

ASSESSING FACULTY PERCEPTION OF POTENTIAL BENEFITS, LIMITATIONS, AND CONCERNS REGARDING ADOPTION OF AI CHATBOTS IN NURSING EDUCATION

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Abstract

Objectives: Artificial Intelligence (AI) chatbots have the capacity to transform nursing educational practice through increasing accessibility, personalizing learning, and reducing workload. However, understanding faculty perceptions is critical for successful adoption. The focus of this study is to assess the perceptions of nursing faculty in Sindh, Pakistan, regarding the benefits, limitations, and usage patterns of AI chatbots in nursing education.

Methods: A descriptive cross-sectional survey was implemented among 85 nursing faculty members, recruited through Purposive sampling. Data were gathered via a structured online questionnaire, and data were analyzed using descriptive statistics (mean, standard deviation, frequency, and percentage).

Results: The faculty demonstrated a generally favorable perception of AI chatbot integration, particularly recognizing its educational benefits, such as enhanced learning support and teaching efficiency (Mean = 46.36). Nevertheless, concerns regarding personalization, adaptability, and misinformation persisted. ChatGPT was the most familiar (40.6%) and frequently used chatbot (69.0%), mainly for self-academic purposes rather than for teaching.

Conclusion: While faculty are receptive to AI chatbot adoption, their concerns should be considered to promote both effective and ethical implementation. Institutional efforts should focus on training, support, and policy development to foster accountable AI integration in nursing education.

INTRODUCTION

In 1956, the term “Artificial Intelligence” was coined by Marvin Minsky and John McCarthy

(1). UNESCO defines Artificial Intelligence (AI) as a set of technological platforms that can

process information, such as reasoning, learning, perception, prediction, and planning or control, in ways that resemble intelligent behavior (2). The textbook on AI (Artificial Intelligence, A modern approach) define AI with reference of 4 historically point of view: (1) Programs that stimulate human like thinking (eg, learning, making choices and resolving issues) (2) Systems that act like human (eg, recognizing images) (3) System that think rationally (eg, perceive, reason and act) (4) Systems that act rationally (eg, intelligence behaviour) (3). AI skills are demographic and culturally dependent, enabling individuals to solve problems, make decisions, and perform specific tasks that demonstrate intelligence by initiating cognitive behavior (4). Since the 1950s, AI has evolved into an academic discipline and is now integrated across sectors such as education, e-commerce, robotics, navigation, healthcare, agriculture, military, marketing, and gaming (5). In healthcare systems, the application of AI technologies is increasing rapidly for disease diagnosis, clinical decision-making, and enhancing healthcare providers' skills to address new challenges (6-8). Reduce the healthcare services costs and improve efficiency through AI tools (9). It is expected that, by the year 2025, AI could save \$150 billion in healthcare costs (10). Over the past four decades, AI has been used in Nursing, but it was first recorded in 1985 when nurses used an expert system to support clinical decisions (von Gerich et al., 2022). AI applications, such as natural language processing models, improve educational outcomes, and the core of AI, algorithms, are increasingly integrated into medical programs (11,12). Incorporating AI in nursing will speed up decision-making, create innovation that saves time, and improve patient outcomes and satisfaction with nursing care (13). However, beyond the clinical setting, AI is also used in the teaching process to enhance the students' learning in healthcare education. AI in nursing education offers significant benefits and is efficient for educators and students (4). In Nursing education, faculty should introduce students to the uses and ethical considerations of AI-driven chatbots to enhance their learning (14).

