

# CHATGPT IN ACADEMIC RESEARCH: ADOPTION PATTERNS, ATTITUDES, AND ETHICAL PERCEPTIONS AMONG PAKISTANI RESEARCHERS

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## ABSTRACT

The rapid emergence of generative artificial intelligence (AI), particularly ChatGPT, has transformed academic workflows and raised critical questions regarding its role in scholarly research. Despite growing global discourse, empirical evidence on researchers' adoption patterns and ethical perceptions remains limited, especially in low- and middle-income countries. This study aimed to assess researchers' awareness, adoption, attitudes, and ethical perceptions regarding ChatGPT in academic research, and to identify key predictors of its use. A national cross-sectional web-based survey was conducted among 237 researchers affiliated with universities and research institutions across Pakistan. A structured questionnaire evaluated awareness, usage patterns, perceived benefits, and ethical concerns related to ChatGPT. Descriptive statistics and multivariable logistic regression analyses were performed to examine factors associated with ChatGPT adoption. Overall, 67.1% of participants were aware of ChatGPT, while only 11.4% reported using it in academic research. Use was primarily limited to low-risk tasks such as paraphrasing and literature searching. Approximately half of respondents perceived ChatGPT as useful for improving research efficiency, whereas 46.4% expressed ethical concerns related to accountability and research integrity. Notably, 37.1% considered that ChatGPT could qualify for authorship under certain conditions. Multivariable analysis indicated that prior familiarity with chatbot technologies was a strong independent predictor of use (adjusted odds ratio [AOR] = 15.62, 95% CI 7.45–32.78,  $p < .001$ ), while younger age was modestly associated with higher adoption (AOR = 1.08 per year decrease, 95% CI 1.01–1.16,  $p = .03$ ). Despite widespread awareness, the adoption of ChatGPT in academic research remains limited and cautious. Ethical uncertainty, concerns regarding reliability, and lack of clear institutional guidance appear to constrain its integration. These findings highlight the need for structured AI literacy training, explicit disclosure policies, and robust governance frameworks to ensure responsible and transparent use of generative AI in scholarly research, particularly in resource-constrained settings.

**Keywords:** Generative AI; ChatGPT; Research Ethics; Academic Integrity; Artificial Intelligence; Cross-Sectional Study; Pakistan

## Introduction

The rapid advancement of artificial intelligence (AI) has fundamentally reshaped multiple

domains of human activity, including healthcare, education, industry, and scientific research. Among recent developments, generative AI

systems such as ChatGPT developed by OpenAI and publicly released in November 2022 have attracted unprecedented academic and public attention due to their ability to generate coherent, context-sensitive, and human-like text through conversational interaction (OpenAI, 2023). Unlike earlier language models, ChatGPT is openly accessible and optimized for dialogue-based interaction, allowing users to refine queries iteratively and receive structured, context-aware responses. These capabilities have contributed to its rapid global diffusion and have raised important questions regarding its appropriate role in academic research.

Growing interest in ChatGPT reflects broader enthusiasm about AI-driven tools as potential enhancers of research productivity. Prior studies suggest that AI applications may assist researchers with literature summarization, language editing, data organization, and preliminary statistical interpretation, thereby reducing time spent on repetitive academic tasks (van Dis et al., 2023; Dave et al., 2023). In increasingly competitive academic environments characterized by publication pressure and limited institutional resources, such tools may appear particularly attractive. However, the promise of efficiency gains has been accompanied by serious concerns regarding accuracy, transparency, and the preservation of core scholarly competencies.

The reliability of AI-generated outputs remains a central concern. Although ChatGPT can produce text resembling academic writing, evidence indicates that it may generate fabricated references, incomplete reasoning, or contextually inaccurate statements phenomena often described as “AI hallucinations” (Alkaiissi & McFarlane, 2023; Biswas, 2023; Sallam, 2023). Such limitations are especially problematic in scientific research, where reproducibility, methodological rigor, and verifiability are essential. Consequently, the integration of ChatGPT into academic workflows demands cautious evaluation rather than uncritical adoption.

Beyond authorship, scholars have expressed concern that AI technologies could disrupt traditional academic roles, including language editing, data analysis, peer review, and even

conceptual writing (Castelvecchi, 2022; Li et al., 2022). While some view these developments as opportunities for augmentation and collaboration between humans and machines, others perceive them as threats to professional expertise and academic labor structures. These tensions underscore the importance of empirically examining how researchers themselves perceive and engage with such technologies.

