



Original Research Article

UTILIZATION AND PERCEPTION OF ARTIFICIAL INTELLIGENCE TOOLS IN SCIENTIFIC RESEARCH WRITING AMONG POSTGRADUATE MEDICAL STUDENTS OF EASTERN GUJARAT, INDIA

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Received : 22/08/2026
Received in revised form : 17/09/2026
Accepted : 01/10/2026

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DOI: 10.70034/ijmedph.2026.4.57

Source of Support: Nil,

Conflict of Interest: None declared

Int J Med Pub Health

2026; 16 (4); 390-395

ABSTRACT

Background: The rapid integration of Artificial Intelligence (AI) is transforming academic research and scientific writing. While offering substantial efficiency in Literature synthesis and drafting, these tools introduce critical challenges regarding transparency, original authorship and research integrity. **Objectives:** To assess the awareness, utilization patterns and perceptions of AI tools in scientific research writing among postgraduate (PG) medical students and to evaluate self-reported disclosure practices and institutional training needs.

Materials and Methods: An institutional Mix Method study was conducted among 104 PG medical residents At a tertiary care teaching hospital in Dahod Gujarat, between August 2025 to February 2026. Data were collected using A validated, pre-tested, self-administered questionnaire covering socio-demographics, domain-specific awareness/experience. A 14-item Likert-scale instrument on AI integration (Cronbach's $\alpha = 0.857$, Scale-Content Validity Index S-CVI = 0.975) and qualitative responses on barriers and disclosure practices. Statistical analysis included descriptive metrics and inferential cross-tabulations using Chi-square (χ^2) test.

Results: Out of 140 eligible postgraduate residents, 104 (74.29%) participated in the survey. The mean age was 26.8 ± 2.1 years, with 65.38% males and 33.65% females. Overall, 94.23% (n=98) were aware of AI tools and 88.46% (n=92) were comfortable using AI for scientific writing. However, only 41.35% (n=43) were aware of established ethical guidelines for AI use in academic publishing. AI was mainly used for language/grammar refinement, literature search, paraphrasing and citation formatting. A major disclosure gap was observed with 59.62% (n=62) never disclosing AI assistance in research submissions. Ethical awareness was significantly higher among second-year residents (54.55%) than first-year residents (31.67%), ChatGPT was the most commonly used AI tool (97.11%), followed by Gemini (58.65%). Social media/blogs (72.10%) and peer discussions (64.40%) were the major sources of AI-related learning. Most residents (89.42%, n=93) requested formal AI-ethics workshops. Overall, the findings indicate positive AI adoption but important gaps in ethical awareness and disclosure practices among postgraduate medical residents.

Conclusion: AI adoption is pervasive among PG medical trainees, yet ethical literacy and transparent disclosure lag substantially behind utility. Medical education programs must implement structured curricula, institutional standard operating procedures (SOPs) and mandatory disclosure frameworks.

Keywords: Artificial Intelligence, Medical Writing, Ethics, Research, Education, Medical, Graduate.

INTRODUCTION

Artificial intelligence (AI) especially generative pre-trained transformers such as ChatGPT has brought a major change in the way scientific papers are written and published.^[1,2] These tools help researchers by speeding up literature review, organizing manuscripts, correcting grammar and managing references. In this way, they reduce the mental workload of researchers.^[1,3,4]

Postgraduate (PG) medical trainees are new researchers who are highly active but also face many challenges.^[5,6] Along with their busy clinical duties, they must complete their dissertations and publish research papers. This double burden often makes it difficult for them to select research topics, write in academic language and manage references.^[2,4] Because of this, digital writing tools such as ChatGPT, Grammarly, QuillBot and Zotero have become very popular among young researchers. as they save time and improve the quality of written work.^[7,8]

However, using AI in scientific writing without proper guidance raises serious ethical concerns.^[1,6,8,9] The main risks include fake but believable references, threats to patient data confidentiality, confusion about intellectual property and weakening of the researcher's own analytical thinking.^[1,2,9] Considering these risks, major international bodies such as the International Committee of Medical Journal Editors (ICMJE) and the Committee on Publication Ethics (COPE) have clearly stated that AI tools cannot be listed as authors and researchers must openly disclose if they have used AI in their manuscripts.^[2,9]

Although this topic is being discussed widely across the world, very little data is available about how postgraduate trainees actually use these tools and whether they honestly disclose their use.^[7,10,11] Earlier studies have looked at general awareness, acceptance and the overall impact of AI on academic writing,^[12] but there is limited evidence about this specific "disclosure gap".