AI Chatbots are complex algorithms that utilize natural language and respond through users' conversations, such as voice and text, and provide immediate and personalized responses to users (15). Therefore, AI-driven chatbots offer numerous benefits in education, including effective grading and feedback, reduced educator workload, and rapid responses to students, thereby accelerating learning and improving knowledge retention (16). For teachers, AI-driven Chatbots provide personalized learning, expand learning resources, reduce workload, and support lesson planning (17). In addition to the numerous advantages of AI and Chatbot integration in nursing curriculum-based learning, there are certain limitations to consider. AI chatbots replace human interaction, empathy, and interpersonal skills among nursing students, and raise ethical issues such as privacy, confidentiality, accountability, transparency, and security (16,18). The previous research (19) examines faculty perceptions of AI integration in nursing education in Jordan and the United States. Another study from Pakistan (20), conducted at Agha Khan University of Karachi, provides insight into AI technology from the perspectives of students and clinical healthcare professionals. There is a lack of clarity among nursing faculty in Sindh, Pakistan, regarding the potential benefits, limitations, and concerns associated with the adoption of AI chatbots in nursing education; however, no significant data have been reported from Pakistan. Hence, the recent research study highlights the benefits, limitations, and usage patterns, which provide information about the faculty's perspective on the adoption of AI chatbots in nursing education.

Rationale of the Study

The adoption of AI technologies, specifically AI Chatbots, in nursing education transforms the traditional instruction and learning pattern. AI applications facilitate opportunities to enhance students' engagement with curriculum activities, support self-directed learning, and provide immediate feedback. The adoption of AI chatbots in nursing education, however, also raises questions about how educators perceive

them. Faculty members play a significant role in the success and continuity of technological advancement in an academic setting. Their perceptions, attitudes, and readiness related to the integration of AI directly influence the implementation outcome and students' experience. To understand the faculty's perspective, provide evidence-based strategies for AI integration that ensure these technologies align with educational goals and professional values in nursing, ultimately contributing to informed policy-making, curriculum development, and professional development efforts.

Methodology

This was a descriptive cross-sectional study conducted on nursing faculty members at various public and private nursing institutions of Sindh, Pakistan.

Sample Size

The Raosoft® online sample size determinant tool was used to calculate the sample size for this study, based on a 95% confidence level, a 5% margin of error, and an estimated population size of 170 nursing faculty members. The calculation indicated a minimum required sample size of 120 participants to ensure sufficient statistical power and representativeness. A total of 142 faculty members were initially approached using purposive sampling. Of these, 22 did not respond or declined to be screened for eligibility, leaving

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120 faculty members assessed for inclusion. Following the implementation of the inclusion and exclusion criteria, 85 participants met the eligibility requirements and consented to participate in the study. This represented 70.8% of those assessed for eligibility. The attrition from 120 to 85 was primarily due to non-eligibility under the specified criteria, particularly a lack of AI chatbot usage, and not being currently engaged in teaching activities (Figure 1).

Inclusion Criteria:

- Teaching in any government or private Nursing College/University
- Teaching faculty holds a BSN /MSN/PHD degree
- Faculty have one year of teaching experience in the nursing curriculum
- Those who are using AI chatbots
- Include both governmental and nongovernmental institutions

Exclusion Criteria:

- Non-faculty members (E.g. Administrator)
- Faculty who are currently not teaching in any governmental or nongovernmental institution
- Faculty who are unfamiliar with the usage of AI
- Faculty members who are not willing to participate in the survey

