recommended to incorporate concepts related to artificial intelligence, digital health technologies, AI-enabled wearable devices, their clinical applications, ethical considerations, data privacy, and appropriate interpretation of technology-generated information into undergraduate and postgraduate nursing programs. Nursing educational institutions should further strengthen training, guidance, simulation-based learning, and hands-on practice opportunities to enhance students' knowledge, skills, confidence, and readiness to adopt AI-enabled wearable technologies in clinical settings. From an administrative perspective, nursing administrators should facilitate the availability of appropriate technological resources, organize regular in-service education and skill-development programs, and establish clear guidelines for the safe, ethical, and effective use of AI-enabled wearable devices.

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