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# A Bibliometric and Scoping Review of Research Integrity among Research Scholars

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**Abstract:** This article describes the scoping that was grounded on Arksey and O'Malley's (2005) mode of operation, and follows the PRISMA extension for scoping reviews. The scoping review aimed to explore a global perspective on research integrity among research scholars, given how little we know about the knowledge, attitudes, and practices of research academics around research integrity. The researchers completed a systematic search for articles spanning 368 records published from 2014 - 2023 from Science Direct, EBSCO and ProQuest. Ultimately, 37 empirical studies were included after screening and a critical appraisal. The co-authorship network illustrated distinct small, but meaningful clusters with limited institutional connections among researchers in the field, while the keywords analysis revealed dominant themes of research misconduct, research integrity, and knowledge, revealing gaps in areas such as questionable research practices and informed consent. Additionally, despite illustrating a great deal of variation, research integrity is generally overlapping, along discipline and across regions, growing with relative higher rates of questionable research practices, including academic authorship, selective reporting, and p-hacking, while as before, at least related, and hardly even acknowledged, of being involved in Fabrication, Falsification and Plagiarism (FFP). Yes, notably, barriers towards protecting research integrity manifest as publication pressures, and institutional support is horrendous. A positive association was given for publication among researchers, at least apparently correlated, and provided with respect to researchers with misconduct. Scholarly education about ethics and institutional support may vary widely, which suggests a range of variables for focus on and moreover blanket customized training and institutional restructuring supporting research integrity.

**Keywords:** Research Integrity, Research Misconduct, Research Ethics and Questionable Research Practice.

## 1. Introduction

Research integrity (RI) represents the depth and breadth of a concern for researchers and organizations as well as for the societal good (Anderson, 2014; Roy & Edwards, 2023; Tang, 2019). The validity, reliability, and advancement of research in the scientific community depend on research integrity. Research integrity embodies the ethical standards and responsibilities, it works to foster accountability, transparency and trust in research (Steneck, 2006). Existing literature similarly suggests that questionable research practices (QRP) such as data fabrication, selective reporting, and plagiarism are seen across domains (Fanelli, 2009; Agnoli, *et al.,* 2017). These practices not only damage the validity but also lessen the public trust in academic research (Das & Rout, 2023).

Although constant attempt has been taken to uplift research integrity through ethical education and deliberate institutional guidelines, remarkable gap exists in the knowledge, attitude and practices of research integrity among researchers (Haven *et al.,* 2019; Chua *et al.,* 2022). Additionally, research misconduct frequently goes unmarked due to power imbalance and lack of ethical guidelines to balance QRPs (Feenstra *et al.,* 2021). The outcome of research misconducts is unconventional, which harms the career of individual, institutional reputation and scientific community at a broad. Studies have declared that specious findings based on manipulated and falsified data can mislead policy makers, and ethical dilemmas in the fields like medicine, environmental science and social policy (Vie, 2020; Evans *et al.,* 2022). Pertaining to these issues, it is crucial to review the existing literatures to

evaluate the prevalence of research integrity violations. By integrating the findings from previous studies across discipline and geographical regions, this scoping reviews aims to ascertain the trends, gaps and best practices for elevating a culture of integrity in scientific research. This scoping review is guided by the following research question, which played a vital role in recognizing key searching words and set up inclusion and exclusion criteria for selecting the relevant literature.

- What are the prevailing challenges, contributing factors and practice relating to research integrity among research scholars?

## 2. Background

Research integrity has been derived form the Latin word 'Integer' which means whole or complete, indicated by honesty, reliability and accountability in conducting research (Drenth, 2012). RI confirms that research is conducted in an ethical, moral and trustworthy manner, including professional standards that needs to be adopted and promoted by the researchers and research institutions (Metcalfe *et al.,* 2020). The integrity of research result hang on the goodness of the research process (Anderson, 2014). Violations of research integrity, known as research misconduct, are central issues in the field of research (Kumar, 2020; Vie, 2020). According to the US Federal Policy on Research Misconduct (FPRM), misconduct includes fabrication, falsification and plagiarism in proposing, performing, receiving or reporting research result. Fabrication associates making up data or result, falsification refers to manipulating research process or changing data to dissimulate result and plagiarism is the appropriation of another's ideas, process, result or words without appropriate credit (Steneck, 2006).