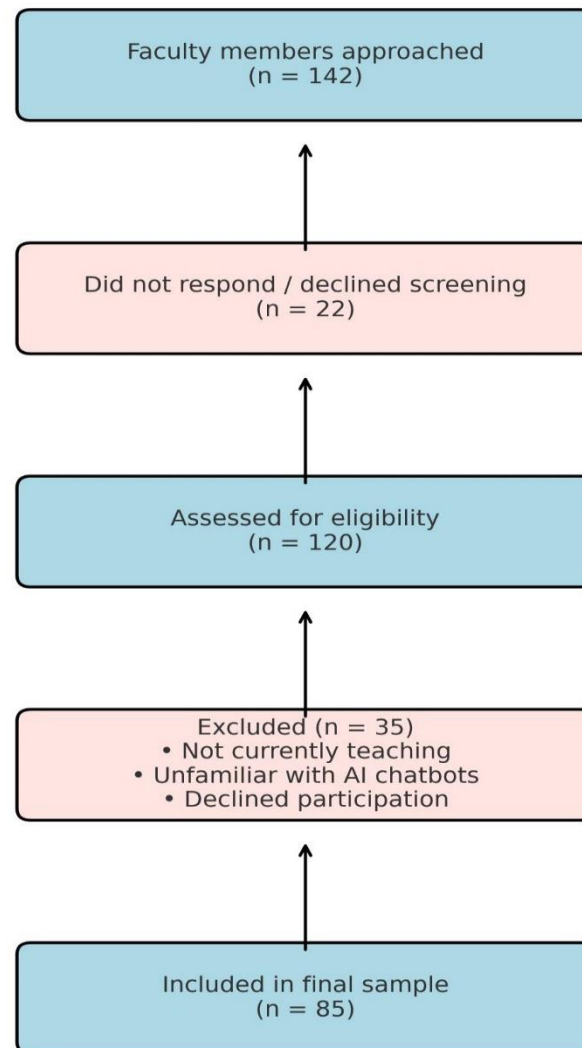


Figure 1. PRISMA flow diagram showing \the recruitment and selection of study participants

Data Collection Instrument, Procedure, and Analysis

The tool used in this study was based on a literature questionnaire from a published research article (19), and permission was obtained from the corresponding author to use the tool for data collection. The tool “Perception of using AI Chatbot” is a Likert scale that comprises two segments. The first segment comprises 6 items to assess familiarity with AI chatbots, patterns used for teaching and learning, and attitudes towards students' awareness of the introduction of AI technology. The second

section comprises 34 items, divided into 12 items that focus on benefits and 22 that explore limitations. The responses of participants were rated on a 5-point Likert-type scale from 1 (Strongly Disagree) to 5 (Strongly Agree). The demographic segment contains the age and gender of participants. The academic information comprises professional characteristics, which include education level, academic position, duration of teaching experience, and current institutional affiliation. The data recording procedure was structured to maintain validity, consistency, and adherence to ethical standards.

An internet-based survey questionnaire was developed through Google Forms and shared with nursing faculty at public and private institutions from May 26, 2025, to July 30, 2025. The email addresses of the nursing faculty were obtained from the university/college principal. The survey link was distributed through the email addresses of nursing faculty to ensure the form could only be filled out by faculty members. In the online survey form, the email address was included to ensure the data was gathered from the nursing faculty members. To analyze the data, SPSS version 27 was employed. The continuous variables were presented in frequency, percentage, mean, range, standard deviation, and variance. Informed consent was secured from the participants to inform them of the benefits and risks associated with the study and to obtain their permission to participate in this research. Confidentiality of participants was maintained during data collection. No identifiable information (name, ID, or personal details) was obtained from participants to ensure identity remained anonymous, and the responses of participants were strictly used for research objectives. In accordance with ethical standards, participants were assured that they reserve the right to withdraw from the study at any stage of

the research without penalty.

Results

In the initial phase of the study, 120 faculty members participated; however, only 85 were included based on selection criteria, while 35 were excluded. The demographic characteristics of respondents are represented in Table 1. The distribution of age shows that the majority (51.8%) were between 25-34 years, followed by 37.6% in the 35-44 age range, and 10.6% were between 45-55 years. Out of 85 study participants, 52 were and 33 were female respondents. In terms of discipline, 39 respondents were from the Bachelor of Nursing program, 44 were from the Master's in Nursing program, and only 2 were from the PhD program. The faculty members, approximately 69% from public institutions and 30% from private institutions, participated in this study. The academic position of participants indicates that 52.9% were nursing/clinical instructors, 29.4% were lecturers, 9.4% were assistant professors, 7.2% were visiting faculty, and 1.2% were professors. The teaching experience of participants shows 60% have 1-5 years, 24.7% have 6-10 years, 11.8% have 11-15 years, and 3.5% have experience of 16-20 years.