Despite extensive commentary in high-impact journals (Else, 2023; Hill-Yardin et al., 2023; van Dis et al., 2023), relatively few empirical studies have systematically investigated researchers’ real-world awareness, usage patterns, and ethical perceptions of ChatGPT, particularly in low- and middle-income countries. Existing evidence suggests that familiarity with AI technologies, generational differences, and disciplinary background may influence adoption patterns (Abdelhafiz et al., 2024). However, robust data remain limited, and contextual factors may shape attitudes in diverse academic environments.

Understanding researchers’ perspectives is essential for informing institutional policy, editorial regulation, and responsible AI governance frameworks. Without empirical evidence, debates about AI integration risk being guided primarily by speculation rather than data-driven insights. Therefore, systematic investigation of researchers’ knowledge, practices, and ethical positions is urgently needed to support balanced, transparent, and accountable implementation of AI technologies in scholarly research.

To our knowledge, no nationally representative empirical study has systematically examined researchers’ awareness, adoption patterns, and ethical perceptions of ChatGPT in Pakistan. While international commentary on generative AI in research is expanding rapidly, empirical evidence from low- and middle-income countries remains limited. By providing national-level data from Pakistani researchers, this study addresses a critical contextual gap and contributes evidence to inform institutional governance, editorial policy, and AI integration strategies in resource-constrained academic settings. The present study aimed to:

1. Assess researchers' awareness and adoption of ChatGPT and related AI tools in academic research.
2. Examine researchers' attitudes toward the perceived benefits and limitations of ChatGPT.
3. Explore ethical perceptions regarding authorship, accountability, and academic integrity in AI-assisted research.
4. Identify demographic and experiential predictors associated with ChatGPT use.

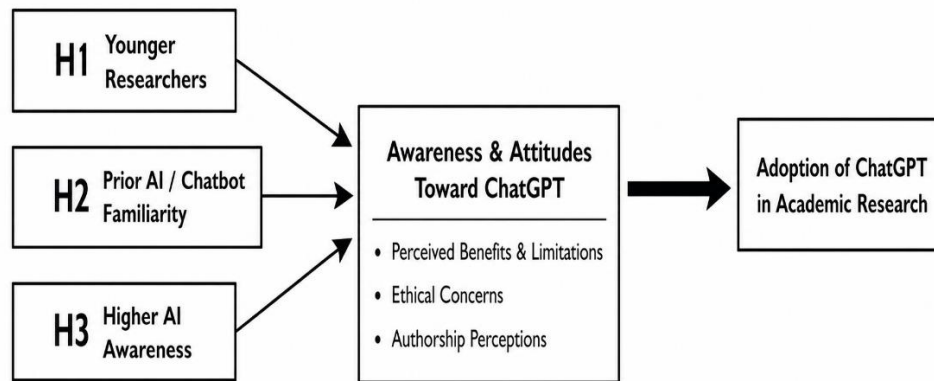
**Research Questions:** This study addressed the following research questions:

1. What proportion of researchers are aware of and actively using ChatGPT in academic research?

2. What attitudes do researchers hold regarding the usefulness and risks of ChatGPT?
3. What ethical concerns are associated with AI-assisted research practices?
4. Which factors independently predict ChatGPT adoption among researchers?

**Hypotheses:** Based on prior literature, the following hypotheses were formulated:

1. H1: Younger researchers are more likely to use ChatGPT in academic research.
2. H2: Prior familiarity with AI or other chatbot technologies independently predicts ChatGPT use.
3. H3: Researchers with greater AI awareness demonstrate more favorable attitudes toward ChatGPT.



**Figure 1.** Hypothesized conceptual framework of predictors influencing ChatGPT adoption in academic research.

## METHODOLOGY

**Study Design and Setting:** A national cross-sectional, web-based survey was conducted to examine researchers' awareness, attitudes, ethical perceptions, and adoption of ChatGPT and related AI tools in academic research. The study targeted researchers affiliated with universities, medical colleges, and research institutions across Pakistan. Data were collected over a predefined study period using a secure online questionnaire platform to ensure broad geographic reach and accessibility.

**Study Population and Eligibility Criteria:** The target population comprised active academic researchers from both medical and non-medical disciplines across Pakistan. Participants were considered eligible if they:

- (1) were affiliated with a recognized university, medical college, or research institution in Pakistan; and
  - (2) were actively engaged in research activities, including publication, research supervision, grant participation, or formal institutional research roles.
- Individuals without formal academic or research affiliation were excluded from the study.

