



RESEARCH PAPER

Use of and Attitudes towards Artificial Intelligence Tools and their Association with Academic Performance among Female Undergraduate Nursing Students: A Cross-Sectional Study from Sahiwal, Pakistan

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ABSTRACT

This study determines the extent to which female nursing students from Sahiwal, Pakistan are using AI and how they perceive it. The relationship between frequency of AI usage and their academic performance was also explored. With recent emergence of ChatGPT and other AI tools, these have begun to get absorbed into learning processes of students, with the risk of over-reliance. Cross-sectional survey design was used. Participants were volunteer BS Nursing students of College of Nursing, Sahiwal. A bilingual paper questionnaire was completed by participants. Data was analyzed using SPSS for Spearman's correlation and non-parametric tests. All students had used AI, and the majority used ChatGPT. About half used AI daily, mostly for understanding difficult concepts. Most believed heavy use could weaken thinking. Higher frequency of AI use was associated with lower academic performance. Colleges should make rules for usage of AI. Teachers should teach proper usage of AI for learning.

KEYWORDS Artificial Intelligence, ChatGPT, Nursing Students, Academic Performance, Nursing Education, Pakistan

Introduction

Generative artificial intelligence (AI) tools, such as ChatGPT, have been rapidly introduced into higher education since late 2022. These tools can aid students with learning and completing writing tasks. However, there are concerns about the accuracy of generated content, the potential for over-reliance on AI, and its impact on students' ability to think critically. The use of AI tools as academic support can also negatively affect academic integrity (Kasneci et al., 2023).

The purpose of this study was to describe the extent to which female undergraduate nursing students use artificial intelligence (AI) in their academic work, to assess their attitudes regarding the use of AI in their studies, and to examine the relationship between frequency of AI use and their academic performance.

Literature Review

The uses and misuse of ChatGPT in educational settings have recently been discussed in the literature. A systematic review on the use of ChatGPT in health professions education reported that while ChatGPT has the potential to support learning and academic writing, it can also present risks such as the provision of inaccurate information, unethical use and, most importantly, students relying on it for thinking and problem solving instead of developing their own critical thinking skills (Sallam, 2023).

Thus, such tools can be used for academic good or misused in nursing education (O'Connor & ChatGPT, 2023).

Studies on the use of AI by nursing students across the globe are becoming increasingly common. For instance, a cross-sectional study of 304 nursing students in Palestine found that 58.6% of participants used AI in their academic coursework, and the majority supported including AI in the nursing curriculum. However, 69.9% reported never having received formal training on the use of AI (Salama, Bsharat, Alwawi, & Khlaif, 2025). A cross-sectional study of 279 nursing students in Albania found that about 84% used AI, mostly ChatGPT for information searching (Taka et al., 2026). A survey of healthcare students and professionals across Pakistan found that 78.7% had never received formal training on AI, and most believed that AI competencies should begin at the undergraduate level (Habib, Hoodbhoy, & Siddiqui, 2024).

Findings on the relationship between AI use and academic performance are mixed. Studies of university students in Pakistan have found a correlation between heavy use of ChatGPT and procrastination, decreased memory and lower academic grades (Abbas, Jam, & Khan, 2024). Similarly, higher academic use of generative AI tools was correlated with lower cumulative grade point average (CGPA) and a decreased sense of academic self-efficacy (Azeem & Abbas, 2025). However, a recent study of nursing students in Albania found that students with mid-to-high grades used AI tools more than those with the lowest grades (Taka et al., 2026). Little is known about how often Pakistani nursing students use AI, for what purposes, and whether this is related to their academic results.

Material and Methods

Study design and setting: This descriptive cross-sectional study was carried out at the College of Nursing, Sahiwal, Pakistan, a nursing college for women affiliated with the University of Health Sciences (UHS), Lahore. Data were collected in September and October 2026.

Population, sample size and sampling: The study population consisted of all female students enrolled in the four-year Bachelor of Science (BS) Nursing programme at the College of Nursing, Sahiwal (N = 400). According to the table of Krejcie and Morgan (1970), at a 95% confidence level and 5% margin of error, the minimum required sample size was 196. A voluntary (convenience) sampling technique was used. The study was announced on the college notice boards, inviting all first- to fourth-year BS Nursing students to participate. A total of 201 completed questionnaires were included in the analysis.

Data collection instrument: A researcher-developed, self-administered questionnaire was used in English, with an Urdu translation of every item. The instrument consisted of four sections:

1. Background information (10 items): age, year of study, residence, home area, device mainly used for study, internet access at home and last academic result.