Table 1: Demographic Variables of Participant

Age Distribution		
	Frequency	Percentage
25-34	44	51.8
35-44	32	37.6
45-55	9	10.6
Total	85	100
Gender of Participants		
	Frequency	Percentage
Female	33	38.8
Male	52	61.2
Total	85	100
Level of Education		
	Frequency	Percentage
Bachelor	39	45.9
Masters	44	51.8
PhD	2	2.4
Total	85	100

College/University Affiliation of Participants		
	Frequency	Percentage
Public Sector	59	69.4
Private Sector	26	30.6
Total	85	100
Academic Position of Participants		
	Frequency	Percentage
Nursing/Clinical Instructor	45	52.9
Lecturer	25	29.4
Assistant Professor	8	9.4
Professor	1	1.2
Visiting Faculty	6	7.1
Total	85	100
Year of Teaching Experience		
	Frequency	Percentage
1-5	51	60
6-10	21	24.7
11-15	10	11.8
16-20	3	3.5
Total	85	100



Perceived Benefits and Limitations of AI Chatbots in Nursing Education

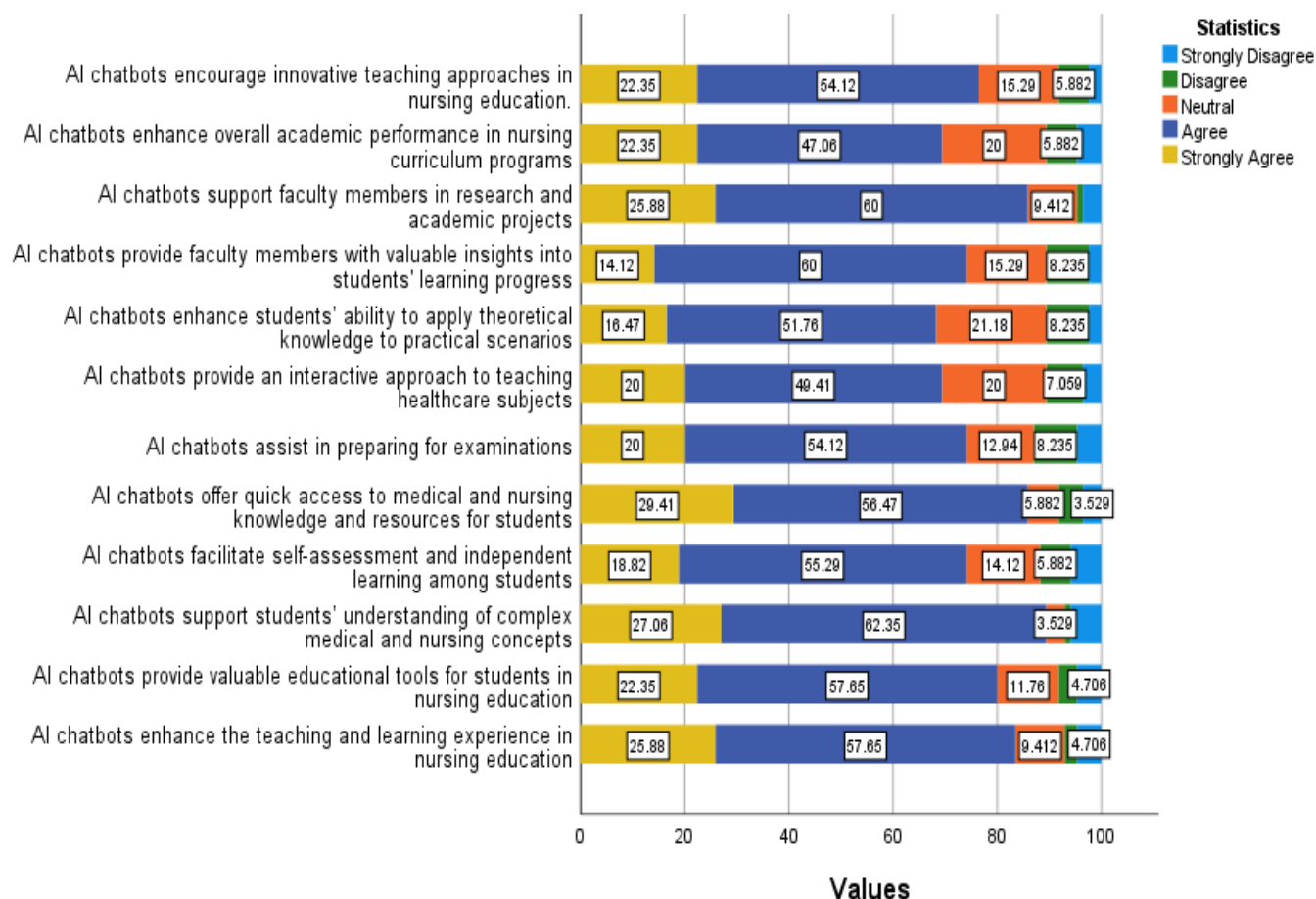


Figure 1: Perceived Benefits of AI Chatbots in Nursing Education

In Figure 1 findings show that nursing faculty most perceived the adoption of AI Chatbots as a strong positive for educational purposes, particularly for access to resources, supporting

student learning, and enriching teaching practices. Most benefit statements show an agreement of about 70 to 85% (Agree and Strongly Agree).

