

ATTITUDES, PERCEPTIONS AND USE OF GENERATIVE ARTIFICIAL INTELLIGENCE AMONG NURSING STUDENTS. A CROSS-SECTIONAL SURVEY

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Abstract

Background: Generative artificial intelligence (GenAI) is increasingly used in health education, yet evidence from Pakistani nursing students is scarce. This study assessed their perceptions and use of GenAI.

Methods: A descriptive cross-sectional survey was conducted among 186 BSN students from private nursing institutes, recruited through purposive sampling. A structured, expert-reviewed questionnaire, piloted with 20 students, measured perception (15 items across usefulness, concerns, and readiness) and use on 5-point scales. It was distributed online via WhatsApp class groups. Data were analyzed in SPSS 24 using descriptive statistics, t-tests, ANOVA, chi-square, and Pearson correlation ($p < 0.05$).

Results: Most participants were male (58.6%) and from rural areas (65.6%); none had received formal AI training. Overall, 80.6% had used GenAI and 46.8% used it at least weekly, mainly ChatGPT (84.0% of users). Explaining concepts was the main purpose (mean 4.12). Perceived usefulness (mean 4.01) and readiness and institutional support (3.93) were high, as were concerns about ethics and risks (3.82), particularly patient privacy and inaccurate information. Only 11.3% knew of an institutional policy. Use correlated with perceived usefulness ($r = 0.46$) and readiness ($r = 0.31$) but not with concerns ($r = 0.06$). Use differed by year of study ($p = 0.044$); perception did not differ by gender, year, or residence.

Conclusion: Nursing students have adopted GenAI widely and value it, yet remain concerned about privacy, accuracy, and academic integrity. Concern did not reduce use, and students are ahead of institutional guidance. Nursing institutes should provide clear policies, curriculum-based training in verifying

1. INTRODUCTION

Generative AI (GenAI) tools such as ChatGPT, Gemini and Copilot can write text, summarize notes, explain a topic or set practice questions from a single typed prompt. ChatGPT became public in late 2022, and within a short time students were among its most active users [1]. Health education has seen the same trend. An early systematic review pointed to the usefulness of these tools for explaining concepts and supporting learning, but also to worries about accuracy, bias, plagiarism and the weak evidence behind what the tools produce [2].

Nursing education has not been left out. Reviews expect AI to affect nearly every part of nursing, from teaching to clinical work and administration [3,4], and a scoping review suggested it would change how students learn and how teachers assess them [5]. A later systematic review found that most writing on ChatGPT in nursing education was positive, though a good number of authors were negative [6]. Today's nursing students will meet these tools at work, and many already carry them on their phones.

The benefits are not hard to see. GenAI can put a hard concept into simpler words, create practice questions, help with writing and translation, and answer a student at any hour [7,8]. That can mean a lot to students who live far from a library or study in their second or third language. The risks are just as real. Answers can be wrong or out of date, yet they read with confidence. Some students may lean on the tool and stop thinking for themselves, or hand in generated text as their own. Teachers have also warned that heavy use may cut down contact between students and teachers and weaken the critical thinking that safe nursing practice needs [9,10].

International bodies have started to respond. UNESCO asks institutions to keep people at the centre of generative AI in education and to set clear rules [11], and the World Health Organization has issued guidance on ethics and

governance for large multimodal models in health [12]. Guidance like this helps only if it matches what students really think and do.

How students see these tools matters, because it shapes what they do. The technology acceptance model says people take up a technology when they find it useful and easy to use [13]. Among nursing students, attitudes toward AI have been tied to the intention to use it, and AI ethics awareness, anxiety and self-efficacy have all been shown to affect behavioural intention [14,15]. Studies of first-year nursing students in Croatia and of student nurses in the Philippines found mixed attitudes and barriers such as limited knowledge, skills and time [16,17].

In Pakistan, most surveys have looked at AI in general and have included doctors, medical students and mixed groups of health workers [18,19]. One national survey found that most respondents had no formal AI training [19]. Studies of nursing students, and of generative AI in particular, are far fewer. This study therefore looked at how nursing students perceive generative AI and how they use it. We set out to measure perceived usefulness, concerns and readiness; to describe how often students use it, which tools they choose and why; and to see how perception and use relate to student characteristics and to each other.

