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Awareness and Attitudes Towards Artificial Intelligence-Generated Study Aids Among Nursing Students in Public and Private Nursing Colleges of Mirpurkhas, Sindh, Pakistan

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ABSTRACT

Artificial intelligence has swiftly become an important technological advancement in healthcare. Chatbots and other digital learning platforms are increasingly being used to support learning, particularly in relation to clinical decision-making and care delivery processes. **Objectives:** To assess and describe nursing students' level of awareness and attitudes toward AI-generated study aids at selected public and private colleges of Mirpurkhas. **Methods:** An analytical cross-sectional design was conducted from December 2025 to January 2026. A total of 210 participants were selected through a stratified random sampling, data were collected via a structured online questionnaire distributed through Google Forms, and SPSS version 27.0 was used for analyzing data in frequency, percentages, mean, and SD while Mann-Whitney test applied to compare total awareness and attitude scores and Spearman's rank correlation used strength of association between awareness and attitude scores. **Results:** Out of 210 participants, 56.7% identified as female, and 73.8% were aged 18 to 22. Nursing students had mean scores of 50.39 for awareness and 25.61 for attitudes toward AI-generated study aids, and the total score was 85, which shows a good level of awareness and favorable attitudes. A Spearman's correlation (r_s = 0.663, p<0.001) showed a strong positive relationship between awareness and attitude scores. **Conclusion:** In order to encourage the safe, efficient, and responsible use of AI in both public and private nursing settings, nursing programs must incorporate structured AI education and ethics training. The study concludes that nursing students tend to have a solid understanding and positive attitudes towards AI-generated study aids.

INTRODUCTION

Artificial intelligence (AI) has revolutionized industrial, economic, and social systems globally throughout the first three decades of the twenty-first century [1]. In the health sciences, where there is a constant need for competent and flexible workers, such as BS nursing students, who enter more complex healthcare environments (hospitals) that use cutting-edge technology and AI-generated resources for their patients' care and educational purposes, this deluge of technology offers new learning opportunities [2]. Since AI solutions are well known for their ability to provide quick feedback, personalized learning support, and easy access to instructional content, the use of AI as a tool in nursing education aims to increase interest that can aid with academic learning, skill development, patient monitoring, idea clarification, and theoretical understanding [3]. These technologies, which range from virtual reality simulations to AI-based clinical decision support systems, provide students with

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immediate feedback and hands-on experience, which helps them develop clinical reasoning because the ongoing use of AI in nursing education improves learning outcomes and clinical skills [4]. Since they enable future nurses to handle health data, become digitally literate, and simplify complicated information, it seems that these qualities are getting increasingly important in the modern clinical environment as the generative AI tools can greatly enhance health worker engagement, motivation, and self-directed learning due to their potential to offer individual learning opportunities [5]. Nevertheless, research shows that nursing students tend to have a shallow understanding of AI technology because of the lack of experience and knowledge about AI-generated aids in the study. The other possible consequence is that much of their knowledge would be self-educated and not acquired in formal education [6]. Limited information exists regarding the awareness and attitudes of nursing students towards AI-assisted study aids, particularly in developing and low-resource regions, even though AI is increasingly being used in nursing education [7]. Good ethical guidelines and well-defined institutional standards are essential as the more widespread the AI is applied to education, the more ethical and pedagogical concerns, academic dishonesty, and the possibility of impairment of clinical critical thinking and threat to the assessment, privacy of patient data, and ambiguity of AI decision-making are raised [8]. Online platforms and social media are usually used as the primary sources of information regarding AI, but not official academic education [9, 10]. Also, the studies on AI-generated study aids conducted in the international field with a specific focus on the awareness and attitudes of nursing students towards AI have explicitly compared the situation in both public and private institutions and found rather dissimilar attitudes. It was because the public and private nursing programs tend to vary in funding, educational independence, technological infrastructure, and student quality, and these variables may have a serious effect on AI implementation [11]. The distinction between these two cases is important to customize adoption plans of AI to capitalize on the strengths of an organization and mitigate its weaknesses, in particular, the variation in funding, infrastructure, and faculty preparation appears to be a key factor in shaping the degree to which AI is integrated into nursing education [12]. While public universities may have financial and physical constraints, private colleges are frequently perceived as having comparatively better access to digital tools and technology resources [13].