Therefore, we conducted this study to assess the awareness, usage patterns and perceptions regarding AI in research writing among postgraduate medical residents of a tertiary care teaching institute in Gujarat. We also studied how these factors vary with academic seniority and specialty and examined whether residents disclose their AI use and what kind of institutional support they need.

MATERIALS AND METHODS

Study Design, Setting, and Period

This institutional, analytical cross-sectional study was conducted by the Department of Community Medicine at Zydus Medical College and Hospital (ZMCH) Dahod Gujarat, between August 2025 to February 2026.

Study Population, Sampling Frame and Participant Flow

The source population comprised all 140 postgraduate medical students (MD/MS residents across 1st and 2nd years) enrolled across clinical, Para-clinical and pre-clinical departments at ZMCH Dahod during the study period. Purposive sampling was employed.

- Total Source Population (N): 140 postgraduate residents.
- Approached: 140 residents.
- Non-responders: 36 residents.
- Final Completed Questionnaires Analyzed (n): 104 residents (Overall response rate: 74.29%).

Inclusion criteria required active residency enrollment, initiation of academic writing or dissertation protocol work and provision of written informed consent. No language barrier exclusions occurred as all registered postgraduates were proficient in English, the institutional medium of instruction and research writing.

Sample Size Determination

The sample size was estimated using the single proportion formula:

$$n_0 = \frac{z^2 pq}{e^2}$$

Where $Z = 1.96$ at a 95% confidence interval, prevalence (p) of AI awareness/usage of 50% (0.50), $q = 1 - p = 0.50$ and absolute allowable margin of error (e) of 5% (0.05). This yielded an initial unadjusted sample size (n_0) of 384.

Applying the finite population correction for the known postgraduate institutional population ($N = 140$):

$$n = \frac{n_0}{1 + \frac{(n_0 - 1)}{N}}$$

$$n = 384 / [1 + (383 / 140)] = 384 / (1 + 2.7357) = 384 / 3.7357 \approx 102.8$$

The adjusted minimum required sample size was 103 participants. A total of 104 residents completed the study, meeting statistical power requirements.

Data Collection Tool and Psychometric Validation

Data were collected by a structured, self-administered questionnaire developed following an extensive literature review and adapted from validated instruments. The tool was structured into four sections:

- Section I: Socio-demographic and academic characteristics (age, gender, postgraduate year, specialty category, and publication/ongoing research output).
- Section II: Categorical (Yes/No) domain-specific items assessing Awareness, Practical Experience, Perceptions, Curricular Attitudes and specific Disclosure Practices in research submissions.
- Section III: A 14-item psychometric Likert scale assessing specific functional dimensions of AI integration (academic writing efficiency, analytical support, dependency concerns and ethical implications). Responses were measured on a 5-

point scale: 1 = Strongly Agree, 2 = Agree, 3 = Neutral, 4 = Disagree, 5 = Strongly Disagree. However lower mean scores indicate higher agreement. Internal consistency was high (Cronbach's alpha = 0.857). Content validity showed a Scale-Content Validity Index (S-CVI) of 0.975 with individual item-total Pearson correlation coefficients ranging from 0.345 to 0.718.

- Section IV: Open-ended qualitative items evaluating properly: learning pathways, operational barriers and requested institutional interventions.

Statistical Analysis

Data were entered into Microsoft Excel and analyzed using Microsoft excel. Descriptive statistics (frequencies, percentages, means, standard deviations and standard errors of the mean) were computed. Missing items (specifically 10 responses for research publications) were treated as missing completely at random and evaluated using missing completely at random available-case analysis with valid denominators reported.

Inferential statistics were performed using Chi-square (χ^2) test to evaluate associations between academic variables (residency year, specialty, prior research output) and primary outcomes: ethical

awareness, comfort, perceived impact on creativity and disclosure behaviors. A two-tailed p-value < 0.05 was considered statistically significant.

Ethical Considerations

The study protocol was reviewed and approved by the Institutional Ethics Committee (IEC) of Zydus Medical College and Hospital, Dahod (Approval No.: ZMCH/IEC-03/50(08)-2025). Written informed consent was obtained from all participants prior to enrolment.