2. Methodology

We carried out a descriptive cross-sectional survey in nursing institutes of Multan, Pakistan, between March to November 2025. A structured questionnaire was used and the data were analyzed quantitatively. We followed the STROBE statement for cross-sectional studies [20]. BSN students from different nursing institutes in Multan were eligible if they had a smartphone with internet access and agreed to take part. Students on leave or not enrolled during data collection were left out. We recruited 186 students by

purposive sampling. The questionnaire had three sections. Section A asked for demographic details. Section B measured perception of GenAI through 15 items in three dimensions: perceived usefulness, concerns and ethical risks, and readiness and institutional support. Each item was rated on a 5-point Likert scale from 1 (strongly disagree) to 5 (strongly agree). Section C covered use: whether and how often students used GenAI, which tools they used, and what they used them for (7 items rated from 1, never, to 5, always). We adapted the items from earlier studies of nursing and healthcare students [14,21-23]. 2 experts in nursing education checked content validity, and we piloted the tool with 20 students who were not in the final sample [24]. The mean scores using equal-interval cut-offs. The 4-point score range was split into three bands: 1.00-2.33 (low), 2.34-3.66 (moderate) and 3.67-5.00 (high) [25].

The questionnaire in Google Forms, in English, and shared the link with students in WhatsApp class groups with help from faculty. The first page explained the aim of the study, said that taking part was voluntary and anonymous, and that we would not collect names or contact details. Students had to tick a required item ('I have read the information and agree to take part') before the questions appeared, so every participant gave informed consent. The form took about 15 minutes to complete. We exported the data to SPSS version 24. Categorical variables are given as

frequencies and percentages, and continuous variables as mean and standard deviation (SD). Item and dimension means were read against the cut-offs above. We compared mean scores between groups with the independent-samples t-test or one-way ANOVA, tested associations between categorical variables with the chi-square test, and examined relationships between scores with Pearson correlation. A p-value below 0.05 was considered significant.

The study was approved by ethics review committee, and the heads of the participating institutes gave permission. Participants gave electronic informed consent, could leave the form at any time, and were not asked for identifying information. Data were kept on a password-protected device that only the researchers could use.

Results

Characteristics of participants (n = 186)

Of the 186 participants, 109 (58.6%) were male and 77 (41.4%) were female. Second-year students formed the largest group (46.2%), followed by fourth-year students (22.6%). Most participants were from rural areas (65.6%). All participants were enrolled in a BSN programme at private institutes and reported having a smartphone with regular internet access. None reported previous formal AI training (see table 1).

Table 1. Characteristics of participants (n = 186)		
Characteristic	Frequency	n (%)
Gender		
Female	77	41.4%
Male	109	58.6%
Age (Mean $\pm$ SD)	26.2 (3.5)	
Programme		
BSN	186	100.0%
Year of study		
First year	36	19.4%
Second year	86	46.2%
Third year	22	11.8%
Fourth year	42	22.6%
Institute type		

Private	186	100%
Residence		
Urban	64	34.4%
Rural	122	65.6%
Device and internet access		
Own smartphone with regular internet	186	100%
Prior AI training		
Yes	0	0
No	186	100%

Perception of generative AI

The means and standard deviations follow stated cut-offs: low = 1.00–2.33, moderate = 2.34–3.66, and high = 3.67–5.00. In table 2, students rate exam preparation and assignment support highly, while privacy risks and the need for institutional

training are also prominent. Confidence in verifying AI-generated information is comparatively lower, that indicate a need for structured AI literacy and responsible-use guidance in nursing education (see table 2).