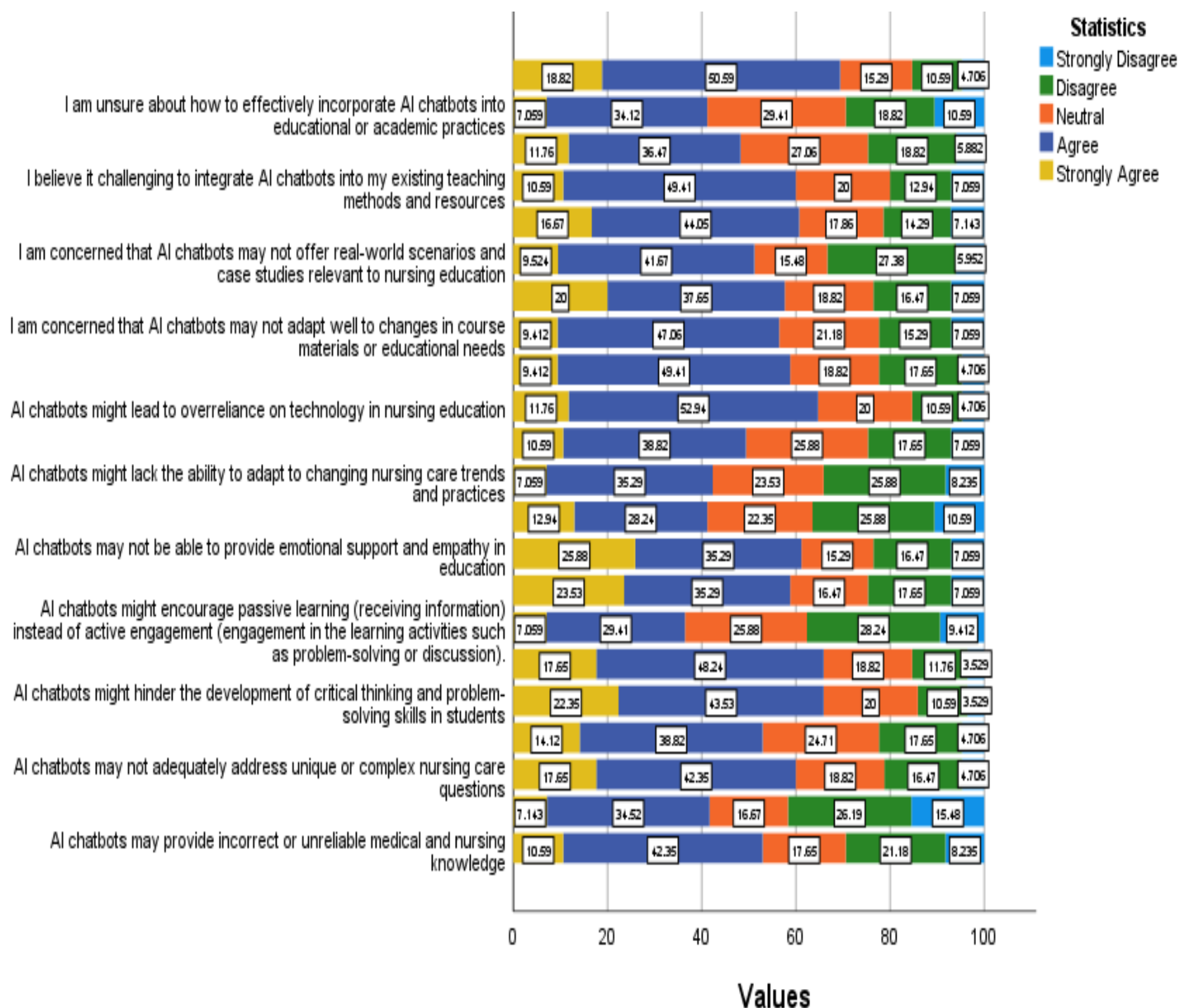


Figure 2: Perceived Concerns and Limitations of AI Chatbots in Nursing Education

Figure 2, findings show that nursing faculty also express concerns, especially related to critical thinking, misinformation, a balanced but cautious acceptance of AI in nursing education.

Perceived Benefits and Limitations of AI Chatbots adoption in Nursing Education: Mean, Standard deviation, and Variance

Table 2: Perceived Benefits and Limitations of AI Chatbots

Components of Perceived benefits and limitations of AI chatbots in nursing education	N	No. of Items	Minimum	Maximum	Mean	Standard deviation	Variance
Perceived Benefits and Limitations of AI Chatbots in Nursing Education Scale	85	34	34.00	152.00	120.0824	19.19773	368.553
1. Perceived Educational Benefits	85	12	12.00	60.00	46.3647	8.49068	72.092
2. Concerns About Interaction and Personalization	85	7	7.00	33.00	23.4471	5.40394	29.203
3. Limitations in Learning and Adaptability	85	8	8.00	38.00	26.8353	6.55898	43.020
4. Implementation and Integration Concerns	85	4	4.00	20.00	13.6706	3.52335	12.414
5. Reliability and Misinformation Concerns	85	3	3.00	15.00	11.7230	2.03981	6.294

The above table summarizes the descriptive statistics of faculty perceptions regarding AI chatbots in nursing education. The overall scale (34 items) showed a mean score of 120.08 (SD = 19.20), indicating generally favorable views. Among the subcomponents, *Perceived Educational Benefits* had the highest mean (M = 46.36), suggesting strong recognition of the chatbots' potential. However, moderate concerns were noted in areas such as *Interaction and*

Personalization (M = 23.45), *Learning and Adaptability* (M = 26.84), and *Implementation* (M = 13.67). *Reliability and Misinformation* concerns were present but comparatively lower (M = 11.72). These findings reflect a balanced perspective, with faculty acknowledging benefits while remaining cautious about potential limitations.