RESULTS

Socio-Demographic and Academic Profile

A total of 104 postgraduate medical students participated in the study (Table 1). The mean age was 26.8 ± 2.1 years, with nearly (63.47%) aged between 24 and 27 years. Males predominated (65.38%). More than half were first-year residents (57.69%) and clinical specialties formed the majority (58.65%). Among the 94 residents who responded to the research output item about (68.27%) had 1–2 ongoing or published scientific papers.

Table 1: Baseline socio-demographic and academic characteristics of study participants (N=104)

Characteristic	Category	Number (n)	Percentage (%)
Age Group (years)	24–25	30	28.85
	26–27	36	34.62
	28–29	30	28.85
	≥ 30	8	7.68
Gender	Male	68	65.38
	Female	35	33.65
	Other	1	0.97
Year of Post-Graduation	1st Year (Junior Resident)	60	57.69
	2nd Year (Senior Resident)	44	42.31
Specialty Category	Clinical	61	58.65
	Para-Clinical	24	23.08
	Pre-Clinical	19	18.27
Research Output (n=94)	None	13	12.50
	1–2 Articles	71	68.27
	3–5 Articles	9	8.65
	> 5 Articles	1	0.96
	Missing Responses	10	—

Awareness, Perception, Attitude and the Disclosure Gap

General awareness of AI tools in scientific writing was high (94.23%) with 88.46% of participants reporting comfort in using these platforms. however, only 41.35% were aware of formal ethical guidelines governing AI in academic publishing. A majority (77.88%) expressed concern that AI use

could impair original creative thinking. A notable disclosure gap was observed only 8.65% of residents always disclosed AI assistance while 41.35% never disclosed it. Nevertheless, curricular integration was strongly endorsed with 88.46% supporting formal AI training in the postgraduate curriculum and 89.42% expressing willingness to attend structured institutional workshops (Table 2).

Table 2: Domain-wise distribution of awareness, perception, ethical literacy, and disclosure behavior (N=104)

Domain	Assessment Question	Response	Frequency (n)	Proportion (%)
Awareness	Aware of AI tools for scientific writing.	Yes	98	94.23
		No	6	5.77
	Aware of ethical publishing guidelines for AI.	Yes	43	41.35
		No	61	58.65
Experience	Encountered operational challenges using AI.	Yes	63	60.58
		No	41	39.42
Perception	Comfortable utilizing AI	Yes	92	88.46

Attitude	in research writing.	No	12	11.54
	AI use adversely impacts original creativity.	Yes	81	77.88
	AI training should be in PG curriculum?	No	23	22.12
		Yes	92	88.46
	Interested in attending formal AI workshops?	No	12	11.54
		Yes	93	89.42
Transparency & Disclosure	Frequency of disclosing AI use in manuscripts.	Never	43	41.35
		Sometimes	25	24.04
		Always	9	8.65
		Not Applicable	27	25.96

Inferential Analysis of Academic Factors and Ethical Behaviors

On bivariate analysis, awareness of ethical guidelines was significantly higher among second-year residents than first-year residents (54.55% vs. 31.67%, $\chi^2 = 5.48$, $p = 0.019$). Whereas it did not differ significantly across specialty categories ($\chi^2 = 0.96$, $p = 0.618$). Overall, 42 of 104 residents

(40.38%) had ever disclosed AI use in their research submissions. Disclosure practices showed no significant association with either year of residency ($\chi^2 = 0.62$, $p = 0.433$) and specialty category ($\chi^2 = 0.0046$, $p = 0.998$) with disclosure rates being nearly comparable across clinical (37.70%), Para-clinical (37.5%) and pre-clinical (36.84%) branches (Table 3).

