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A multicenter cross-sectional study on perceptions and peer-reported prevalence of research misconduct among Chinese medical postgraduates

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Abstract

Objective

This study aimed to explore the gap between attitudes towards and personally observed breaches of research integrity among medical postgraduates in China, a critical yet understudied population.

Method

We conducted an online, cross-sectional survey among postgraduates at three Chinese medical schools. A self-administered questionnaire was used to evaluate their attitudes toward research

integrity breaches and their perceptions of such behaviors among peers.

Results

Among 983 respondents (719 master's, 264 doctoral), a strong majority condemned serious research misconduct. Only 0.93% expressed acceptance for falsifying images to reverse results, and 1.53% for manipulating data to achieve significance. However, peer-reports revealed a higher prevalence of observed misconduct, with 18.41% indicating knowledge of data fabrication among peers.

Conclusion

In conclusion, while Chinese medical postgraduates largely condemn serious research misconduct, the peer-reported occurrence of such behaviors indicates that ethical awareness has not been fully translated into practice. These findings highlight the need for bolstered educational initiatives and suggest that the peer-report method can be a key tool for educators to assess and address integrity issues within their institutions.

Keywords

Research Integrity; Academic Misconduct; Medical Education; Peer Report; China

Introduction

Research integrity, the cornerstone of scientific credibility and innovation, has garnered significant global attention [1]. Internationally, frameworks such as the United States' "A Framework for Federal Scientific Integrity Policy and Practice" [2] and Europe's "The European Code of Conduct for Research Integrity" [3] provide structured guidance for upholding ethical standards.

Similarly, China has demonstrated a strong commitment through national regulations and institutional policies[4–8].

Despite these concerted efforts, breaches of research integrity persist as a global challenge, particularly within academic institutions. Empirical evidence from Norway and Sweden indicates that a substantial proportion of doctoral candidates are aware of misconduct among their peers [9]. Alarmingly, a 10-year follow-up study in Norway revealed that 1.1% of medical doctoral students admitted to engaging in serious integrity breaches themselves[10] . Within the Chinese context, studies also suggest that medical students and residents may inadvertently or deliberately compromise research integrity, highlighting a pressing need for enhanced education[11,12] .

A critical obstacle in addressing this issue is the inherent difficulty in detection, as researchers are often reluctant to self-report misconduct. The "peer-report" method has thus emerged as a vital tool for uncovering the true landscape of integrity breaches, with multiple studies validating that researchers are frequently aware of their peers' unethical practices [9,10,13].

While the incidence of misconduct has been explored globally, a focused investigation into the knowledge, attitudes, and behaviours of medical postgraduates in China—a key group shaping the future of healthcare and research—remains limited. To bridge this gap, this cross-sectional study employs a peer-report questionnaire to achieve two primary objectives: (1) to investigate the attitudes of medical postgraduates in three Chinese medical schools towards various research integrity breaches, and (2) to assess the peer-reported incidence of such behaviours within their academic environment.

Methods

Study Design and Participants

This cross-sectional study was conducted in accordance with the principles of the Declaration of Helsinki and designed following the STROBE guidelines. The operational definition of academic misconduct in this study was based on the "Measures for the Prevention and Handling of Academic Misconduct in Higher Education Institutions" issued by the Ministry of Education of China. This study was approved by the Ethics Committee on Biomedical Research, West China Hospital, Sichuan University.

Given the vast geographical expanse and numerous medical schools across China, to enhance the feasibility of the survey within the authors' capacity, a convenience sampling method was adopted to recruit participants from three medical schools in Sichuan Province. The target population comprised a total of 5,500 postgraduate students. Inclusion criteria consisted of enrolled master’s and doctoral students, while international students were excluded. The questionnaire was distributed by the authors in the form of an online link within student groups, and students were encouraged to forward it to their peers. Although convenience sampling is not the most scientifically rigorous method, it was the most feasible approach for this study.

Data Collection and Procedure

Data were collected in September through an online survey conducted via a questionnaire platform. Participation was anonymous. The questionnaire began with an informed consent section; if participants agreed, they could proceed to answer the questions, while those who declined could choose not to participate.

Participants were free to withdraw from the survey at any time. To ensure data quality, the questionnaire was configured to require completion of all items before submission.