**Sampling Strategy and Recruitment:** A non-probability purposive sampling approach was employed to recruit participants with relevant research experience. Recruitment was conducted using multiple academic channels to enhance disciplinary diversity:

- Targeted identification of researchers via Google Scholar and Research Gate profiles.

- Dissemination of the survey link through academic and professional groups on LinkedIn, Facebook, and WhatsApp.
- Circulation through institutional mailing lists via faculty and research coordinators.
- Snowball sampling, whereby participants were encouraged to share the survey with eligible colleagues.

A total of 512 researchers were invited. Of these, 357 accessed the survey link. After excluding incomplete responses and ineligible submissions ( $n = 120$ ), a final analytic sample of 237 complete responses was obtained and included in all analyses. All statistical analyses were conducted using this final sample ( $N = 237$ ).

**Sample Size Determination:** Sample size estimation was conducted using OpenEpi (Dean et al., 2013). Assuming a conservative prevalence of 50% for adequate awareness of ChatGPT among researchers, a minimum required sample size of 196 participants was calculated at a 95% confidence level with a 7% margin of error. To account for potential incomplete responses, recruitment continued until at least 230 complete responses were obtained. The final sample of 237 participants exceeded the minimum requirement.

**Study Instrument:** Data were collected using a structured, self-administered questionnaire developed following an extensive review of literature on AI applications, generative chatbots, and research ethics (van Dis et al., 2023; Dave et al., 2023; Sallam, 2023).

The questionnaire included the following sections:

- Demographic and academic characteristics
- Awareness and familiarity with ChatGPT and other AI tools
- Patterns of AI use in research
- Attitudes toward ChatGPT (perceived benefits and limitations)
- Ethical perceptions, including authorship and accountability concerns

The survey was administered via Google Forms, with the “limit to one response” feature enabled to reduce duplicate submissions.

**Validity and Reliability:** Content validity was established through expert review by senior academics with expertise in research methodology and AI applications. Revisions were made to improve clarity and conceptual alignment. Internal consistency reliability was assessed using Cronbach’s alpha ( $\alpha = .81$ ), indicating acceptable reliability. Test-retest reliability was evaluated using the intraclass correlation coefficient ( $ICC = .96$ ), demonstrating excellent temporal stability (Shrout & Fleiss, 1979).

**Data Collection Procedure:** Participants accessed the survey through a secure link. An introductory page provided information regarding study objectives, voluntary participation, confidentiality, and estimated completion time. Electronic informed consent was obtained prior to survey initiation. No personally identifiable information was collected.

**Statistical Analysis:** All statistical analyses were performed using Minitab (Version 17.1.0). The final dataset comprised 237 complete responses without missing values. Normality was assessed using the Shapiro–Wilk test. Age was non-normally distributed and summarized using median and interquartile range (IQR), whereas categorical variables were reported as frequencies and percentages. Univariate associations between independent variables and ChatGPT use (Yes/No) were examined using the Mann–Whitney U test for age and chi-square tests for categorical variables. Variables demonstrating theoretical relevance and/or statistical significance were entered into a multivariable logistic regression model. Adjusted odds ratios (AORs) with 95% confidence intervals (CIs) were calculated, with ChatGPT use specified as the dependent variable. Model fit was evaluated using the Hosmer–Lemeshow goodness-of-fit test, overall model chi-square statistics, and Nagelkerke  $R^2$ . Multicollinearity was assessed using variance inflation factors (VIF), with values  $< 2$  considered indicative of acceptable independence among predictors. All statistical tests were two-tailed, and  $p < .05$  was considered statistically significant.

**Ethical Considerations:** Ethical approval was obtained from the Prior to data collection, ethical approval was obtained from the Health Services

Academy (HSA), Ministry of Health, Pakistan. The study protocol was reviewed and approved by the Institutional Review Board (IRB No: 00015099).