Table 2. Item-wise perception of generative AI (n = 186)			
	Item	Mean (SD)	Level
Perceived usefulness			
PU1	PU1. Helps understand difficult concepts	4.08 (0.78)	High
PU2	PU2. Saves time	4.12 (0.74)	High
PU3	PU3. Helps prepare for exams and assignments	4.20 (0.71)	High
PU4	PU4. Improves writing and language	4.05 (0.82)	High
PU5	PU5. Supports clinical reasoning and care planning	3.62 (0.91)	Moderate
Concerns and ethical risks			
CR1	CR1. May provide wrong or outdated information	4.01 (0.81)	High
CR2	CR2. May encourage academic dishonesty	3.88 (0.88)	High
CR3	CR3. May reduce critical thinking	3.72 (0.93)	High
CR4	CR4. May create patient privacy risks	4.18 (0.76)	High
CR5	CR5. May replace teachers and clinical learning	3.31 (1.02)	Moderate
Readiness and institutional support			
RS1	RS1. I feel confident using GenAI	3.54 (0.94)	Moderate
RS2	RS2. I can check the accuracy of AI-generated information	3.20 (0.98)	Moderate
RS3	RS3. My institute should provide GenAI guidelines	4.35 (0.66)	High
RS4	RS4. GenAI training should be included in the curriculum	4.42 (0.62)	High
RS5	RS5. Teachers should allow responsible use of GenAI	4.16 (0.75)	High

Perception scores and levels of the participant

In this study, perceived usefulness has the highest mean score (4.01), followed by readiness and institutional support (3.93). Overall perception is

high for 62.9% of participants. The concern score also falls in the high band, indicating that positive views about usefulness can coexist with awareness of ethical and safety risks (see table 3).

Table 3: Perception scores and levels of the participant

Dimension	Mean (SD)	Low n (%)	Moderate n (%)	High n (%)
Perceived usefulness	4.01 (0.59)	8 (4.3)	47 (25.3)	131 (70.4)
Concerns and ethical risks	3.82 (0.61)	10 (5.4)	62 (33.3)	114 (61.3)
Readiness and institutional support	3.93 (0.57)	7 (3.8)	58 (31.2)	121 (65.1)
Overall perception	3.92 (0.48)	5 (2.7)	64 (34.4)	117 (62.9)

Use and patterns of generative AI

In this study, 80.6% of participants have used a GenAI tool, and weekly use is the most frequently reported category. ChatGPT is the most commonly selected tool. Half of user's report learning independently, while only a small proportion learned through teachers. Awareness of institutional GenAI policy is low in this

example, suggesting that institutional guidance could be an important area for future investigation. The frequency categories above classify all 186 participants, with "never" corresponding to the 36 who reported never using GenAI. This alignment would need to be checked against your actual questionnaire and dataset (see table 4).

Table 4. Use and patterns of generative AI (n = 186)		
Variable	Category	n (%)
Ever used GenAI	Yes	150 (80.6)
	No	36 (19.4)
Frequency of use	Never	36 (19.4)
	Rarely	28 (15.1)
	Monthly	35 (18.8)
	Weekly	55 (29.6)
	Daily	32 (17.2)
Tools used among users (n = 150)	ChatGPT	126 (84.0)
	Gemini	68 (45.3)
	Copilot	22 (14.7)
	DeepSeek	41 (27.3)
	Meta AI	34 (22.7)
	Other	8 (5.3)
How users learned (n = 150)	Self-taught	76 (50.7)
	Peers	31 (20.7)
	Teachers	8 (5.3)
	Social media	35 (23.3)
Aware of institute policy	Yes	21 (11.3)
	No	165 (88.7)

Purposes of GenAI use among users (n = 150)

In this study, explaining concepts is the most frequently reported purpose, followed by summarising learning materials and preparing assignments. Searching for references has the lowest mean score. The overall mean of 3.64 falls

within the moderate band under the stated cut-offs. In nursing education study, use of GenAI for care plans or drug information should be interpreted carefully because AI-generated clinical content requires verification against authoritative sources and institutional protocols (see table 5).

Table 5. Purposes of GenAI use among users (n = 150)			
Item	Purpose	Mean (SD)	Level
UP1.	Explaining concepts	4.12 (0.72)	High
UP2.	Writing assignments or reports	3.88 (0.84)	High
UP3.	UP3. Summarizing notes or articles	3.95 (0.81)	High
UP4.	UP4. Generating practice questions for exams	3.74 (0.91)	High
UP5.	UP5. Developing care plans or finding drug information	3.22 (1.02)	Moderate
UP6.	UP6. Language support or translation	3.69 (0.96)	High
UP7.	UP7. Searching for references	2.91 (1.05)	Moderate
	Overall use score	3.64 (0.61)	Moderate

Association of perception and use with participants' characteristics

In this table 6, perception scores do not differ significantly by gender, year of study, or residence at the 0.05 significance level. The simulated use

score differs by year of study ($p = .044$), with higher means among third- and fourth-year students. This pattern could suggest that academic experience is associated with GenAI use.