Major principles of research integrity comprised of honesty, accuracy and objectivity. Researchers must report the findings truthfully, by avoiding fabrication, falsification and plagiarism, which diminish the authenticity of scientific communication (Steneck, 2006). Efficient use of resources, accuracy in data collection, analysis and reporting, which is essential for the replication, verification of result, is fundamental for scientific progress (Steneck, 2006). Research which covers animals requires proper adherence to guidelines for human treatments and minimizing suffering (Russell *et al.* 1959). The ethical consideration in research extend to the treatment of human and animal subject, environmental impacts and societal impact of research findings. Informed consent, confidentiality of information and minimization of harm of the subjects are fundamental principles in research involving human participants. Research misconduct can have a number of consequences, including the retraction of published publications, loss of funding, damage to professional reputation, and legal ramifications (Fenelli, 2009; Steneck, 2006; Vie, 2020). Research misconduct mistreats individual researchers and weakens public trust in scientific research, potentially causing major social harm if flawed findings are used in policies, practices, and future research (Fanelli, 2009; Vie, 2020; Stroebe *et al.,* 2012; Vie, 2020). Research integrity is fundamental to academic and scientific investigation, assuring the legitimacy, replicability, and ethical standards of research. Despite their crucial importance, misconducts like as data fabrication, plagiarism, and unethical authorship practices have aroused serious concerns among the academic community (Fenelli, 2009; Steneck, 2006; Das & Rout, 2023).

The theoretical frameworks underlying research integrity provide critical contexts for translating knowledge of relational dynamics. For instance, organizational climate theory posits that the style of leadership, a climate for organizational culture and the incentive system to researchers, substantially shape ethical decision-making (Schneider *et al.*, 2013). However, an organization that is both coordinated and competitive, does not, and cannot, legitimately encourage or mentor, may inadvertently endorse QRPs despite organizational efforts to discourage it (Martinson *et al.* 2005). Simultaneously, the higher education governance framework positions research integrity within institutional accountability mechanism including: policy framework, quality assurance systems and credentialing best practices to enable sustainability (Altbach & Knight, 2007; De Boer *et al.*, 2010).

Jointly, these theories assist to bridge the gap between knowledge, attitude, and practices (KAP). When surveyed, researchers often indicate an awareness of the ethical principles; however, their behaviors do not align (Grosek *et al.*, 2023; Chen *et al.*, 2024). The social relational gap between knowledge of right and wrong, ethics and practice are better understood when the organizational and governance context is considered, that is, the researcher may know what is right, ethics and best practices but will submit to pressures from supervisors or the demand for publication to do the otherwise. Therefore, theories make it clear that interventions based on manipulation of ethics

training alone would be disingenuous. A multi-level organizational climate, that acts to implant integrity into the governance and accountability structure of academic practice more legitimately addresses QRPs.

## 3. Methodology

Utilizing the scoping review methodology, the scoping review was conducted in accordance with Arksey and O'Malley (2005) five stages of scoping review: 1. Identifying the research question, 2. Identifying the relevant literature, 3. Selecting Studies, 4. Charting the data, and 5. Collating, summarizing, and reporting results. The scoping review also complied with the PRISMA-ScR guidelines detailed by Tricco *et al.,* (2018).

### 3.1 Search Strategy

We crafted our search strategy based on the recommendation by Gasparyan, *et al.* (2011), which yielded guidance for systematic search and identification of relevant literature. We used three databases including EBSCO, ProQuest and ScienceDirect to access the literature with a justification for excluding Web of Science and Scopus (due to access restrictions), ERIC and PsycINFO (due to overlapping coverage by EBSCO). The search was limited to "English language" and a time frame between 2014 to 2024 (last 10 years). The RIS file has been exported from the EBSCO and ProQuest on dated 25.04.2024 and from ScienceDirect on 27.04.2024.

**Table 1.** Searching Key Words

| Database | Key words |
|---|---|
| **Science Direct** | "Research Integrity" OR "Research Misconduct" OR "Research Ethics" OR "Questionable Research Practices" AND "Research Scholars" OR "Doctoral Student" OR "Ph.D. Scholars" |
| **EBSCO** | "Research Integrity" OR "Research Misconduct" OR "Research Ethics" OR "Questionable Research Practices" AND "Research Scholars" OR "Doctoral Student" OR "Ph.D. Scholars" |
| **ProQuest** | "Research Integrity" OR "Research Misconduct" OR "Research Ethics" OR "Questionable Research Practices" AND "Research Scholars" OR "Doctoral Student" OR "Ph.D. Scholars" |

### 3.2 Inclusion and Exclusion Criteria

Inclusion and exclusion criteria were used to reduce personal bias, improve consistency and credibility of the findings and to provide valid conclusion. The following inclusion and exclusion criteria were employed while searching the literature in databases.

**Table 2.** Inclusion and exclusion criteria

| S.No | Inclusion Criteria | Exclusion Criteria |
|---|---|---|
| 1 | English language | Other than English language |
| 2 | Empirical research | Review article |
| 3 | Last 10 years | Not come under time frame |
| 4 | Addressing research question | Not addressing research question |
| 5 | Addressing target population | Wrong target population |
| 6 | Full article with abstract | Conference proceedings/editorials |

### 3.3 Literature Screening

After eliminating the duplicate using Rayyan a search collaboration platform (https://www.rayyan.ai/), five reviewers independently screened the literature. During the screening process relevant literatures were included for further full text reading and other studies were excluded considering the above exclusion criteria. Conflicts were resolved through consensus consultation with an independent senior researcher with expertise in research ethics. In total six extractors participated in the data screening process to identify the most relevant studies for this review. The process of study selection was documented using the following PRISMA-ScR diagram (see Figure 1).