2. Pattern of AI use (5 items): awareness of different AI tools, AI use for studies in the past, the tools used, frequency of use (daily, few times a week, once a week, seldom) and purposes of use.

3. Opinions about AI (12 statements): on a 5-point Likert scale from 1 (strongly disagree) to 5 (strongly agree) including perceptions of positive and negative outcomes as well as perceptions of the need for guidance to use AI.

4. Open-ended optional question how to best use AI in higher education.

Academic performance: For the purpose of this study the last CGPA or percentage by the participants were recorded. For semester-system students (first to third year), CGPA was grouped into four categories: below 2.50 (low), 2.50 to 3.00 (average), 3.01 to 3.50 (good) and above 3.50 (excellent). For annual-system students (fourth year), percentage marks were converted to the same categories using the official UHS grading scale (University of Health Sciences [UHS], 2025): below 65% (low), 65–74% (average), 75–79% (good) and 80% and above (excellent).

Data collection procedure: Students who were willing to participate in the study collected a copy of the questionnaire from the researcher's office and completed it within the college premises under the researcher's supervision. The students were explained as to why they were required to complete the questionnaire and participants assured of their anonymity. No name or roll number was recorded of any participant. To protect their identity, participants placed completed questionnaires in a collection box. Each completed questionnaire was assigned a serial number. The data from all questionnaires were entered using a data-entry form in a spreadsheet.

Ethical considerations: Exempt Status: This study was exempted from full review by the Institutional Review Board (IRB) of the College of Nursing, Sahiwal on September 22, 2026. Since there was no intervention used in this study, the following conditions had to be met in order for it to be exempted from full IRB review: participants were or could be so notified that their participation was completely voluntary; only paper copies of the questionnaires were used; and findings from the study would be shared with the college.

Permission to conduct the study was granted by the Principal, College of Nursing, Sahiwal, on 17 September 2026. Participation was voluntary and anonymous. By completing and returning the questionnaire, participants gave their informed consent after being informed of the purpose of the study.

Statistical analysis: Frequencies and percentages were calculated for categorical variables, and means and standard deviations (SDs) for Likert items, together with the proportion agreeing (4 or 5) and disagreeing (1 or 2). Opinion items were initially grouped into three domains (benefits, concerns and need for guidance), but internal consistency was low (Cronbach's alpha = .25, -.67 and -.47, respectively); therefore, each statement was analysed and reported separately. Spearman's correlation was used to examine the relationship between frequency of AI use and academic performance, as both variables were ordinal, and a partial correlation was calculated to control for year of study. The chi-square test compared daily with less frequent AI use across academic performance groups. Differences in frequency of AI use by residence and home area were tested with the Mann-Whitney U test, and by year of study and main study device with the Kruskal-Wallis test. As an additional exploratory analysis, Spearman's correlation was used to examine the relationship of academic performance with each purpose of AI use and with the number of purposes reported. A p-value below .05 was considered statistically significant. Data were analysed using IBM SPSS Statistics version 27.0 (IBM Corp., 2020), and findings were cross-checked with Python 3.13 (SciPy 1.18).

Results and Discussion

The sample consisted of 201 female students from the first to fourth year of the BS Nursing programme. More than half of the participants were aged 21–23 years (55.2%), and the largest group was in the third year of study (35.8%). Most participants lived in the college hostel (77.1%) and came from urban areas (70.1%). The smartphone was the most commonly used study device (60.7%), followed by both smartphone and laptop (30.8%). Nearly all participants (98.5%) had internet access at home. Academic performance could be classified for 163 students (81.1%) (Table 1).

Table 1
Characteristics of participants (N = 201)

Characteristic	Category	n (%)
Age (years)	18–20	90 (44.8)
	21–23	111 (55.2)
Year of study	First	38 (18.9)
	Second	48 (23.9)
	Third	72 (35.8)
	Fourth	43 (21.4)
Residence	Hostel	155 (77.1)
	Day scholar	46 (22.9)
Home area	Urban	141 (70.1)
	Rural	60 (29.9)
Main device for study	Smartphone	122 (60.7)
	Laptop/computer	17 (8.5)
	Both	62 (30.8)
Internet at home	Yes	198 (98.5)
	No	3 (1.5)
Academic performance	Low	18 (9.0)
	Average	67 (33.3)
	Good	30 (14.9)
	Excellent	48 (23.9)
	Not available	38 (18.9)

All (100%) of the students included in this study had heard of tools that utilized AI and had used them in academic endeavors. Half of students (47.8%) utilized these tools on a daily basis. The most used tools for students in this study included ChatGPT (84.6%), Google Gemini (65.7%), and Meta AI (23.9%). Students used AI for a variety of purposes including understanding difficult academic material (90.0%), completing written assignments (53.7%), and checking grammar and writing in general (51.7%) (See Table 2).