Thus, there is insufficient data on nursing students regarding awareness and attitudes toward AI-generated study aids, particularly at public institutes, and moreover in low-resource income countries, despite the growing incorporation of AI in nursing education. It is evident from the previous research that few studies examine direct comparisons between public and private colleges. Hence, this study addresses the existing gap by directly comparing awareness and attitudes toward AI-generated study aids among BS nursing students at public and private institutions in Mirpurkhas, Sindh. Therefore, this study aims to assess and describe nursing students' awareness and attitudes toward AI-generated study aids at selected colleges of Mirpurkhas, Sindh, Pakistan.

METHODS

This study uses an analytical cross-sectional design among undergraduate BSN generic nursing students, both male and female, from first to final year at the public and private nursing colleges of Mirpurkhas, Sindh, Pakistan. An analytical cross-sectional design was conducted from December 2025 to January 2026. Data were collected after obtaining written informed consent from all participants, in accordance with the ethical principles outlined in the Declaration of Helsinki. Students who were unable to understand AI-related knowledge or unwilling to participate were excluded from the study. This study design was chosen not only to describe the awareness and attitude score but also to analyze the strength of the association between variables (e.g., awareness and attitudes). This supports the adoption of an analytical method rather than a simply descriptive design as it is consistent with the goals and purpose of the study. Because the research design was based on a 95% confidence level and a 5% accuracy level, RAO soft was used to compute the sample size. The final sample size was 210. Because the population was not homogenous, participants were chosen using a stratified random selection procedure. There may be differences in the educational resources and technological exposure of BSN students from public and private universities. Before distributing the tool to participants in this trial, the researchers made a few small adjustments [14]. These modifications enhance clarity and relevance to the target population, reflecting local educational and cultural context. The tools had three sections. First, “sociodemographic information", and the second consists of seven items, “awareness of artificial intelligence,” and the third section consists of fifteen items on “Attitude towards artificial intelligence. All tools' responses were recorded using a five-point Likert scale ranging from strongly disagree to strongly agree. To assess the validity of the tool, a pilot study on 10% were conducted to improve the clarity, relevance, and applicability of the instrument. Moreover, to assess the internal consistency of the tool using Cronbach's alpha (≥0.916) for all domains, which

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indicates an acceptable range for the tool. This tool was distributed via online platform through Google Forms via official WhatsApp groups of the colleges, and the list of students was obtained from the head of the colleges, with institutional permission. Before data collection, participants were informed about the study's benefits and risks and required to provide informed consent before proceeding with the survey, and were assured that their participation was voluntary and that the confidentiality of responses was maintained.

For analysis, SPSS version 27.0 was used. In descriptive statistics, the findings were presented in frequencies, percentages, and mean ± SD. The study employed the Mann-Whitney test to compare total awareness and attitude scores between private and public colleges. Additionally, Spearman's rank correlation test was used to examine the relationship between awareness and attitude scores.

RESULTS

The study confirms the demographic distribution of participants, with a majority 56.7% of were female, indicating a predominance of female nursing students among all participants 73.8% were aged from 18 to 22 years, while only 1% were aged 28 to 30. Additionally, this study found nearly equal representation from private and public colleges, facilitating effective comparative analysis (Table 1).