Questionnaire Development and Measures

The questionnaire was developed through a multi-step process: a comprehensive review of existing research integrity surveys[14–17], expert evaluation to refine the items, and a pilot test to assess clarity and reliability.

The final questionnaire comprised three sections:

1. **Demographic Information:** This section captured data on age, gender, university, major, degree type, academic year, and research involvement.

2. **Attitudes Towards Research Behaviors:** This section assessed attitudes towards four types of research integrity behaviors using a 5-point Likert scale (Oppose, Somewhat Oppose, Acceptable, Somewhat Approve, Approve).

3. **Occurrence of Breaches Among Peers:** This section evaluated the perceived prevalence of seven types of research integrity breaches among the respondents' peers using a 5-point Likert scale (None, Few or Some, Many, Quite a Lot, A Lot).

The full questionnaire is provided in the Appendix, titled "Survey on Research Integrity among Medical Postgraduates."

Data Analysis

Data were managed using Excel 2019 and analyzed with SPSS 20.0.

Categorical variables were summarized using frequencies and percentages. Group differences were analyzed using Chi-square tests, with a two-sided significance level set at $\alpha = 0.05$.

Results

Demographic Characteristics of Participants

The survey yielded 983 valid responses from a target population of 5,500 postgraduates, corresponding to a response rate of 17.87%. The sample comprised 646 (65.72%) respondents from University A, 184 (18.72%) from University B, and 153 (15.56%) from University C. The majority of participants were master's students (73.14%, 719/983) and enrolled in professional degree programs (60.43%, 594/983). The cohort had a mean age of 25.98 ± 3.17 years and consisted of 347 males (35.3%) and 636 females (64.7%). Regarding publication experience, 370 participants (37.6%) had published any paper, and 274 (27.87%) had authored an SCI-indexed paper. Detailed demographic characteristics are summarized in Table 1.

Attitudes Towards Research Integrity Behaviors

Attitudes towards research integrity varied considerably depending on the nature and severity of the breach. A large majority of respondents (76.09%, 748/983) found it acceptable or approvable to use image editing software solely to enhance experimental images without altering the results. In stark contrast, only a small fraction (0.93%, 9/983) expressed acceptance or approval of using software to falsify results by turning negative images into positive ones.

A similar gradient was observed concerning data manipulation. When the original P-value was only slightly above 0.05, 5.08% (50/983) of participants accepted or understood modifying raw data to achieve statistical significance. This proportion decreased to 1.53%

(15/983) when the P-value was far above 0.05. A complete breakdown of attitudes is provided in Table 2.

Peer-Reported Occurrence of Academic Misconduct

To facilitate comparison with existing literature, responses on the perceived occurrence of misconduct among peers were dichotomized into "No" (None) and "Yes" (combining 'Few or Some,' 'Many,' 'Quite a Lot,' and 'A Lot').

The most commonly reported misconduct was honorary authorship—including non-contributing individuals as authors—which was reported by 37.64% (370/983) of respondents. This was followed by the deletion of undesirable outcomes or samples (30.32%, 298/983). In contrast, data fabrication was the least reported behavior, though still notable, with 18.41% (181/983) of respondents indicating its occurrence among their peers. The results for all seven types of misconduct are detailed in Table 3.

Subgroup analyses were conducted to identify demographic factors associated with higher reporting rates of specific misconducts (Table 4). Doctoral students reported significantly higher occurrences of deleting unfavorable results, honorary authorship, and unauthorized authorship compared to master's students (all $p < 0.05$). Similarly, students pursuing academic degrees reported a higher prevalence of deleting unfavorable results and honorary authorship than their professional degree counterparts. Furthermore, respondents who had published SCI papers reported a higher perceived occurrence of these three misconduct types compared to those without SCI publications.

Discussion

This study provides a nuanced understanding of research integrity among Chinese medical postgraduates, revealing a critical divergence between their general ethical stance and their tolerance for specific, often perceived as "less severe," forms of misconduct. Furthermore, it underscores the utility of the peer-report method in uncovering the landscape of academic misconduct that self-report surveys might fail to capture.