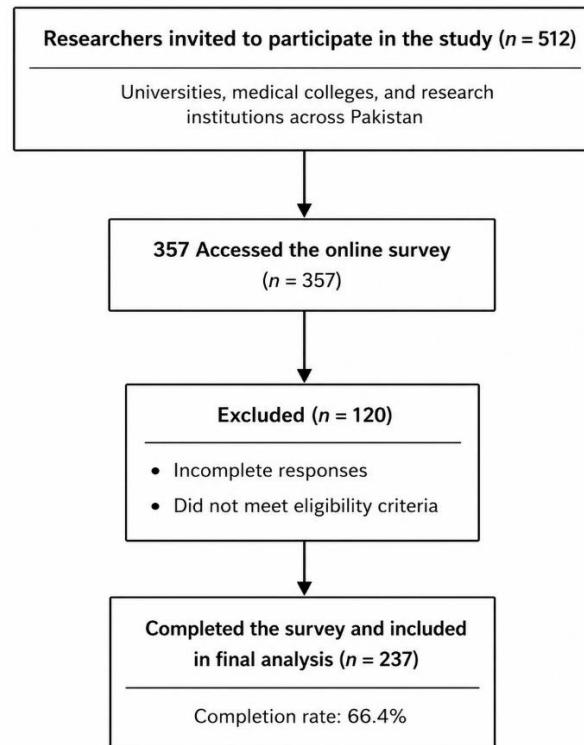


Figure 2. Flow diagram of participant recruitment and inclusion in the final analysis (N = 237).

## RESULTS

Table 1. Demographic and Academic Characteristics of Participants (N = 237)

Variable	Category	N	%
Age (years)	Median (IQR)	35	30–42
Gender	Female	136	57.4
	Male	101	42.6
Discipline	Medical/Health Sciences	161	67.9
	Non-medical	76	32.1
Institutional Affiliation	University/Research Center	178	75.1
	Other	59	24.9
Highest Qualification	Master's/Doctorate	162	68.4
	Other	75	31.6
Publications	≥1 publication	152	64.1
	None	85	35.9

A total of 237 complete responses were included in the final analysis. The median age of participants was 35 years (IQR: 30–42). Most respondents were female (57.4%) and affiliated with medical or health sciences disciplines

(67.9%). Approximately three-quarters (75.1%) were employed at universities or research centers, and 68.4% held a master's or doctoral degree. Nearly two-thirds (64.1%)

**Table 2. Knowledge and Use of ChatGPT and AI Tools (N = 237)**

Item	Response	n	%
Heard of ChatGPT	Yes	159	67.1
	No	78	32.9
Familiar with AI in research	Yes	104	43.9
	No	133	56.1
Used AI tools in research	Yes	47	19.8
	No	190	80.2
Used ChatGPT in research	Yes	27	11.4
	No	210	88.6

Overall, 67.1% of participants reported having heard of ChatGPT, while 43.9% indicated familiarity with AI applications in research. Although 19.8% had used AI tools for research purposes, only 11.4% reported specifically using

ChatGPT in academic research (Table 2). ChatGPT use was primarily limited to low-risk academic tasks such as paraphrasing, language refinement, and preliminary literature searching.

**Table 3. Attitudes Toward ChatGPT and Ethical Concerns (N = 237)**

Statement (Agree/Strongly Agree)	n	%
ChatGPT useful in academic research	122	51.5
Improves research efficiency	120	50.6
Useful for paraphrasing	128	54.0
AI may replace language editors	107	45.1
Ethical concerns exist	110	46.4
ChatGPT could qualify as author	88	37.1

Approximately half of respondents agreed that ChatGPT is useful in academic research (51.5%) and improves research efficiency (50.6%). A slightly higher proportion (54.0%) considered it helpful for paraphrasing tasks. However, 46.4% expressed ethical concerns regarding AI-assisted

research. Notably, 37.1% believed that ChatGPT could qualify for authorship under certain circumstances (Table 3). These findings indicate a divided perception, reflecting concurrent recognition of utility and ethical ambiguity.

**Table 4. Univariate Associations with ChatGPT Use (N = 237)**

Variable	Users (n = 27)	Non-Users (n = 210)	Test	p-value
Age, median (IQR)	34 (28–38)	37 (30–45)	Mann–Whitney U	.01
Female, n (%)	15 (55.6%)	121 (57.6%)	Chi-square	.84

Variable	Users (n = 27)	Non-Users (n = 210)	Test	p-value
Medical discipline, n (%)	18 (66.7%)	144 (68.6%)	Chi-square	.84
Prior chatbot familiarity, n (%)	21 (77.8%)	55 (26.2%)	Chi-square	< .001

Univariate comparisons demonstrated that ChatGPT users were significantly younger than non-users (median 34 vs. 37 years; Mann-Whitney U test,  $p = .01$ ). Prior familiarity with chatbot technologies was strongly associated with

ChatGPT use (77.8% among users vs. 26.2% among non-users;  $\chi^2$  test,  $p < .001$ ). No statistically significant associations were observed for gender ( $p = .84$ ) or disciplinary background ( $p = .84$ ) (Table 4).