Table 1: Demographic Distribution of the Participants

Variables	Frequency (%)
Gender	
Female	120 (56.7%)
Male	90 (42.4%)
Age	
18-22	155 (73.8%)
23-27	53 (25.2%)
28-30	2 (1%)
Type of Institute	
Private	108 (51%)
Public	102 (49%)
Total	210

The distribution of 210 student participants by academic year is displayed in the findings. With 72 participants (34.3%), first-year students were the biggest group, followed by second-year students (62, 29.5%), and fourth-year students (32, 15.2%). This suggests that junior pupils participate more than seniors (Figure 1).

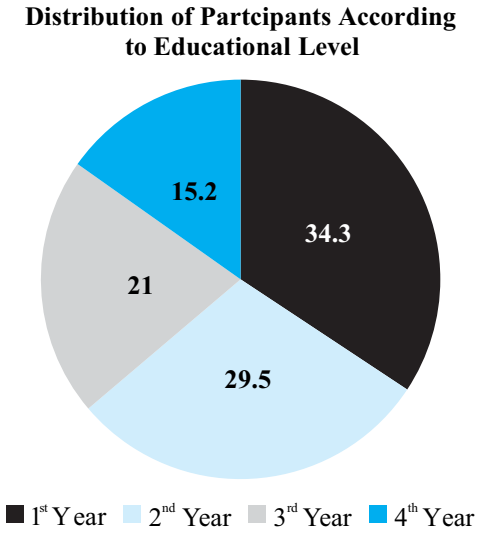

Figure 1: Level of Education

The frequency and percentage distribution of participants' awareness of AI items are shown in the research. Fifteen items on a five-point Likert scale are used to gauge nursing students' attitudes regarding artificial intelligence. The frequency and percentages of replies from both public and private nursing students are displayed for each item (Table 2).

Table 2: Awareness, Attitude of Artificial Intelligence among Nursing Students

Statements	Strongly Disagree,n (%)	Disagree, n (%)	Neutral, n (%)	Agree, n (%)	Strongly Agree, n (%)
Awareness					
I am familiar with the concept of AI in nursing education	3 (1.4%)	15 (7.1%)	27 (12.9%)	112 (53.3%)	53 (25.2%)
I am familiar with the various AI tools available for educational purposes	2 (1.0%)	15 (7.1%)	22 (10.5%)	123 (58.6%)	48 (22.9%)
I believe that AI can improve the quality of nursing education	1 (0.5%)	24 (11.4%)	32 (15.2%)	98 (46.7%)	55 (26.2%)
I believe that AI will revolutionize the way we learn in the future	5 (2.4%)	20 (9.5%)	32 (15.2%)	95 (45.2%)	58 (27.6%)
I think AI can aid in nursing research	7 (3.3%)	21 (10.0%)	47 (22.4%)	90 (42.9%)	45 (21.4%)
I am familiar with the various AI tools used in nursing practice	7 (3.3%)	15 (7.1%)	44 (21.0%)	99 (47.1%)	45 (21.4%)
Nursing professionals need to understand how AI works	4 (1.9%)	21 (10.0%)	32 (15.2%)	106 (50.5%)	47 (22.4%)
Attitude					
I am willing to try out new AI technologies for nursing educational purposes	5 (2.4%)	14 (6.7%)	24 (11.4%)	108 (51.4%)	59 (28.1%)
I am confident in my ability to use AI technologies for learning purposes	7 (3.3%)	20 (9.5%)	27 (12.9%)	113 (53.8%)	43 (20.5%)
I am comfortable with using AI in my nursing education	12 (5.7%)	5 (2.4%)	30 (14.3%)	105 (50%)	54 (25.7%)
I am comfortable with the idea of AI grading my academic work	8 (3.8%)	12 (5.7%)	40 (19.0%)	104 (49.5%)	44 (21.0%)