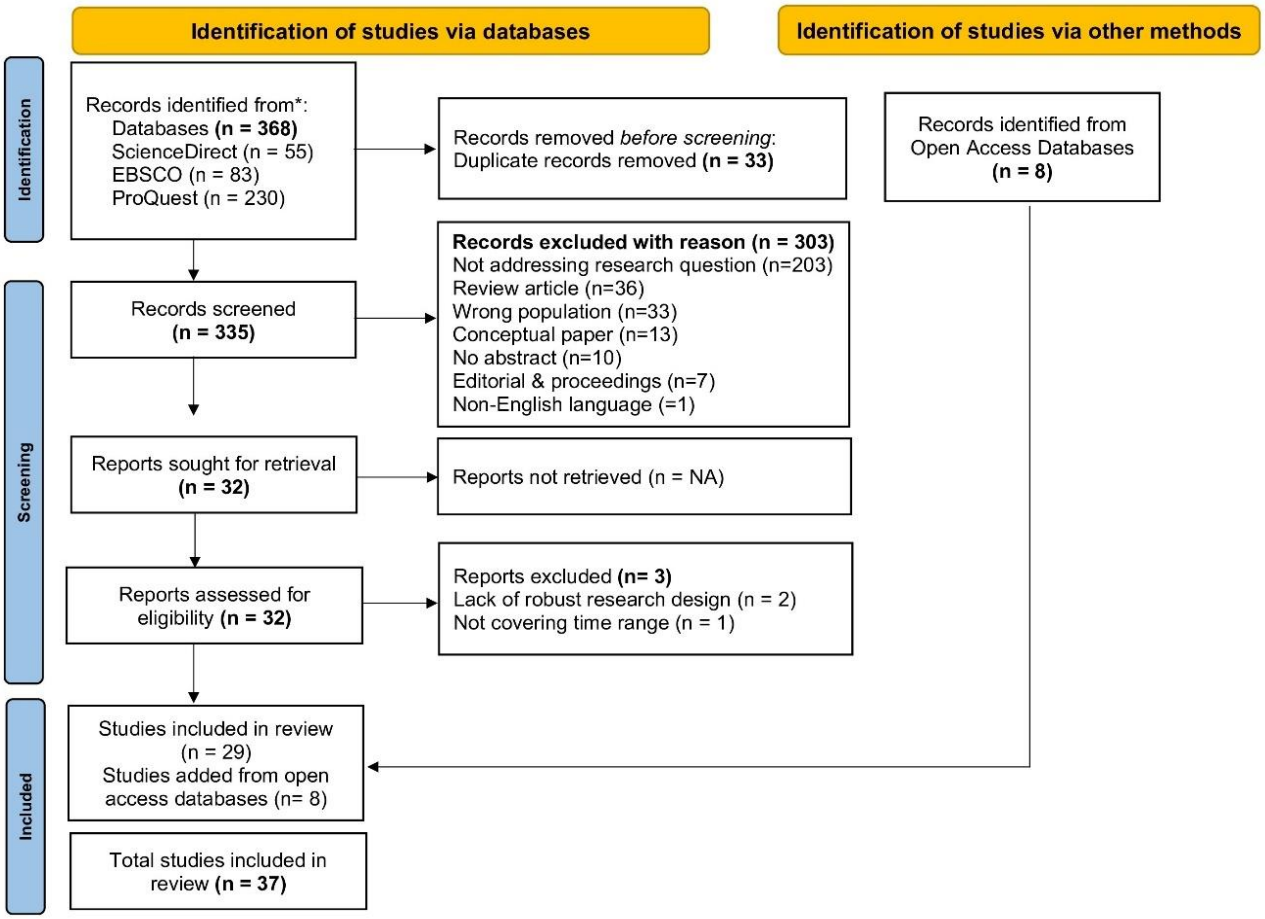


**Figure 1.** PRISMA flow diagram of screening

### 3.4 Study Selection

From the beginning a total 368 studies were collected from three database (ScienceDirect, EBSCO and ProQuest). Out of them 33 duplicates were removed. A total 335 studies are included for screening process (see Figure 1). Out of them 303 studies were excluded considering the exclusion criteria selected by the reviewers. Rest 32 studies were selected for full text screening. During full text analysis 3 studies were eliminated (Lack of robust research design, n=2 and not covering time range, n=1). Additionally, 8 relevant studies were included from open access databases. Finally, 37 articles were considered as the sample study for this scoping review. The Joanna Briggs Institute (JBI) checklist was adopted for critical appraisal of included studies. The highlights of quality appraisal of all included studies have been delineated in the result section (see table no. 4).