Table 2
Pattern of AI tool use (N = 201)

Variable	Category	n (%)
Frequency of use	Daily	96 (47.8)
	A few times a week	57 (28.4)
	Once a week	22 (10.9)
	Rarely	25 (12.4)
	Not reported	1 (0.5)
Tools used*	ChatGPT	170 (84.6)
	Google Gemini	132 (65.7)
	Meta AI	48 (23.9)
	Others (Copilot, Claude, DeepSeek)	4 (2.0)
Purposes of use*	Understanding difficult topics	181 (90.0)
	Writing assignments	108 (53.7)

Variable	Category	n (%)
	Checking grammar and writing	104 (51.7)
	Exam preparation	60 (29.9)
	Summarizing notes or books	57 (28.4)
	Making presentations	53 (26.4)
	Translation (English ↔ Urdu)	52 (25.9)

Multiple responses allowed

Attitudes toward AI: All students agreed that AI helps them understand difficult topics (mean = 4.92, SD = 0.28) and that students may become dependent on AI (mean = 4.81, SD = 0.39). Most agreed that AI saves study time (95.0%) and that using AI too much can weaken their own thinking ability (92.5%), and 87.1% agreed that information from AI tools is not always correct. Few believed that AI improves their English writing (9.5%) or their grades (5.5%). Nearly two-thirds (62.7%) agreed that submitting AI-written assignments is cheating, while only 25.9% considered AI important for their future career. Just over half of the respondents (55.2%) wanted clear AI rules at college (Table 3).

Table 3
Nursing students' attitudes towards AI tools (N = 201)

Statement	Mean (SD)	Agree n (%)	Disagree n (%)
AI tools help me understand difficult topics.	4.92 (0.28)	201 (100.0)	0 (0.0)
AI tools save my study time.	4.04 (0.40)	191 (95.0)	1 (0.5)
AI tools improve my writing in English.	2.27 (0.82)	19 (9.5)	136 (67.7)
AI tools can help improve my grades.	2.87 (0.54)	11 (5.5)	31 (15.4)
Information from AI tools is not always correct.	3.80 (0.58)	175 (87.1)	16 (8.0)
Using AI too much can weaken my own thinking ability.	4.30 (0.62)	186 (92.5)	1 (0.5)
Submitting AI-written assignments is cheating.	3.72 (0.62)	126 (62.7)	0 (0.0)
Students may become dependent on AI tools.	4.81 (0.39)	201 (100.0)	0 (0.0)
Teachers should teach students how to use AI properly.	3.79 (0.75)	138 (68.7)	10 (5.0)
My college should have clear rules about AI use.	3.51 (0.92)	111 (55.2)	15 (7.5)
Students should be allowed to use AI if they mention it.	3.77 (0.50)	152 (75.6)	2 (1.0)
AI tools will be important for my future career.	2.72 (1.13)	52 (25.9)	92 (45.8)

Scale 1–5; agree = 4 or 5, disagree = 1 or 2; the remainder were neutral.

AI use and academic performance: We found a significant negative correlation between frequency of use of AI and academic performance ($\rho = -0.59$, $p < .001$; $n = 162$). The percentage of daily users of AI decreased as academic performance increased: 82.4% of low performers used AI daily compared with 20.8% of excellent performers ($\chi^2 = 37.89$, $df = 3$, $p < .001$). After controlling for year of study, the correlation remained significant (partial $\rho = -0.56$, $p < .001$). It was also significant within each year of study: first year ($\rho = -0.74$), second year (-0.72), third year (-0.35) and fourth year (-0.50), all $p < .05$ (Table 4).

Table 4
Frequency of AI use by academic performance (n = 162)

Academic performance	Daily n (%)	A few times a week n (%)	Once a week n (%)	Rarely n (%)
Low (n = 17)	14 (82.4)	3 (17.6)	0 (0.0)	0 (0.0)
Average (n = 67)	44 (65.7)	21 (31.3)	1 (1.5)	1 (1.5)
Good (n = 30)	7 (23.3)	13 (43.3)	6 (20.0)	4 (13.3)
Excellent (n = 48)	10 (20.8)	5 (10.4)	14 (29.2)	19 (39.6)

Row percentages. Spearman's $\rho = -0.59$, $p < .001$. One low-performing student did not report frequency of use.

Frequency of use by student characteristics: Frequency of AI use differed significantly by year of study ($p = .018$), residence ($p = .024$) and main study device ($p = .007$), but not by home area ($p = .569$). Daily use was highest among third-year students (57.7%), hostel residents (51.9%) and students who used only a smartphone (54.5%) (Table 5).