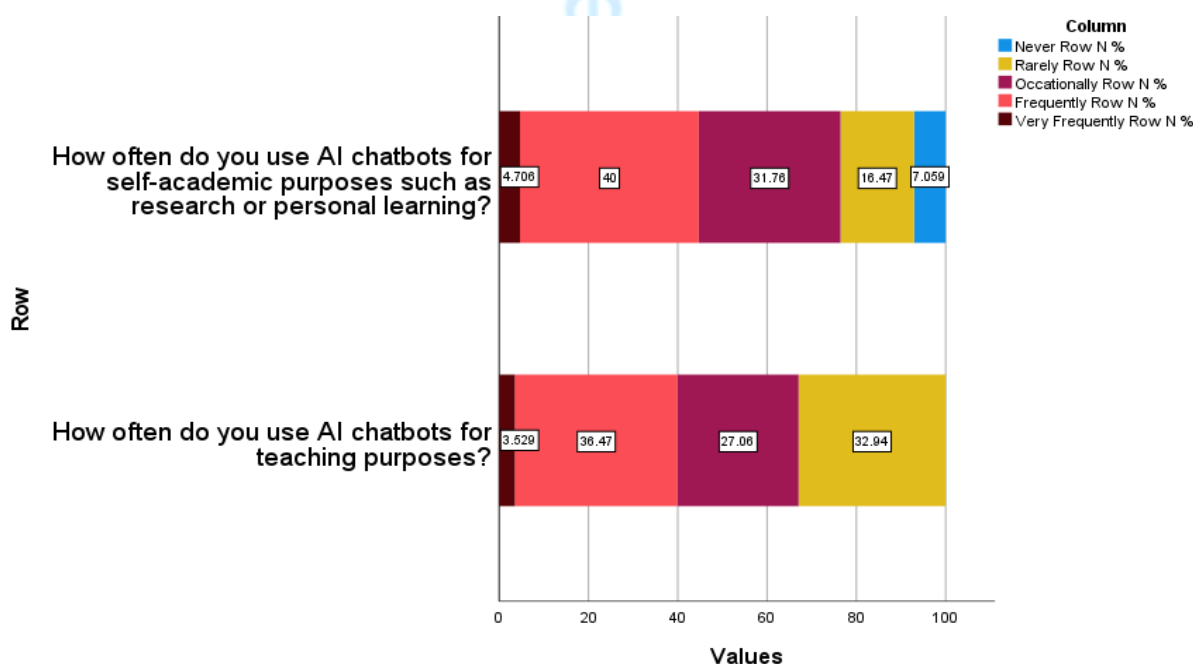


Figure 1: Use of AI chatbots for Self-academic learning and teaching purposes

Usage Pattern of AI Chatbots Among Nursing Faculty

Participants were asked to state their response, whether they used AI for self-academic learning and teaching purposes (Figure 1). The results show the majority of respondents use AI chatbots for self-academic aims frequently (40%) and occasionally (31.76%), indicating a strong preference for using AI in individual learning and research. Very few respondents use it “very

frequently” (4.71%) or “never” (7.06%). The application of AI chatbots for instructional purposes is less frequent than for personal academic purposes. The highest group is those who use it rarely (36.47%), followed by those who use it frequently (32.94%), and then those who use it occasionally (27.06%). Notably, none of the respondents reported using AI chatbots for teaching very frequently.

Table 3: Familiarity with AI Chatbots among Nursing faculty

Familiarity with AI Chatbots among Nursing Faculty		
AI Chatbots	Frequency (N)	Percentage (%)
ChatGPT by OpenAI	76	40.6
Google Assistance	38	20.3
DeepSeek by Liang Wenfeng	26	13.9
Bard by Google AI	16	8.6
Bing Chat by Microsoft	10	5.3
Siri by Apple	11	5.9
Alexa by Amazon	7	3.7
Other	3	1.6

The table presents the distribution of nursing faculty familiarity with various AI chatbots. ChatGPT by OpenAI was the most recognized, reported by 40.6% of participants. This was followed by Google Assistant (20.3%) and DeepSeek by Liang Wenfeng (13.9%). Other tools such as Bard, Siri, Bing Chat, and Alexa

showed lower levels of familiarity, ranging from 3.7% to 8.6%. Only 1.6% of respondents indicated familiarity with other AI platforms. These results suggest that while awareness of certain chatbots like ChatGPT is high, overall familiarity varies widely across platforms.

Table 4: Applications of AI Chatbots for Purposes of Self-academic learning and teaching among Nursing Faculty

Applications of AI Chatbots for Purposes of Self-academic learning and teaching among Nursing Faculty		
AI Chatbots	Frequency (N)	Percentage (%)
ChatGPT by OpenAI	58	69.0
Google Assistance	11	13.1
DeepSeek by Liang Wenfeng	6	7.1
Siri by Apple	5	6.0
Bard by Google AI	2	2.4
Alexa by Amazon	1	1.2
Other	1	1.2
Bing Chat by Microsoft	0	0

The table illustrates the application of AI chatbots used by nursing faculty for academic purposes and teaching. ChatGPT, developed by OpenAI, was the most widely used, reported by 69.0% of respondents, indicating a strong preference for educational purposes. Other tools, such as Google Assistant (13.1%) and DeepSeek (7.1%), had limited usage, while platforms like Bard, Siri, and Alexa were used minimally. Notably, Bing Chat was not used at all. These findings highlight a clear inclination toward ChatGPT as the primary AI tool in academic contexts among nursing faculty.