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I am concerned about the ethical implications of using AI in nursing education	5 (2.4%)	18 (8.6%)	37 (17.6%)	108 (51.4%)	42 (20.0%)
I think it is important for universities to integrate AI technologies into nursing education	3 (1.4%)	13 (6.2%)	37 (17.6%)	99 (47.1%)	58 (27.6%)
I think it is important for universities to provide training on how to use AI tools	7 (3.3%)	7 (3.3%)	31 (14.8%)	105 (50%)	60 (28.6%)
I think it is important for universities to teach students about the ethical implications of AI	5 (2.4%)	12 (5.7%)	39 (18.6%)	103 (49.0%)	51 (24.3%)
I think AI can replace traditional teaching methods	9 (4.3%)	25 (11.9%)	37 (17.6%)	85 (40.5%)	54 (25.7%)
I am concerned about the potential for AI to replace human teachers	11 (5.2%)	46 (21.9%)	30 (14.3%)	78 (37.1%)	45 (21.4%)
I am willing to learn about the applications of AI in medicine	13 (6.2%)	29 (13.8%)	34 (16.2%)	93 (44.3%)	41 (19.5%)
I am willing to use AI in my future nursing practice	7 (3.3%)	28 (13.3%)	35 (16.7%)	93 (44.3%)	47 (22.4%)

The study represents the mean score of Awareness and Attitude towards AI-generated study aids; the responses were measured on a five-point Likert scale (ranging from one = strongly disagree to five = strongly agree). Higher scores reflected greater awareness and more favorable attitudes. This study categories score as 22 to 54 indicates Poor, 55 to 82 as Moderate, and 83 to 110 = Good. The study revealed a total mean score of 85, indicating a good level of awareness and positive attitudes toward artificial intelligence (Table 3).

Table 3: Mean Score of Awareness and Attitude Towards AI-Generated Study Aids

Domain	Minimum Score	Maximum Score	Mean ± SD
Attitude Score	15	75	50.39 ± 12.149
Awareness Score	7	35	25.61 ± 5.788
Total Attitude Score and Awareness score	22	1106.896	85.0 ± 16.896

The results revealed the normality test using the Shapiro-Wilk test. The results showed that the data were not normally distributed ($p<0.050$). Therefore, non-parametric statistical tests, i.e., the Mann-Whitney U test, were applied to evaluate awareness and attitude scores between students at public and private nursing colleges.

For the given data, a Mann-Whitney Test was conducted to compare total awareness and attitude scores between public and private nursing colleges. The results showed that students from private nursing colleges had a slightly higher mean rank (107.09) compared to students from public nursing colleges (103.82). However, a Mann-Whitney U test revealed no statistically significant difference in total awareness and attitude score between students from public (mean rank = 103.82) and private nursing colleges (mean rank = 107.09), U = 5336.50, p = 0.697. This means that the type of institution (public vs private) does not significantly influence the awareness and attitude of nursing students regarding AI-generated study aids (Table 4).

Table 4: Tests of Normality and Comparison of Total Awareness and Attitude Score Between Public and Private Nursing Colleges

Statement	Type of Institution	Kolmogorov-Smirnova			Shapiro-Wilk			N	Mean Rank	Mann-Whitney U	p-value
		Statistic	df	Sig.	Statistic	df	Sig.				
Total Awareness and Attitude Score	Public Nursing College	0.140	102	<0.001	0.900	102	<0.001	102	103.82	5336.50	0.697
	Private Nursing College	0.096	108	<0.016	0.925	108	<0.001	108	107.09		

a. Lilliefors Significance Correction

A Spearman's rank correlation test examined the relationship between awareness and attitude scores on artificial intelligence among nursing students. Students with more awareness likely to have more positive views regarding AI in education and medical practice, according to the research, which revealed a substantial positive association ($r_s = 0.663$, $p < 0.001$). At the 0.01 level, the connection was statistically significant. implying that the two variables have a significant link (Table 5).

Table 5: Correlation Between Awareness and Attitude Scores

Variables	Awareness Score	Attitude Score
Awareness Score	1	0.663**
Attitude Score	0.663**	1
p-value	–	<0.001

Note: Spearman's rho correlation test was applied. ** Correlation is significant at the 0.01 level (2-tailed).