## 4. Analysis and Results

### 4.1. Analysis of the Cases

The table no. 3 illustrates the number of studies retrieved from various sources incorporated in this scoping review. ProQuest is the most prolific source providing highest 20 studies. EBSCO follows with around 8 studies, while Research Gate offers 4 studies. Springer bestowed fewer studies, i.e. 3. Science Direct and Sage has the least, with just one study retrieved by each. This distribution indicates that ProQuest is the most substantial source for studies in this context, while Science Direct, Springer open access and Sage are less utilized for retrieving studies. All the included studies are journal articles. The co-authorship and keyword co-occurrence network were constructed using VOSviewer software (version 1.6.20). The visualization provided in the figure 2 accentuate collaborative patterns among researchers engaged on research integrity.

**Table 3.** Source of the selected studies

| Name of the sources | Number of articles retrived |
|---|---|
| EBSCO | 8 |
| ProQuest | 20 |
| Springer | 3 |
| Research Gate | 4 |
| Science Direct | 1 |
| Sage | 1 |

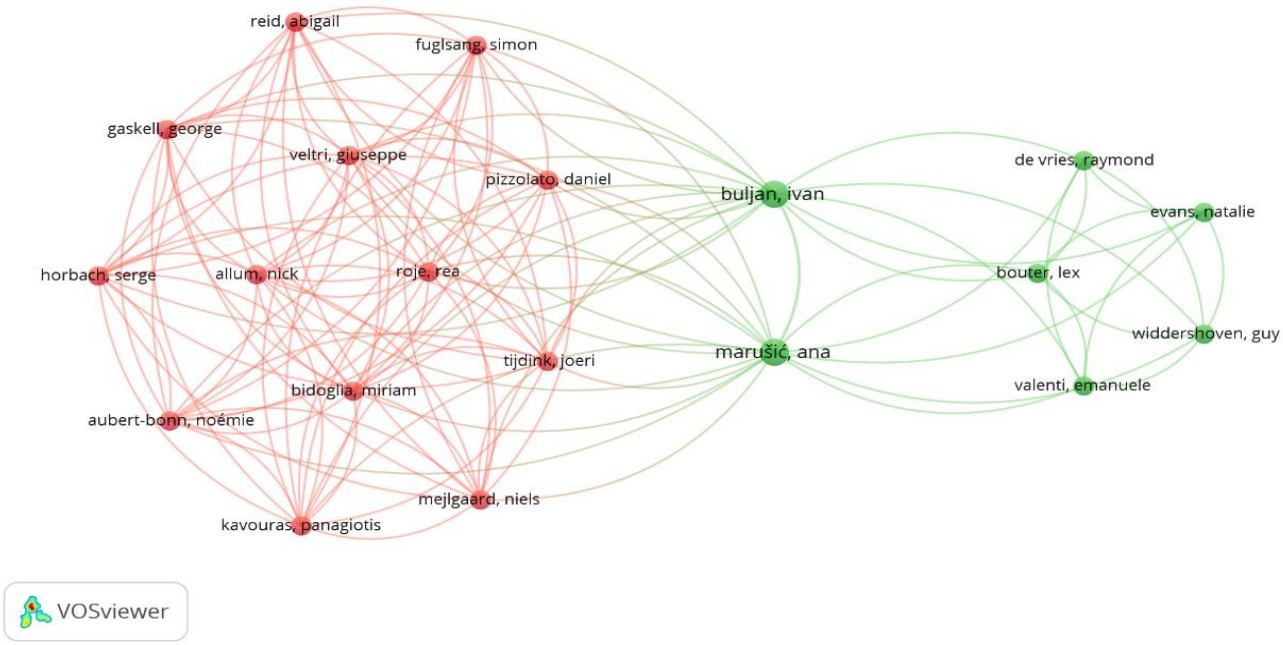


**Figure 2.** Co-authorship network analysis

For the co-authorship analysis, the threshold was set to a minimum number of articles of an author is one. Out of 173 authors associated in the dataset, all the authors met the threshold and were embraced in the visualization. The map is split into two major clusters, (covering red 13 authors and green 7 authors) stipulating distinct but interconnected. The association between both clusters, particularly through Ana Marusic and Ivan Bulijan advocate bridging roles that amalgamate methodological approaches from social science with bioethical perspectives. Overall, this network encapsulate the interconnected nature of research integrity, highlighting association across discipline and regions.

The keyword co-occurrence network depicted in Figure 3, which emphasizes the conceptual links within the discourse on research integrity. For the keyword co-occurrence analysis, the threshold was set at three co-occurrences per term. Out of 80 different keywords, ten of the most commonly used terms met this criterion and were included in the visualization. A clustering method was used to group the keywords based on the strength of their co-occurrence associations. It also highlighted the most persistent and strongly connected keyword is research misconduct with 9, 11 cooccurrence and link strength respectively, followed by research integrity (7, 11) and knowledge (5, 12) highlighting the central themes of research integrity and misconduct prevalence. Other repeating keywords comprise research ethics (8, 8), practice (4, 10) and attitude (4, 9), indicating the focus on ethical framework and behavioural dimensions. Less frequent but relevant keywords such as informed consent and questionable research practices indicate the scope of integrity related concerns. The above picture exhibits three notable clusters in different colours. The green cluster spotlights the centrality of research misconduct, research integrity, research ethics and questionable research practices, showing how these are linked to the concept of misconduct. The red cluster relates knowledge, attitude, practices with misconduct, strongly adherence to ethical

norms. The blue clustering covering ethics and informed consent are related but somehow faraway keywords, connected with research misconduct.