Table 5
Daily AI use by student characteristics (n = 200)

Characteristic	Category	Daily use n (%)	p-value
Year of study	First (n = 38)	19 (50.0)	.018†
	Second (n = 48)	19 (39.6)	
	Third (n = 71)	41 (57.7)	
	Fourth (n = 43)	17 (39.5)	
Residence	Hostel (n = 154)	80 (51.9)	.024‡
	Day scholar (n = 46)	16 (34.8)	
Home area	Urban (n = 141)	70 (49.6)	.569‡
	Rural (n = 59)	26 (44.1)	
Main device	Smartphone (n = 121)	66 (54.5)	.007†
	Laptop/computer (n = 17)	7 (41.2)	
	Both (n = 62)	23 (37.1)	

†Kruskal-Wallis test; ‡Mann-Whitney U test, both comparing the full four-level frequency scale.

Purposes of AI use and academic performance (exploratory): Students with higher academic performance reported fewer purposes of AI use (mean = 3.89 for low performers vs 2.40 for excellent performers; $\rho = -.46$, $p < .001$). Excellent performers mainly used AI to understand difficult topics (100%), whereas low performers used AI more for writing assignments (72.2% vs 25.0%), making presentations (50.0% vs 0%), checking grammar (83.3% vs 35.4%) and translation (55.6% vs 12.5%) (Table 6).

Table 6
Purposes of AI use by academic performance (n = 163)

Purpose	Low (n = 18)	Average (n = 67)	Good (n = 30)	Excellent (n = 48)	rho	p
Understanding difficult topics	15 (83.3)	55 (82.1)	26 (86.7)	48 (100.0)	.22	.006
Writing assignments	13 (72.2)	50 (74.6)	17 (56.7)	12 (25.0)	-.40	< .001
Checking grammar and writing	15 (83.3)	43 (64.2)	9 (30.0)	17 (35.4)	-.34	< .001
Making presentations	9 (50.0)	33 (49.3)	3 (10.0)	0 (0.0)	-.49	< .001
Translation (English ↔ Urdu)	10 (55.6)	19 (28.4)	4 (13.3)	6 (12.5)	-.28	< .001
Exam preparation	2 (11.1)	17 (25.4)	9 (30.0)	15 (31.3)	.12	.138
Summarizing notes or books	6 (33.3)	18 (26.9)	8 (26.7)	17 (35.4)	.05	.567
Number of purposes, mean (SD)	3.89 (1.23)	3.51 (1.25)	2.53 (1.33)	2.40 (1.38)	-.46	< .001

Values are n (%) unless stated. Spearman's correlation between academic performance group and each purpose.

Discussion

All participants had used AI tools for learning, and this study gives insight into the extent, frequency and main purposes of AI use among female undergraduate nursing students.

The rate of AI use in this sample was higher than the 84% reported among Albanian nursing students (Taka et al., 2026) and the 58.6% among Palestinian nursing students (Salama et al., 2025). ChatGPT was the most commonly used tool (84.6%). The vast majority of students used AI to understand difficult material, suggesting that this group mainly uses AI as a learning aid. However, more than half also used it for writing assignments (53.7%) and checking grammar and written work (51.7%), and about a quarter used it for making presentations (26.4%). Such use raises important questions about academic integrity (O'Connor & ChatGPT, 2023).

All students agreed that AI helps them understand study material, yet all of them also agreed that students could become dependent on it. Moreover, 92.5% felt that heavy use of AI could weaken their own thinking. Students' written comments expressed similar views, for example: "it is a tool we should take help from it but we should not totally rely on it", "AI is itself not bad, it's helping us but it is not substitute of books" and "AI is skill killer." Similar concerns about AI have been raised in health professions education (Sallam, 2023). Most students did not feel that AI helped them improve their English writing skills. A possible explanation is that language skills are acquired through the practical application of writing and speaking, and using AI to write on students' behalf may reduce such practice. Only about one quarter of the students felt that AI would be important for their future careers. This suggests that most students viewed AI as a study aid rather than a professional skill, which is consistent with the lack of formal AI training reported among healthcare students in Pakistan (Habib et al., 2024).

Frequency of AI use and academic performance: There was a strong association between frequency of AI use and academic performance. Results of this study indicated that more than 80% of the underperforming students used AI on daily basis as compared to about 20% of students who were excellent performers. Findings of current study concur with those of Abbas et al. (2024) who noticed that individuals who used ChatGPT more tended to have lower grades, procrastination, and memory loss. Additionally, Azeem and Abbas (2025) found that students who used AI more for academic purposes had lower CGPA. In contrast to the above studies, results of Taka et al. (2026) indicated that nursing students with mid-to-high grades tended to use more AI.