DISCUSSION

This study provides insightful information on the understanding and attitudes of nursing students regarding AI-generated study aids in clinical and educational settings in Mirpurkhas. Sindh. A greater percentage of female students in this research utilize AI, and they are usually young people in their first or second year. Unlike older or less technologically familiar individuals, younger groups tend to report greater familiarity and positive attitudes towards AI, although the results of previous studies show that age and academic level can also change perceptions about AI [15]. Also, the same results have been reported in these areas, where women participants were found to be more users of AI due to their greater representation in the nursing profession [16]. Moreover, research in Arab countries suggests that younger learners in the early

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phases of their educational experiences are more likely to access digital learning materials, such as AI-based study tools, because they are more familiar with new technologies and web-based learning environments [17]. As can be seen in the data of this research, the awareness and attitudes of the BS nursing students, the results show that the majority of nursing students were well acquainted with the concept of AI and AI tools, with a significant percentage of them agreeing that AI has the potential to enhance nursing education and transform learning. This is in line with earlier studies [18] that indicate that moderate outcomes in terms of awareness score tend to support a positive attitude towards AI technologies among the nursing students. Similarly, this is justifiable by other developing countries, in that students are being exposed to simple AI tools primarily online, via social media, and through self-education, and not necessarily through schooling [19]. Thus, there is never a chance of AI dependence. However, contrary to our findings, other studies have indicated that nursing students are less familiar with AI, especially at those colleges where the topic is not a regular course in the curriculum. This gap shows that a positive attitude towards AI does not necessarily result in knowledge or expertise [20]. The current findings align with the international statistics that show that students of nursing are typically positive about the educational benefits of AI [21]. Furthermore, another study found that eighty-two-point-six percent of students studying nursing positively rated AI, and most of them were moderately aware of AI use in healthcare education. This digital health expressed positive views regarding the benefits of AI and its possible use, but challenges and risk awareness also emerged [22]. In a study of the attitudes of Saudi Arabian nursing students toward AI in the training of nursing skills, more than 90 percent of the respondents expressed positive attitudes and great willingness to adopt AI technology [23, 24]. This paper reviewed the perceptions and beliefs of nursing students in the public and private sectors regarding AI-generated study aids. The findings indicated that the mean rank (107.09%) was slightly higher than that of the students in the public sector (103.82%), but the difference was not statistically significant. That means that students in the private sector would be better exposed to the digital learning environments and technical devices than students of state-run universities, perhaps due to a higher number of resources.

The findings might not be as generalizable to other students or regions since the research was done on nursing students in some institutions in Mirpurkhas, Sindh. Second, this survey is cross-sectional, and it becomes harder to compare the level of awareness and attitudes over time. The online method of data collection can restrict participation in that it may be difficult to fill out the third self-report questionnaire, which can alter the representativeness of the sample. It is recommended that further studies be conducted in order to establish the impact of the integration of AI on the academic performance and clinical decision-making skills of nursing students.

CONCLUSIONS

Overall, the attitudes and awareness of AI-generated study aids were positive among nursing students in Mirpurkhas, Sindh, which means that they are willing to use them in academic learning. The positive correlation of awareness and attitudes is strong, which means that the more a person is aware of AI, the more positive his or her perspective is. These findings highlight AI's potential as a useful tool for nursing education. Organized AI training and ethical education are to be proposed in nursing schools to facilitate safe and effective use of these technologies.

Authors' Contribution

Conceptualization: AKA
Methodology: IMK, PRK, RB
Formal analysis: IAC
Writing and Drafting: IAC, SDM
Review and Editing: AKA, IAC, IMK, PRK, RB, SDM

All authors approved the final manuscript and take responsibility for the integrity of the work.

Conflicts of Interest

All the authors declare no conflict of interest.

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