**Figure 3.** Keyword co-occurrence mapping

**Table 4.** Comprehensive Summary Of İncluded Studies

| Author (Year) | Key Findings | Scopus Listed | Quality Appraisal Result |
|---|---|---|---|
| Allum *et al.* (2023) | A significant number of European researchers (28%) compared to Americans (14%) express a desire for additional research integrity (RI) training. | Yes | High (Included) |
| Hofmann *et al.* (2023) | A small percentage admitted to engaging in scientific misconduct, while a notable portion reported experiencing unethical pressures related to authorship. | Yes | High (Included) |
| Troughton & Obasi (2022) | Researchers understood integrity in terms of rigour, they often neglected 'care and respect'. Barriers include inequitable power dynamics, competitive pressures, funding structures, and institutional safety. | Yes | Moderate (Included) |
| Evans *et al.* (2022) | It identifies key themes for research integrity like governance and institutional implementation, roles and structures, education and supervision, and infrastructure, technology, and tools. | Yes | Moderate (Included) |
| Chua *et al.* (2022) | Over 92% of respondents recognize the importance of RI education and lack of awareness was a common reason for non-participation across all RI education modes. | Yes | High (Included) |
| Hofmann *et al.* (2020) | 10% to 20% admitted to questionable research practices like data omission or altering data. One-third reported authorship misconduct, such as adding unqualified authors. 20% experienced pressure to include or order authors. | Yes | High (Included) |
| Haven *et al.* (2019) | Researchers in natural sciences had more positive perceptions of the integrity climate compared to those in social sciences and humanities, who reported less fairness in departmental expectations for publishing and funding. | Yes | High (Included) |
| Satalkar & Shaw (2019) | Two-thirds of participants had not received formal research integrity training, and awareness of available training was limited. | Yes | Moderate (Included) |
| Mnasri & Jaber (2024) | Significant knowledge gaps among researchers threaten research ethics. Researchers often place unwarranted trust | Yes | Moderate (Included) |

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|---|---|---|---|
| | in the reliability of lab machines and consumables from external providers without questioning their validity. | | |
| Chen *et al.* (2024) | 88.5% of residents attending a course on research integrity, 53.7% admitted to committing at least one form of research misconduct. | Yes | High (Included) |
| Tiruneh *et al.* (2024) | More than half of the participants (52%) were not given the relevant information prior to consenting, and 40% did not understand what was offered. Although 56% of individuals voluntarily agreed to participate, 28.7% felt pressured. Only 9.4% gave written consent. | Yes | Moderate (Included) |
| Costa *et al.* (2023) | Political scientists generally place less importance on ethics compared to theoretical contributions, research design, and empirical contributions when evaluating research. | Yes | High (Included) |
| Grosek *et al.* (2023) | 54 out of 57 doctorate candidates demonstrated major gaps in their knowledge of research ethics, with those who had prior research experience rating higher. Most students were aware of fundamental ethical principles such as informed consent and data protection, but fewer were familiar with specific ethical reports and guidelines. | Yes | High (Included) |
| Alahmad *et al.* (2023) | About 53.78% had received prior research ethics education, primarily during academic training, but 78.51% expressed a need for more training. | Yes | High (Included) |
| Roy & Edwards (2023) | 16% admitted to academic cheating, and 3.7% to research misconduct. Only 30.7% would report suspected misconduct. | Yes | High (Included) |
| Gopalakrishna *et al* (2022) | The prevalence of fabrication is 4.3%, whereas falsification is 4.2%. QRPs ranged between 0.6% and 17.5%, with 51.3% of respondents participating in at least one QRP on a regular basis. | Yes | High (Included) |
| Andronic *et al.* (2022) | Students answered 34% of the questions correctly. Those who assessed their own expertise highly did not perform any better on the test. Women performed better on average than males. | Yes | High (Included) |
| Ateudjieu *et al.* (2022) | Training requirements were identified for recommendations on health research ethics, research protocol evaluation methods, participant protection in clinical trials, and fundamental ethical concepts. | Yes | Moderate (Included) |
| Abdi *et al.* (2021) | The study looked on the effectiveness of a mandatory 3-hour research integrity course for new PhD students. The course increased awareness and discussion of research integrity, and 79% of students applied course content. | Yes | Moderate (Included) |
| Nishimura *et al.* (2021) | 93% of physicians have undergone training in research integrity, typically for institutional or IRB approval. However, inappropriate actions were common, including copying and pasting (11%) and gifting authorship (11%). | Yes | Moderate (Included) |
| Vie (2020) | Emphasizes the importance of broader social control mechanisms beyond whistleblowing to handle misconduct, ensuring a balanced and supportive approach to maintaining research integrity. | No (Discontinued form 2021) | High (Included) |
| Azakir *et al.* (2020) | A significant correlation existed between knowledge of ethics principles and positive attitudes towards them. | Yes | High (Included) |
| Tarboush *et al.* (2020) | Moderate level of knowledge, with an average correct score of 62% and only 64% had prior training in research ethics. | Yes | High (Included) |
| Mathur *et al* (2019) | STEM students found Responsible Conduct of Research (RCR) course most beneficial, while students from social sciences and arts and humanities (AH) disciplines perceived it as less relevant | Yes | Moderate (Included) |