Discussion

This study assessed the perceptions of nursing faculty in Sindh, Pakistan, regarding the adoption of AI chatbots in nursing education. The study findings were derived from a sample of 85 nursing faculty members at private and public nursing institutes of Sindh, Pakistan. Findings from the current study demonstrate the strong harmony of the core advantages of AI chatbot adoption. This finding aligns with a research article that emphasizes the positive attitude of various healthcare faculty members towards the benefits of AI chatbots and their implementation in education (21). Another study shows a positive perspective of nursing faculty regarding the benefits of AI chatbots in nursing education (19). Faculty recognized AI chatbots as a vital tool for developing the educational practice experience, facilitating the understanding of medical concepts, providing quick access to knowledge, enabling students to apply theoretical knowledge, and improving overall academic performance in nursing education, as well as facilitating self-learning. This aligns with previous literature (22,23), which suggests that educators believe students can effectively seek medical information and comprehensively grasp complex nursing and medical concepts by using AI chatbots (such as ChatGPT), thereby offering personalized learning, developing skills, and improving learning outcomes in nursing education. Despite the constructive perception of AI chatbot adoption in nursing education, the findings of this current study also highlight significant

concerns associated with limitations of AI chatbots, including critical thinking, personalized learning, misinformation, and limited adaptability. Concerns about reliability and misinformation among faculty are higher. With deeper insight into this tool, faculty developed doubt about whether AI chatbots can increase the reliability of information in tutoring without reducing the standard. Prior study supports these concerns, AI chatbots provide accurate information in most cases, but may also produce error cases, which lead to misconceptions in feedback (24). Faculty expressed concerns related to incorrect or unreliable information on nursing knowledge, reducing the interaction of faculty and students, and inadequately addressing unique or complex nursing care. Faculty stressed that healthcare education requires a tailored response, analytical reasoning, and adaptability to adapt to patient-specific needs. In contrast to individual educators, with the capacity to meet the diverse needs of students through teaching and address the complexities of clinical cases based on real-world experience, AI chatbots cannot provide the personalized learning essential for health science education. Beyond these practical concerns, instructors believed that overreliance on technology, AI chatbots cannot offer the emotional support and which will produce ethical and legal risk in AI-generated content. The study also revealed the familiarity and pattern of AI chatbot usage within nursing faculty for purposes of self-academic learning and teaching. ChatGPT by OpenAI and Google Assistant by Microsoft were recognized as the most common and widely used AI chatbot applications among nursing instructors. This finding aligns with the literature (19), the faculty members from Jordan and the United States, which may be due to ChatGPT being a natural language processing Chatbot that easily understands human language and facilitates detailed descriptions in an educational context (25). The integration of Google Assistant with various platforms provides quick information and makes it a convenient tool for academic settings (26).

Conclusion

The findings reveal that faculty members generally express constructive perceptions regarding the educational benefits of AI chatbots, particularly enhancing student engagement, accessibility to learning resources, and improving teaching efficiency. However, the study also highlights significant concerns related to the limitations of AI in promoting critical thinking, personalization, and adaptability, as well as apprehensions about misinformation and integration challenges. Usage patterns indicate that AI chatbots are more commonly employed for self-academic purposes than for teaching. ChatGPT emerged as the most recognized and widely used platform among participants.

Recommendation

Implement AI chatbot-based teaching interventions in selected courses and compare learning outcomes, engagement, and critical thinking skills with traditional teaching methods. Further research is needed to identify effective methods for integrating AI chatbots into teaching practices, curriculum design, and learning management systems. Future research should also include students' perspectives to understand how they perceive the usefulness, accessibility, and ethical implications of AI chatbots in their learning.

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