Table 3: Bivariate associations of academic characteristics with ethical guideline awareness and disclosure practices (N=104)

Variable		Ethical Awareness Yes	Ethical Awareness No	χ^2	p-value	Disclosed AI Use Yes	Disclosed AI Use No	χ^2	p-value
Residency Year	1st Year (n=60)	19 (31.67%)	41 (68.33%)	5.48	0.019*	22(36.67%)	38 (63.33%)	0.62	0.433
	2nd Year (n=44)	24 (54.55%)	20 (45.45%)			20 (45.45%)	24 (54.55%)		
Specialty Category	Clinical (n=61)	27 (44.26%)	34 (55.74%)	0.96	0.618	23 (37.70%)	38 (62.30%)	0.0046	0.998
	Para-Clinical (n=24)	10 (41.67%)	14 (58.33%)			9 (37.5%)	15(62.5%)		
	Pre-Clinical (n=19)	6 (31.58%)	13 (68.42%)			7 (36.84%)	12 (63.16%)		

Statistically significant at $p < 0.05$

Quantitative Evaluation of the 14-Item Likert Scale

Residents responses on the 14-item AI integration scale (1 = Strongly Agree to 5 = Strongly Disagree) lower scores indicate stronger agreement are summarized in Table 4. Strongest agreement was observed for practical utility items . “Saves time and reduces effort” (1.798± 0.674), “Improves writing style and grammar” (1.885 ± 0.728) and “Improves

research writing quality” (1.933 ± 0.714). In contrast, the ethical items “Unacknowledged use is unethical” (2.413 ± 0.866) and “Reduces plagiarism” (2.538 ± 0.835) attracted the weakest agreement with neutral responses forming the modal category (36 and 43 respectively), suggesting ambivalence rather than outright disagreement (Table 4).

Table 4: Descriptive statistics and response distributions for the 14-item AI integration scale (N=104)

Item	Mean	SD	SE	SA (1)	A (2)	N (3)	D (4)	SD (5)
Saves time and reduces effort.	1.798	0.674	0.066	33	61	9	0	1
Improves writing style and grammar.	1.885	0.728	0.071	32	54	16	2	0
Improves research writing quality.	1.933	0.714	0.070	27	59	17	0	1
Assists in data analysis.	2.029	0.756	0.074	23	59	19	2	1
Assists in literature review.	2.029	0.689	0.068	20	64	17	3	0
Poses risk of inaccuracy/misinterpretation.	2.144	0.806	0.079	20	55	24	4	1
Improves research skills.	2.173	0.794	0.078	17	60	19	8	0
Enhances collaborative work.	2.202	0.716	0.070	13	62	24	5	0
Recommended to peers.	2.212	0.832	0.082	19	51	28	5	1
Causes dependency and reduces critical thinking.	2.231	0.916	0.090	23	44	28	8	1
Valuable for hypothesis generation.	2.231	0.779	0.076	16	54	28	6	0
Replaces traditional writing methods.	2.260	0.881	0.086	16	57	21	8	2
Unacknowledged use is unethical.	2.413	0.866	0.085	14	44	36	9	1
Reduces plagiarism.	2.538	0.835	0.082	8	44	43	6	3

(Scored on a 5-point Likert scale: (1) SA=Strongly Agree,(2) A=Agree, (3)N=Neutral, (4)D=Disagree, (5)SD=Strongly Disagree , Cronbach's $\alpha = 0.857$).

Among postgraduate medical residents (n=104), ChatGPT (97.11%), Gemini (58.65%), and Grammarly (40.38%) were the most frequently used AI tools. AI literacy was primarily acquired through social media/blogs (72.10%) and peer discussions (64.40%). Overall, informal and easily accessible sources were prominent pathways for AI literacy acquisition (Figure 1 and Figure 2).

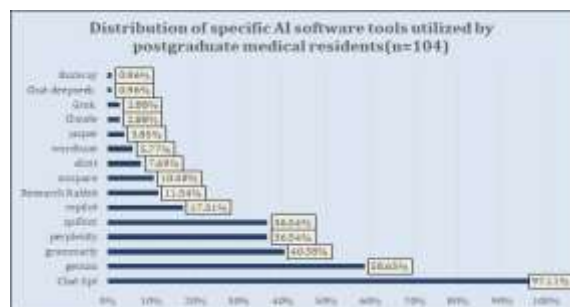


Figure 1: Distribution of specific AI software tools utilized by postgraduate medical residents (N=104)

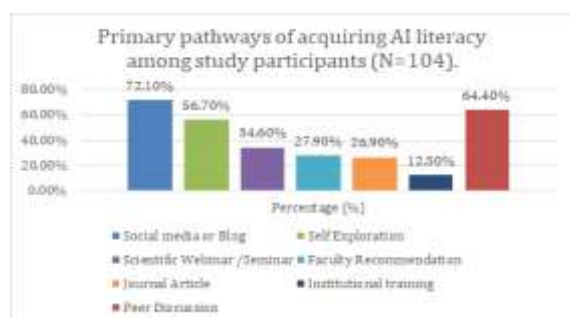


Figure 2: Primary pathways of acquiring AI literacy among study participants (N=104)