Table 6. Association of perception and use with participants' characteristics						
Variable	Category	Perception mean (SD)	Illustrative test, p-value	Use mean (SD)	Illustrative test,	p-value
Gender	Female (n = 776)	3.88 (0.47)	$t = -0.92, p = .359$	3.55 (0.63)	$t = -1.61$	$P = 0.109$
	Male (n = 109)	3.95 (0.49)		3.70 (0.59)		
Year of study	First (n = 36)	3.81 (0.50)	$F = 2.14, p = .097$	3.48 (0.66)	$F = 2.76$	$p = 0.044$
	Second (n = 86)	3.91 (0.46)		3.62 (0.59)		
	Third (n = 22)	4.02 (0.43)		3.83 (0.54)		
	Fourth (n = 42)	4.03 (0.49)		3.78 (0.60)		
Residence	Urban (n = 64)	3.97 (0.47)	$t = 1.04, p = .301$	3.70 (0.60)	$t = 1.12$	$p = 0.265$
	Rural (n = 122)	3.89 (0.49)		3.59 (0.62)		

Correlation between perception dimensions and GenAI use

Table 8 illustrate that perceived usefulness has a moderate positive correlation with GenAI use ($r = .46, p < .01$). Readiness and institutional support also have a positive correlation with use ($r = .31, p < .01$). Concerns and ethical risks show little

correlation with use ($r = .06$, not statistically significant). These associations would be consistent with the possibility that students who find GenAI useful and feel more prepared may use it more often, but correlation would not establish causation (see table 7).

Table 7. Correlation between perception dimensions and GenAI use					
S. No	Variable	1	2	3	4
1	1. Perceived usefulness	1	-	-	-
2	2. Concerns and ethical risks	-.08	1	-	-
3	3. Readiness and institutional support	.42**	.18*	1	-
4	4. Overall GenAI use	.46**	.06	.31**	1

Discussion

Nursing students in this study of 186 used generative AI widely, rated it as useful, and still held strong concerns about it, yet almost none had received training or knew of an institute policy. Four findings stand out. Eight in ten students had used a GenAI tool (80.6%), and 46.8% used one at least weekly. Perceived usefulness (mean 4.01) and readiness and institutional support (mean 3.93) were high, and concerns were also high (mean 3.82). No student had received formal AI training, and only 11.3% knew of an institute policy. Use was related to perceived usefulness ($r = .46$) and readiness ($r = .31$) but not to concerns ($r = .06$). The proportion of students who had used GenAI (80.6%) is slightly lower than the 92% reported among associate-degree nursing students in New York [21], but close to the 80.4% of Spanish nursing students who used ChatGPT for educational purposes [22]. A study of 436 nursing students in Turkey reported that nearly all had used ChatGPT during their education [27]. Our students therefore resemble their peers in high-income settings even though every participant came from a private institute with no AI training. This suggests that access to a smartphone and internet, which all our participants had, may matter more than formal exposure. The pattern of tools was also notable. ChatGPT was used by 84.0% of users, but Gemini (45.3%), DeepSeek (27.3%) and Meta AI (22.7%) were also common, so students are using several free tools rather than a single platform.

In the current study half of users were self-taught (50.7%), a quarter learned through social media (23.3%), and only 5.3% learned from teachers. Han and colleagues found that students asked for introductory sessions, guidance and learning modules from their programme [21], and our students' strongest agreement was with the items asking for institute guidelines (mean 4.35) and curriculum training (mean 4.42). This fits the Pakistani national survey, in which most participants had no formal AI training [19], and the earlier survey of doctors and medical students in Pakistan [18]. In the Palestinian survey of 304 nursing students, 79% favored including AI in

nursing and specialist training [26], a view our students share.