**Table 5. Multivariable Logistic Regression Analysis Predicting ChatGPT Use (N = 237)**

Predictor	$\beta$ (SE)	Adjusted OR	95% CI	p-value
Age (per year decrease)	0.077 (0.035)	1.08	1.01-1.16	.03
Female gender (ref = Male)	-0.061 (0.408)	0.94	0.42-2.11	.88
Medical discipline (ref = Non-medical)	-0.083 (0.425)	0.92	0.40-2.13	.85
Prior chatbot familiarity (Yes vs. No)	2.748 (0.365)	15.62	7.45-32.78	< .001

In multivariable analysis, prior chatbot familiarity remained a strong independent predictor of ChatGPT use (AOR = 15.62, 95% CI: 7.45-32.78,  $p < .001$ ). Younger age was modestly

associated with greater likelihood of use (AOR = 1.08 per year decrease, 95% CI: 1.01-1.16,  $p = .03$ ). Gender and disciplinary background were not statistically significant predictors.

**Table 6. Model Fit and Diagnostic Statistics for Multivariable Logistic Regression (N = 237)**

Statistic	Value	df	p-value	Interpretation
Model $\chi^2$	78.46	4	< .001	Overall model statistically significant
Hosmer-Lemeshow $\chi^2$	6.12	8	.63	Good model calibration (non-significant)
Nagelkerke $R^2$	.38	-	-	Model explains 38% of variance

The multivariable logistic regression model was statistically significant overall ( $\chi^2 = 78.46$ ,  $df = 4$ ,  $p < .001$ ), indicating that the included predictors reliably distinguished between ChatGPT users and non-users. The Hosmer-Lemeshow test was non-significant ( $p = .63$ ), suggesting adequate model fit. The model explained approximately 38% of the variance in ChatGPT use (Nagelkerke  $R^2 = .38$ ), indicating meaningful explanatory power.

## DISCUSSION

This national cross-sectional study examined researchers' adoption, attitudes, and ethical perceptions regarding the use of generative AI, particularly ChatGPT, in academic research. Although awareness of ChatGPT was relatively

high (67.1%), actual research use remained limited (11.4%). These findings suggest that while generative AI technologies have achieved substantial visibility in academic discourse, their integration into formal research workflows remains cautious and selective.

### Adoption Patterns and Theoretical Framing:

The observed gap between awareness and actual use can be interpreted through the lens of the Technology Acceptance Model (TAM), which posits that perceived usefulness and perceived ease of use influence technology adoption (Davis, 1989). In the present study, approximately half of participants agreed that ChatGPT improves research efficiency and supports academic tasks. However, persistent ethical concerns and doubts

regarding accuracy appear to moderate adoption. This suggests that perceived usefulness alone is insufficient to drive integration when perceived risk remains high. Consistent with TAM and diffusion-of-innovation theory, younger researchers were significantly more likely to adopt ChatGPT. Greater digital fluency and openness to emerging technologies may explain this generational effect. Similar age-related adoption patterns have been reported in prior studies examining researchers' engagement with ChatGPT (Abdelhafiz et al., 2024). The strong predictive value of prior chatbot familiarity (OR = 15.62) further reinforces the role of experiential exposure in shaping adoption behavior.

**Comparison with International Evidence:** International evidence reflects similar trends. Studies conducted in Europe and North America have documented high levels of awareness but cautious integration of generative AI into formal research activities (van Dis et al., 2023; Hill-Yardin et al., 2023). Abdelhafiz et al. (2024) reported that although many researchers recognized ChatGPT's potential benefits, concerns regarding reliability and ethical boundaries limited widespread adoption. Our findings align with these patterns, suggesting that global academic communities are navigating similar tensions between innovation and integrity. However, unlike some high-income contexts where institutional AI guidelines are emerging rapidly, regulatory clarity in many lower- and middle-income countries (LMICs) remains underdeveloped. This contextual difference may contribute to heightened uncertainty regarding appropriate use.