Qualitative Thematic Analysis and Institutional Recommendations

Thematic analysis of open-ended responses identified five major themes (Table 5). Residents primarily employed AI for supportive academic tasks: grammar refinement, paraphrasing, literature discovery and summarization of lengthy texts .yet acquired these skills almost exclusively through informal channels such as peer networking, social media and self-directed exploration rather than structured institutional training. Although trainees regarded AI as a valuable assistive drafting tool, they expressed apprehensions regarding fabricated references, plagiarism and erosion of critical thinking, compounded by operational barriers including complex interfaces and inconsistent output accuracy. Respondents accordingly recommended hands-on prompt design workshops, institutional standard operating procedures defining permissible AI use, research ethics training and subsidized software access (Table5).

Table 5: Thematic summary of qualitative perceptions, operational barriers and support needs (N=104)

Core Qualitative Theme	Synthesized Findings and Resident Perspectives
Primary Functional Applications	Grammar refinement, sentence paraphrasing, literature discovery, summarizing long articles, and reference formatting.
Modalities of Tool Acquisition	Informal learning via YouTube/social media, trial-and-error, peer recommendations, and unaccredited online webinars.
Perceived Risks & Apprehensions	Generation of fabricated citations , plagiarism, reduced critical thinking, and intellectual risks.
Operational & Logistical Barriers	Complicated user interfaces, and inconsistent output accuracy.
Requested Institutional Interventions	Hands-on workshops on prompt design, institutional SOPs on permissible AI use, research ethics training and subsidized software access.

DISCUSSION

This study evaluated AI adoption patterns, ethical literacy and disclosure behaviors among postgraduate medical residents at a tertiary care center in Gujarat. The findings demonstrate near-universal awareness (94.23%) and high utility (88.46%) of AI writing tools, contrasted with low awareness of publishing guidelines (41.35%) and disclosure compliance.

AI tools were widely utilized with ChatGPT (97.11%) being the most commonly used followed

by Gemini (58.65%) and other AI tools as per their Requirements.

The findings suggest a generally positive perception and attitude toward AI among postgraduate medical residents with social media/blogs (72.10%) and peer discussions (64.40%) being the main pathways for developing AI literacy.

The high adoption rates observed in the present study align with broader national and international trends.^[1,7,10,11] Monika et al. observed that 89% of Indian research scholars utilized tools such as ChatGPT, QuillBot and Grammarly for editorial and summarization tasks.^[2] Similarly, Jhaggi et al. and

Farhat et al. emphasized that generative models ease the linguistic and structural burden on early-career medical researchers.^[1,9] In our study, the highest agreement on the 14-item scale centered on time savings and linguistic refinement, confirming that residents view AI primarily as an efficiency multiplier during residency training.

The central finding of this investigation is the “disclosure gap” in postgraduate medical research. While 94.23% of participants were aware of AI tools and 88.46% felt comfortable but 41.35% were aware of established ethical guidelines. This builds upon findings by Debbarma et al. who observed limited ethical awareness among postgraduate students in northeastern India.^[3] Inferential analysis revealed that second-year residents had significantly higher ethical awareness (54.55% vs. 31.67%, $p = 0.019$) and disclosure compliance (45.45% vs. 36.67%, $p = 0.433$) than first-year residents, likely reflecting progressive exposure to Institutional Ethics Committees and dissertation reviews. However, even among senior trainees, non-disclosure remained common. As noted by Ramoni et al. and Guleria et al. undisclosed generative AI use compromises scientific accountability and increases the risk of unverified or fabricated data entering the biomedical literature.^[6,12]

Trainees also recognized risks associated with cognitive overreliance. This research also seen that (77.88%) acknowledged uncritical AI reliance could impair independent creative thinking and 60.58% experienced operational challenges. These concerns align with the findings of Eppler et al. who cautioned against accepting AI-generated outputs without verification.^[10]

The high demand (89.42%) for structured institutional workshops highlights an opportunity for curricular intervention. Consistent with recommendations by Rani et al. and Sharma et al. ad-hoc informal learning must be replaced with systematic academic instruction.^[4,5]

PROPOSED 4-PILLAR INSTITUTIONAL AI FRAMEWORK

1. Curricular Integration: Embed AI literacy into compulsory Research Methodology modules, provide hands-on prompt design and reference-verification training.