| | | | |
|---|---|---|---|
| Maggio *et al.* (2019) | Older researchers reported less misconduct whereas publication pressure considered a strongest predictor of misconduct. | Yes | High (Included) |
| Fraser *et al.* (2018) | 64% of participants admitted to not reporting results that were not statistically significant, 42% collected additional data after checking for significance, and 27% admitted rounding p-values to satisfy significance limits. | Yes | High (Included) |
| Wolff *et al.* (2018) | The poll on ego depletion research found that 39.2% of researchers were aware of dubious research methods (QRPs), while 37.7% acknowledged to using such practices. | Yes | High (Included) |
| Agnoli *et al.* (2017) | Common QRPs used by researchers included selectively reporting studies (40.1%), deciding to collect more data after evaluating findings (53.2%), and rounding p-values (22.2%), with 88% admitting to employing at least one QRP. | Yes | High (Included) |
| Zhao *et al.* (2022) | Enhancing moral education, reforming evaluation mechanisms, and improving the research environment can significantly reduce research misconduct. | Yes | Moderate (Included) |
| Feenstra *et al.* (2021) | 91.5% observe an increase in misconduct, while 63.2% identify at least three prevalent fraudulent acts. Notable misconducts include duplicate publishing (66.5%), self-plagiarism (59%), and personal influence (57.5%). Less common techniques included data manipulation (10%) and fake authorship (20.5%). | Yes | High (Included) |
| Felaefel *et al.* (2018) | It discovered a significant prevalence of self-reported misconduct, with 59.4% of respondents confessing to at least one form of misconduct. The most common misconduct was ignoring research ethics (50.5%), followed by data fabrication or falsification (28.6%). | Yes | High (Included) |
| Hofmann (2019) | 13% of surveyed PhD grads were aware of major scientific misconduct in their academic environments, and 31% faced unethical authorship pressures while pursuing their PhDs. | Yes | High (Included) |
| Kaiser *et al.* (2022) | Fabrication, falsification, and plagiarism (FFP) were reported at extremely low rates (0.2-0.3%), with 40% admitting to engaging in at least one QRP in the previous three years. | Yes | High (Included) |
| Okonta *et al.* (2014) | Half of the respondents were aware of misconduct incidents, with 96.2% believing such acts had occurred in their institutions. | Yes | High (Included) |
| Olesen *et al.* (2018) | One of the main causes of misconduct, according to researchers, is the strong "publish or perish" culture, which fosters a hostile and competitive workplace that jeopardizes the integrity of research. | Yes | High (Included) |
| Pupovac *et al.* (2017) | 3.8% acknowledged plagiarism, 9.3% acknowledged data falsification, 3.8% acknowledged fabrication, and 25.3% acknowledged breaking authorship guidelines. There were more observational reports: 30.4% reported plagiarism, 29.1% reported data falsification, 19.4% reported fabrication, and 55.7% reported authorship violations. | Yes | High (Included) |
| Sivasubramaniam *et al.* (2021) | Two primary categories of unethical behaviors are identified based on interviews with 110 participants from various European institutions: publishing ethics violations, such as authorship issues and peer-review manipulations, and methodological malpractices, such as data manipulation. | Yes | Moderate (Included) |

### 4.2. Prevalence of QRPs and FFP

Research integrity studies conducted in various disciplines and geographical areas show significant disparities. A survey of Spanish ethics and philosophy researchers revealed a notable rise in misconduct, with 91.5% admitting to an increase and citing self-plagiarism and duplicate publications as common problems (Feenstra *et al.,* 2021). A study on research misconduct among medical residents in southwest China revealed that 53.7% of them had engaged in at least one type of misconduct, highlighting a significant regional problem in spite of educational initiatives (Agnoii *et al.,* 2017; Chen *et al.*, 2024; Allum *et al.,* 2023). Besides this, natural science searchers contemplate the RI atmosphere more auspicious in comparison to the scholars in social science and humanities (Haven *et al.,* 2019). These results indicate that the prevalence of questionable research practices (QRPs) (such as selective reporting, data omission and p-hacking) were widespread across disciplines and regions. In contrast, higher misconduct FFP cases were rare (Feenstra *et al.*, 2021; Allum *et al.*, 2023; Hofmann *et al.,* 2020; Grosek *et al.*, 2023).