A key finding is the "gradient of acceptability" in students' attitudes. While an overwhelming majority condemned egregious practices like fabricating data (98.47%) or falsifying images (99.08%), their opposition significantly wavered for behaviours they might perceive as minor or cosmetic. For instance, only 23.91% opposed the use of software to beautify images without altering results, and the acceptance for data modification increased when the original P-value was only marginally non-significant (5.08% acceptance vs. 1.53% for a far greater P-value). This suggests that students' ethical judgments are contextual and that ostensibly "minor" breaches may be normalized within their academic environment. This highlights a vulnerable grey area in research integrity, where practices that compromise methodological rigor might be inadvertently encouraged if not explicitly condemned with the same vigour as outright fraud.

Beyond attitudes, our peer-report data shed light on the perceived prevalence of misconduct. Honorary authorship was the most frequently reported issue (37.64%), indicating it may be a common and potentially entrenched practice. This was followed by the selective deletion of unfavourable data (30.32%), while outright data fabrication was the least reported (18.41%). It is crucial to interpret these figures not as direct prevalence rates but as indicators of the

relative visibility and perceived commonality of different misconducts within the student community. The high reporting of honorary authorship points to potential flaws in mentorship and authorship norms, whereas the lower reporting of fabrication may reflect its more concealed nature or genuine lower occurrence.

The peer-report methodology itself proved invaluable. Given the strong social desirability bias that plagues self-reported data on sensitive topics like misconduct, peer reporting offers a critical indirect measure. The fact that a substantial proportion of students reported witnessing various forms of misconduct confirms that these are not hypothetical concerns but are present in their academic surroundings. This validates the use of this method, as employed in other international studies[9,10,13,18,19], for diagnosing integrity issues within institutions.

It is important to note that the causes of academic misconduct among researchers are multifaceted, and academic pressure can increase the likelihood of such behavior[20]. In recent years, Chinese researchers have faced growing academic pressures, including graduation requirements, professional promotion demands, and job performance evaluations, all of which may elevate the risk of academic misconduct[21–23]. When addressing research integrity issues, government and institutional administrators should, on one hand, establish stringent regulations to constrain researchers' conduct, and on the other hand, strive to reduce the pressures on researchers, enabling them to focus on scientific inquiry rather than being preoccupied with meeting evaluation metrics.

Limitations

The findings of this study should be interpreted in light of its

limitations. First, the reliance on convenience sampling means that the results may not be fully representative of the broader population of Chinese medical postgraduates. Second, as with all surveys on sensitive behaviors, the potential for social desirability bias persists even with anonymous reporting; peer reports may be based on hearsay rather than verified facts. Consequently, the proportions derived from peer reporting are likely to remain conservative estimates. Finally, although the use of a context-specific, self-developed questionnaire was necessary for this study, it implies that cross-cultural comparisons should be made with caution. Future research employing nationally stratified random sampling and validated cross-cultural instruments would help to strengthen and generalize these findings.

Conclusion

This study reveals a critical gap in research integrity among Chinese medical postgraduates: while outright fabrication is widely condemned, significant tolerance exists for 'grey-area' practices like image beautification and conditional data manipulation. This finding underscores an urgent need for integrity education in medical schools that moves beyond defining misconduct to address these nuanced ethical dilemmas. To effectively monitor the academic environment, we recommend the peer-report method as a valuable tool for uncovering the perceived prevalence of misconduct that often remains hidden in self-reported surveys. Ultimately, fostering a culture of integrity requires a concerted effort from medical educators globally to implement targeted education and proactive assessment, ensuring the next generation of scientists is equipped to uphold the highest standards of research ethics.

Ethics approval

This study was approved by the Ethics Committee on Biomedical Research, West China Hospital, Sichuan University, 2020 Review (No.890).

Consent to participate

All participants received informed consent.

Conflict of interest

There are no potential conflicts of interest that might influence the content of this study.

Data availability

The datasets used and analyzed in this study are available upon reasonable request. The corresponding author can be contacted for access.

Author contributions

This study was collaboratively conducted with contributions from all authors in various aspects including design, implementation, data analysis, and manuscript preparation. Zeng Wen, Zhou Jingya, and Tang Haitao played a pivotal role in conceptualizing and designing the research. Wang Jinsong took the lead in administering the questionnaire survey. The drafting of the manuscript was principally undertaken by Tang Haitao and Zhou Jingya.