**Ethical Perceptions and Authorship Concerns:** Ethical considerations emerged as a central theme in this study. Nearly half of respondents expressed concerns regarding accountability, transparency, and research integrity in AI-assisted scholarship. Furthermore, 37.1% believed that ChatGPT could potentially qualify for authorship under certain conditions. This perception directly contrasts with the explicit positions of the International Committee of Medical Journal Editors (ICMJE, 2023, 2024) and the World Association of Medical Editors (WAME, 2023),

both of which state that AI tools cannot meet authorship criteria because they lack accountability and the capacity for intellectual responsibility. The persistence of authorship ambiguity highlights the need for clearer dissemination of editorial standards. Concerns about fabricated citations and inaccurate outputs, commonly described as AI hallucinations have been documented extensively in prior literature (Alkaissi & McFarlane, 2023; Biswas, 2023; Sallam, 2023). These reliability issues appear to influence researchers' cautious adoption patterns.

**Implications for Academic Labor and Professional Roles:** Participants also expressed concerns that AI technologies may disrupt traditional academic roles, including language editing, statistical analysis, and manuscript preparation. Similar anxieties have been observed in other professional domains influenced by automation (Castelvecchi, 2022; Li et al., 2022). However, current evidence suggests that generative AI tools function more effectively as augmentative technologies rather than replacements. The responsible framing of AI as a collaborative aid may mitigate resistance and facilitate more balanced integration.

**Implications for LMIC Contexts:** The present findings carry particular relevance for LMIC academic environments. Institutions in resource-constrained settings may perceive AI tools as opportunities to enhance research productivity and global competitiveness. However, limited access to formal AI training and regulatory guidance may amplify risks related to misuse, plagiarism, and methodological inaccuracies. Structured institutional training programs, AI literacy initiatives, and context-specific ethical guidelines are therefore especially critical in LMIC settings to prevent inequitable or inappropriate adoption.

**Policy and Governance Implications:** These findings underscore the urgent need for coordinated institutional and editorial policies governing AI use in research. Academic institutions, funding bodies, and journal editors

should collaborate to establish clear disclosure requirements, define acceptable AI-assisted tasks, and reinforce authorship accountability standards. Mandatory reporting of AI assistance and integration of AI ethics modules into research training programs could enhance transparency and safeguard scientific credibility. Moreover, development of AI-detection tools and methodological verification frameworks may further protect research integrity (Turnitin, 2024; Marusic, 2023).

**Strengths and Limitations:** This study contributes empirical data from a national sample of researchers in an LMIC context, addressing a significant gap in the current literature. However, several limitations must be acknowledged. The use of non-probability sampling introduces potential selection bias. Self-reported data may also be subject to social desirability bias. Additionally, attitudes toward generative AI evolve rapidly, and findings should be interpreted within the temporal context of data collection. Longitudinal studies are needed to examine evolving adoption trajectories.

## CONCLUSION & RECOMMENDATIONS

This national study demonstrates that while awareness of ChatGPT among academic researchers is substantial, its actual adoption in research practice remains limited and cautious. Ethical uncertainty, concerns regarding accountability, and doubts about reliability continue to moderate its integration into scholarly workflows. Younger age and prior familiarity with AI technologies independently predicted ChatGPT use, underscoring the importance of digital exposure in shaping adoption behavior. Generative AI tools should be positioned as supportive research aids rather than autonomous contributors. Clear institutional policies, mandatory disclosure of AI assistance, and adherence to established authorship standards are essential to maintain research integrity. Structured AI literacy training programs and context-specific ethical guidelines particularly in resource-constrained settings are urgently needed to ensure responsible and transparent integration. By

balancing technological innovation with ethical oversight, academic institutions and journals can harness the benefits of AI augmentation while safeguarding credibility, accountability, and trust in scientific research.

**Author Contribution:** The author was responsible for all aspects of the study, including conceptualization, study design, data collection, data analysis, interpretation of findings, manuscript preparation, and approval of the final manuscript.

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**Data Availability:** The datasets generated and/or analyzed during the current study are available from the corresponding author upon reasonable request.

**Declarations:** Ethical approval was obtained from the Institutional Review Board (IRB) of the Health Services Academy prior to data collection. All procedures were conducted in accordance with the ethical standards of the institutional research committee. Electronic informed consent was obtained from all participants after a clear explanation of the study objectives. Participation was voluntary, and participants had the right to withdraw at any time before submitting the completed questionnaire.

**Competing Interests:** The author declares that there are no competing interests.

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