### 4.3. Knowledge, Attitude and Practices

There is a notable variability in knowledge, attitude and practices linked to RI among different professionals and academic groups. A study conducted among PhD. scholars at Oslo University let out that although there was a slight improvement in attitudes of PhD scholars from graduates, the overall knowledge and practices of RI among scholars were inadequate (Hofmann *et al.,* 2023; Grosek *et al.,* 2023; Mnasri & Jaber, 2024). Furthermore, significant deficiencies were revealed on the survey assessing the knowledge of medical research ethics among first year doctoral students at the Ljubljana university (Grosek *et al.,* 2023), with an average correct response rate of only 48% (Azakir *et al.*, 2020). In contradiction to the findings, study conducted by Alahmad *et al.* (2023) revealed that medical researchers had a great positive attitude towards research ethics principles and researchers were more aware of ethical issues in medical research. A survey of researchers in different disciplines highlights that researchers exhibit notably high rate of common Questionable Research Practices (QRPs), with 64% admitting to selectively reporting results and 42% engaging in p-hacking, multiple submissions (50.6%), falsifying research data, fabricating research result (49%), authorship misconduct (40%) (Nishimura *et al.*, 2021; Fraser, *et al.,* 2018; Chen *et al.,* 2024; Hofmann *et al.*, 2020; Dhingra & Mishra, 2014). In contrast, a study of Italian research Psychologist found that 29% admitted to engaging in QRPs (Allum *et al.,* 2023; Agnoli *et al.*, 2017; Feenstra *et al.,* 2021; Gopalakrishna *et al.,* 2022), with 88% acknowledging at least one such practice (Agnoli *et al.*, 2017; Chen *et al.,* 2024; Roy & Edwards, 2023). It underlined agitating disparity between perceived and genuine ethical standards among students (Agnoli *et al.*, 2017; Alahmad *et al.,* 2023). Uniformly, the perceived occurrence of data falsification and fabrication remains low among the students (Feenstra *et al.*, 2021; Allum *et al.*, 2023; Hofmann *et al.*, 2020; Grosek *et al.*, 2023).

### 4.4. Barriers to Integrity

Numerous factors including, unequal power structures, insufficient organizational support, and intense competition challenge the maintenance of research integrity (Hofmann *et al.*, 2023). Even where study participants and researchers acknowledge the imperatives of research integrity, a study of global health collaborations between researchers in the UK and researchers in low- and middle-income countries (LMIC) encountered constraints of power, desire to produce a coherent story, timelines to submit reports, and publication pressure that regularly undermined the norms of research integrity (Fraser *et al.*, 2018; Maggio *et al.*, 2019; Troughton & Obasi, 2022; Gopalakrishna *et al.*, 2022; Roy & Edwards, 2023) Research conducted in Croatia, Netherlands, and Spain similarly indicated common challenges for researchers including external pressures, and sometimes inconsistent practice with guidance; however, there was not complete agreement on increasing governance, nor was there uncertainty about the scope of governance (Evans *et al.*, 2022). These examples reveal the need for systematic reform that enhances institutional supports, including the reduction of competitive pressures that threaten research integrity (Palla & Singson 2023; Poduthase et al. 2018).

### 4.5. Institutional Support and Training

Institutional support as well as education are important components of research integrity advocacy. Sinces type of support has quantitatively improved compared to other approaches (Hofmann *et al.,* 2023; Allum *et al.*, 2023; Chen *et al.*, 2024). That being said, a research based at Wayne State University revealed that while there was continual adherence to strategies, and improvement in strategies, students in the social sciences and humanities still considered a required course, Responsible Conduct of Research (RCR), irrelevant. This indicates a reemergent need for training that is more pertinent to both discipline and practice (Grosek *et al.*, 2023; Hofmann *et al.*, 2023; Mathur *et al.*, 2019; Allum *et al.*, 2023). Emailing to the studies on participant preferences for research integrity education also revealed, even though most respondents indicated that these topics were important to learn, there was a lack of awareness regarding formal options related to research integrity training. Implicitly this indicates there is a need for more engaging, formalized, and user-friendly research ethics and integrity training options (Chua *et al.*, 2022; Satalkar & Shaw, 2029; Costa *et al.*, 2023; Andronic *et al.*, 2022).