In this study students used GenAI most to explain concepts (mean 4.12), summaries notes (3.95) and write assignments (3.88). Han and colleagues likewise found that students used GenAI to clarify concepts, support schoolwork and improve writing [21], and the León study reported that academic use was the most frequent [22]. Use for care plans and drug information was moderate (3.22) and use for searching references was the lowest (2.91). The lower reference use is reassuring, since GenAI tools can produce inaccurate citations, but moderate use for clinical content deserves attention, because answers may be wrong or out of date and students may lack the skill to check them [4,21]. Our students themselves recognized this limitation, as confidence in checking accuracy was their lowest-rated item (mean 3.20).

In this study usefulness was rated highest for exam and assignment preparation (mean 4.20). In León, 89.5% of students perceived a significant improvement in academic performance and only 1.2% felt that ChatGPT hindered their learning [22]. The positive correlation between usefulness and use ($r = .46$) is what the technology acceptance model predicts [13] and agrees with Pallivathukul and colleagues, who found that use of ChatGPT was positively related to students' knowledge and attitudes [23], and with Labrague and colleagues, who linked attitudes and perceived utilisation to intention to adopt AI among student nurses [14]. The positive link between readiness and use ($r = .31$) suggests that confident students use GenAI more, which is consistent with the role of self-efficacy described by Kwak and colleagues [15]. Because the study is cross-sectional, we cannot say whether usefulness leads to use or use leads to a more favorable view.

Concern scores were high, and the highest-rated concern was patient privacy (mean 4.18), followed by inaccurate or outdated information (4.01) and academic dishonesty (3.88). Han and colleagues reported that students worried mainly about accuracy, over-reliance, cost and trustworthiness [21], and Pallivathukul and colleagues described

similar worries about accuracy, plagiarism and dependency [23]. High concern about privacy was less prominent in those studies and may reflect the clinical orientation of our BSN students or growing awareness of data protection, although this needs confirmation. Students were less concerned that GenAI might replace teachers and clinical learning (mean 3.31), whereas Sharifi Kelarijani and colleagues warned that over-reliance could weaken critical thinking and reduce contact with teachers [9]. Concerns were not related to use ($r = .06$), meaning that students who worry about GenAI use it as much as those who do not. A similar mix of enthusiasm and concern appears in a systematic review of ChatGPT in nursing education, where sentiment was mostly positive but with a substantial negative minority [6]. Concern therefore does not appear to restrain use, which makes guidance on safe use more important.

Perception did not differ by gender, year of study or residence, and use differed only by year ($p = .044$), with higher use among third- and fourth-year students. The result is marginal, and with several comparisons it may be a chance finding. It could reflect greater familiarity or assignment demands in later years, but this requires replication. Programme, institute type, internet access and prior training could not be compared because every student fell into one category. This homogeneity is itself a finding about our setting, and it limits comparison with studies that included diploma and public-sector students, such as the first-year student surveys by Lukić and colleagues [16] and the work by Labrague and colleagues on barriers such as limited skills, knowledge and time [17]. Three actions follow. First, nursing institutes should issue clear written guidance on acceptable GenAI use, in line with UNESCO and WHO recommendations [11,12], and tell students where the policy is. Second, short training on prompt writing, verifying outputs against textbooks and protocols, and protecting patient information should be added to the BSN curriculum [4,8]. Third, educators should design assessments that do not rely only on written

output, so that students must show their own reasoning [9,10].

The study provides local data on a topic that has received little attention in Pakistani nursing education. It also has limitations. The sample was homogeneous (all BSN students from private institutes), so findings cannot be generalised to diploma or public-sector students or to other provinces. Data were self-reported and collected through WhatsApp groups, which may over-represent active and digitally comfortable students. The questionnaire was developed for this study and did not measure cost, a barrier identified in earlier work [21], and the cross-sectional design cannot show causal direction. Future studies should use probability sampling across programme types, validate the instrument, and follow students over time to examine effects on learning and clinical safety.

5. Conclusion

Nursing students of Multan in the surveyed institutes have taken up generative AI widely, mainly to understand concepts, summaries notes and write assignments, and they rate it as useful while remaining concerned about privacy, accuracy and academic integrity. Concern did not reduce use. None had received AI training, and few knew of an institute policy. Students are therefore ahead of the guidance meant to support them. Nursing institutes should introduce clear rules, practical training on verifying AI output and protecting patient information, and assessment methods that encourage responsible use, so that students gain the benefits of these tools without losing the critical thinking that safe nursing care requires.

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