This discrepancy may be due to differences in measurement: that study measured whether students used AI at all, whereas this study measured how often they used it. All participants in this study were AI users. Consequently, it might be more meaningful to look at frequency of use of AI instead of number of users. An exploratory analysis of the purposes for which excellent performers and low achieving students used AI indicated that the excellent performers used AI more to understand concepts whereas low achieving students used AI more for production purposes such as writing essays, making presentations and checking grammar.

An important point to make about this study as it is cross-sectional is that it is not possible to make the assumption that underperforming students at academia are using more AI to complete work, than those of high academic ability, and therefore potentially getting poor results due to lack of deep understanding of material studied using AI.

Opinion statements: The lack of internal consistency for the opinion items was to be expected as each individual item represents a distinct view as opposed to one construct, and most of the domains contained only a few items (Tavakol & Dennick, 2011). Several of the individual items were deemed to be near to unanimous agreement by students. The findings based on behavioural items (frequency and purposes of use, and their association with academic performance) were not affected.

Differences by student characteristics: The data revealed that the daily use of AI was greater in case of the students living in hostels and those using only a smartphone. The students living in hostels depend more on AI because of lack of support from their family, and a smartphone enables its user to use AI 24/7.

Third-year students had the highest frequency of daily use, possibly because of their greater academic and clinical workload; workload and time pressure have also been found to drive ChatGPT use (Abbas et al., 2024).

Results of the students' responses showed that they needed teachers to guide them on how to use AI properly and that they were willing to learn to use it in an organized manner. 68.7% agreed with the statement that teachers should teach students proper use of AI and 75.6% agreed with the statement that students should be allowed to use AI if they declare that they are using it. Nursing colleges may consider holding AI literacy sessions that teach students how to verify information obtained from AI, how to use AI to support rather than replace learning, and how to declare their use of AI honestly.

Limitations

This study has several limitations. First, it was conducted in a single women's nursing college, so the findings may not be generalised to male students or to students in other disciplines. Second, the cross-sectional design allows only association, not cause, to be established. Third, CGPA and percentage marks were self-reported and could not be verified against college records. Fourth, academic performance could not be classified for 38 students (18.9%), mainly annual-system students who did not report an exact percentage. Fifth, overall percentages were converted using the UHS subject-level grading scale, which is an approximation. Sixth, the questionnaire was researcher-developed, and its opinion statements, with few items per domain, did not show internal consistency as subscales; they were therefore analysed individually. Seventh, voluntary sampling may have introduced self-selection bias. Finally, similar response patterns among some forms suggest that some students may have discussed their answers with peers.

Conclusion

All female undergraduate nursing students in this sample used AI in their studies, and nearly half used it every day. ChatGPT was the most commonly used tool. Students had positive views of AI for learning but were aware of the risks of overuse, and more frequent AI use was strongly associated with lower academic performance.

Recommendations

- Nursing colleges should develop clear, written policies on acceptable AI use in assignments and assessments.

- Nursing students should learn how to verify information received from AI, use AI responsibly and declare their use of AI in academic work honestly.
- Teachers need to show students how to best use AI for learning purposes and avoid abusing it.
- Students who are frequent users of AI but are not performing well academically should be referred for study-skills support.
- Longitudinal or multi-centre studies, including male students and verified academic records, should be carried out to clarify the link between AI use and academic performance.

Declarations

Ethics approval: Exempted from full review by the Institutional Review Board, College of Nursing, Sahiwal, on 22 September 2026. Permission was granted by the Principal, College of Nursing, Sahiwal, on 17 September 2026. As required by the IRB, the findings of this study will be shared with the college.

Informed consent: Participation was voluntary and anonymous. Completion and return of the questionnaire constituted informed consent to participate in the study.

Conflict of interest: The author declares no conflict of interest.

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Author contributions: Muhammad Luqman – Conceptualization; Methodology; Investigation; Data Curation; Formal Analysis; Writing (Original Draft); Writing (Review & Editing). The author approved the final manuscript.

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AI Use Statement

The author used Claude (Anthropic) to assist with drafting the questionnaire, writing the statistical analysis code, preparing an initial draft and the organisation of the manuscript, and language editing and checking. The author rewrote the manuscript in his own words, re-ran all analyses in IBM SPSS Statistics 27.0, and reviewed and verified all content. The author takes full responsibility for the work.

Data Availability Statement

The dataset generated and analyzed during the current study is available from the corresponding author upon reasonable request.

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