2. Institutional Ethics & SOPs: Define acceptable vs. unacceptable generative use, establish clear departmental standard operating procedures.

3. Mandatory Disclosure Templates: Require ICMJE-aligned AI declaration forms for dissertations and protocols with explicit statements on software, prompts and verification.

4. Institutional Access & Governance: Provide subsidized access to secure, validated academic tools and implement institutional plagiarism and AI-screening safeguards.

Limitations

This was a single-center study, which may limit generalizability to other regions in India and the data rely on self-administered questionnaires.

Future Directions

Larger multi-center studies across Indian medical institutions are warranted to establish national benchmarks on AI usage and disclosure. Future interventional research should evaluate whether structured AI-ethics modules improve disclosure compliance and reduce referencing errors in postgraduate dissertations.

CONCLUSION

Postgraduate medical trainees actively use AI technologies for scientific writing but awareness of publishing ethics and transparent disclosure practices remains deficient. Medical colleges and health universities must establish clear institutional policies, standard disclosure protocols and formal training workshops to ensure the ethical and transparent integration of AI tools in biomedical research.

REFERENCES

1. Jhaji KS, Jindal P, Kaur K. Use of Artificial Intelligence Tools for Research by Medical Students: A Narrative Review. *Cureus*. 2024;16(3):1–9.
2. Monika M, Divyavarsini V, Suganthan DC. A survey on analyzing the effectiveness of AI tools among research scholars in academic writing and publishing. *Int J Adv Res Innov Ideas Educ*. December 2023 [Internet]. 2023;9(6):1293. Available from: <https://www.researchgate.net/publication/376198760>
3. Samar Debbarma RKM and MAGA. AI Literacy, Awareness, and Use among Postgraduate Students in India: A Study of Tripura University. In: 14th International Conference of University Librarians Association of Sri Lanka AI. 2023.
4. Rani S, Kumari A, Ekka SC, Chakraborty R. Perception of Medical Students and Faculty Regarding the Use of Artificial Intelligence (AI) in Medical Education: A Cross-Sectional Study. *Cureus*. 2025;17(1):1–15.
5. Sharma V, Saini U, Pareek V, Sharma L, Kumar S. Artificial Intelligence (AI) Integration in Medical Education: A Pan-India Cross-Sectional Observation of Acceptance and Understanding Among Students. *Scr Medica (Banja Luka)*. 2023 Dec 1;54(4):343–52.
6. Ramoni D, Sgura C, Liberale L, Montecucco F, Ioannidis JPA, Carbone F. Artificial intelligence in scientific medical writing: Legitimate and deceptive uses and ethical concerns. *Eur J Intern Med* [Internet]. 2024;127(June):31–5. Available from: <https://doi.org/10.1016/j.ejim.2024.07.012>
7. Pashkovskyy V.M., Pashkovska N.V. TIO. Perspectives of Using Artificial Intelligence in Postgraduate Medical Education. *SWorldJournal*. 2023;(20–02):61–4.
8. Farhat KH, Arfa MA. The Role of Artificial Intelligence in Scientific Writing. *Int J Sci Healthc Res*. 2024;9(4):153–5.
9. Pandey B, Scholar ME, Singh JK. Study Of Attitude Of Students Studying In Post Graduate Towards Academic Research. *IJCRTORG*. 2023;11(6).
10. Michael Eppler, Timothy Chu, Inderbir Gill GC. The benefits and dangers of artificial intelligence in healthcare research writing. *Uro-Technology J*. 2023;7(1):1–2.
11. Agung Rinaldy Malik, Yuni Pratiwi, Kuusubakti Andajani, IWayan Numertayasa, Sri Suharti, Arisa Darwis M. Exploring Artificial Intelligence in Academic Essay: Higher Education Student's Perspective. *Int J Educ Res Opem*. 2023;(5):1–11.
12. Guleria A, Krishan K, Sharma V, Kanchan T. ChatGPT: ethical concerns and challenges in academics and research. *J Infect Dev Ctries*. 2023;17(9):1292–9.