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Abbreviations

SCI: Science Citation Index

SPSS: Statistical Product and Service Solutions

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Table 1: demographic characteristics (n=983)

Variable	Number	Proportion (%)
University		
A university	646	65.72
B university	184	18.72
C university	153	15.56
Gender		
Male	347	35.30
Female	636	64.70
Age (Years)		
<24	202	20.55
24-28	544	55.34
28-32	185	18.82
≥32	52	5.29
Degree		
Master's	719	73.14
Doctoral	264	26.86
Type of Degree		
Academic	389	39.57
Professional	594	60.43
Published SCI papers		
Yes	274	27.87
No	709	72.13

Table 2: attitudes of medical postgraduates towards research integrity n(%)

Behavior	Oppose	Somewhat oppose	Acceptable	Somewhat approve	Approve
Photo editing using software					
Beautification without changing results	97 (9.87)	138 (14.04)	406 (41.30)	257 (26.14)	85 (8.65)
Changing negative to positive	897 (91.25)	77 (7.83)	3 (0.31)	3 (0.31)	3 (0.31)
Modifying original data for significance					
P-value slightly above 0.05	701 (71.31)	232 (23.60)	25 (2.54)	23 (2.34)	2 (0.20)
P-value much above 0.05	829 (84.33)	139 (14.14)	7 (0.71)	5 (0.51)	3 (0.31)

Table 3: answer to questions about whether anyone in the surrounding population has committed academic misconduct n(%).

Academic misconduct	None	Yes
Using unpublished research images from others in one's own articles without acknowledgment.	774 (78.74)	209(21.26)
Reporting a higher number of cases or sample size in article publications than actually studied.	744 (75.69)	239(24.31)
Fabricating non-existent sample data for inclusion in analysis to meet publication requirements.	802 (81.59)	181(18.41)
Deleting undesirable outcomes or samples from original research data and publishing only the more favorable results.	685 (69.68)	298(30.32)
Publishing the same research findings as two or more papers with no significant content difference in different journals.	776 (78.94)	207(21.06)
Including individuals who have not made substantial contributions to the research as authors of one's own articles.	613 (62.36)	370(37.64)
Publishing one's own paper with someone else as an author without their consent.	765 (77.82)	218(22.18)

Table 4: analysis of Academic Misconduct in Surrounding Population in Relation to Characteristics of Medical Postgraduates

Behavior	Male	Female	P	Doctoral	Master's	P	Academic	Professional	P	Published SCI	Not published SCI	P
Using others' unpublished research images without acknowledgment	90 (25.94%)	119 (18.71%)	0.008*	58 (21.97%)	151 (21.00%)	0.74	86 (22.11%)	123 (20.71%)	0.6	60 (21.90%)	149 (21.02%)	0.76
Reporting higher case/sample numbers than actual in publications	102 (29.39%)	137 (21.54%)	0.006*	71 (26.89%)	168 (23.37%)	0.25	91 (23.39%)	148 (24.92%)	0.58	74 (27.01%)	165 (23.27%)	0.22
Fabricating non-existent data for publication	77 (22.19%)	104 (16.35%)	0.024*	52 (19.70%)	129 (17.94%)	0.53	76 (19.54%)	105 (17.68%)	0.46	50 (18.25%)	131 (18.48%)	0.93
Deleting undesirable outcomes/samples for favorable publication	107 (30.84%)	191 (30.03%)	0.79	93 (35.23%)	205 (28.51%)	0.042*	136 (34.96%)	162 (27.27%)	0.01*	103 (37.59%)	195 (27.50%)	0.002*
Publishing the same research in multiple journals	74 (21.33%)	133 (20.91%)	0.88	46 (17.42%)	161 (22.39%)	0.09	83 (21.34%)	124 (20.88%)	0.86	50 (18.25%)	157 (22.14%)	0.18
Authoring papers with non-contributing individuals	145 (41.79%)	225 (35.38%)	0.047*	121 (45.83%)	249 (34.63%)	0.001*	162 (41.65%)	208 (35.02%)	0.036*	130 (47.45%)	240 (33.85%)	0.000*

Publishing with unconsented authorship	90 (25.94%)	128 (20.13%)	0.036*	71 (26.89%)	147 (20.45%)	0.031*	90 (23.14%)	128 (21.55%)	0.56	73 (26.64%)	145 (20.45%)	0.036*