## 5. Discussion

The synthesized literature review demonstrated that research integrity varies by discipline and place (Mathur *et al.*, 2019; Evens *et al.* 2022; Feenstra *et al.* 2021). Despite some educational interventions, researchers reported some form of misconduct (Chen *et al.* 2024). These findings suggest that inquiries related to research integrity happen, but they take different form depending on the discipline and the place, and thus different integrity practices are required (Maggio *et al.* 2019). Despite the awareness and recognition for the value of integrity, researchers identified barriers to uphold research integrity, including a lack of awareness, inequitable power relations, and lack of institutional cognizance and support; as well as a lack of presentation in a coherent narrative, the publication pressure, the reporting timeline, and the lack of integrity guidelines at their institutions (Pupovac *et al.,* 2017; Fraser *et al.,* 2018; Maggio *et al.,* 2019; Troughton *et al.,* 2022; Evans *et al.* 2022; Chua *et al.*, 2022; Gopalakrishna *et al.*, 2022; Roy *et al.*, 2023). Although the existence of research integrity and its importance is acknowledged (Nishmura *et al.*, 2021; Ateudjieu *et al.,* 2022), the way, in which the academic research structure and universities engage with, and reward integrity, highlights a need for more engaging training (Satalkar *et al.*, 2019; Hofmann *et al.,* 2020; Chua *et al.*, 2022; Alahmad *et al.*, 2023; Chen *et al.*, 2024). Effective institutional support requires comprehensive, tailored training that address the unique requirements of various academic and professional groups (Roy *et al.,* 2023; Andronic *et al.*, 2022; Azakir *et al.,* 2020).

Study also highlighted the considerable variability in knowledge, attitudes and practices related to research integrity across different groups (Allum *et al.*, 2023; Hofmann *et al.*, 2023; Troughton *et al.,* 2022; Chua *et al.*, 2022; Grosek *et al.* 2023; Andronic *et al.*, 2022;). Ph. D. students' attitudes improved slightly from candidates to graduated (Adronic *et al.*, 2022; Alahmad *et al.*, 2023). In contrary, newly admitted doctoral students had significant gaps in research ethics knowledge (Azakir *et al.*, 2020; Hofmann *et al.,* 2023; Grosek *et al.* 2023). To some extent it is also found that the research integrity climate is negatively perceived by junior researchers more than senior researchers (Maggio *et al.,* 2019; Haven *et al.,* 2019; Azakir *et al.,* 2020). The overall knowledge and practice remained substandard (Wolff *et al.,* 2018; Tarboush *et al.,* 2020), but those having prier research experience scored higher in research ethics (Grosek *et al.* 2023; Hofmann *et al.*, 2023; Azakir *et al.,* 2020), except the study conducted by Andronic *et al.* (2022). It is also noticed that participants had witnessed scientific misconduct or QRP including authorship issues, informed consent, self-plagiarism, selectively reporting results and multiple submission (Fraser *et al.*, 2018; Chen *et al.,* 2024; Palla & Singson 2023; Hofmann *et al.*, 2020; Dhingra & Mishra, 2014; Nishimura *et al.*, 2021; Azakir *et al.*, 2020; Wolff *et al.*, 2018), while sever research misconduct i.e Falsification, Fabrication and Plagiarism (FFP) were rarely found among the scholars (Allum *et al.*, 2023; Agnoli *et al.*, 2017; Feenstra *et al.,* 2021; Gopalakrishna *et al.*, 2022; Kaiser *et al.*, 2022; Pupovac *et al.*, 2017). Most of the research scholars admitted to at least one QRP (Agnoli *et al.,* 2017; Chen *et al.*, 2024; Roy & Edwards, 2023; Gopalakrishna *et al.*, 2022; Feenstra *et al.*, 2021; Kaiser *et al.*, 2022), revealing a gap between perceived and actual ethical standards (Zhao, *et al.*, 2022; Hofmann *et al.*, 2023).

In addition to the thematic synthesis of empirical studies, the bibliometric analysis i.e. co-authorship network and keyword co-occurrence mapping supplement the analysis of the findings. While acknowledging the significance of cross-network connections both within and across disciplines and geographical areas, co-authorship networks

exemplify the integrated nature of research integrity. Important themes like research integrity, research misconduct, and knowledge are depicted in the inferred keyword cooccurrence map, while less common terms like informed consent draw attention to a less studied facet of research integrity. In summary, the bibliometric analysis and thematic synthesis of the literature confirm that multi-level interventions are necessary to address research misconduct. At the individual level, training and awareness programs are still needed but insufficient (Haven *et al.*, 2019; Chua *et al.,* 2022). At the institutional level, an improved mentoring and leadership system is preferable in fostering responsible conduct (Martinson *et al.,* 2005; Schneider *et al.* 2013). At the governance level, research integrity ought to be established in national and international quality assurance systems (Altbach & Knight, 2007; de Boer *et al.*, 2010).

## 6. Conclusion

From the policy perspective of education, these findings highlight the necessity for tailored academic strategies that foster responsible research practices across different disciplines. From an organizational behaviour perspective, the findings highlight how an absence of dynamic, relationships of unequal power and a weak mentoring system to support the pressure to publish reflects organizational and disciplinary climate in relation to ethical or unethical research cultures. Organizational climate and leadership theories suggest that integrity will not be supported through simple compliance mechanisms but rather needs to have role modelling, trust and reward systems to counter misconduct. Lastly, in the context of governance, research integrity should be a global academic and policy discipline concern rather than merely an institutional or individual academic integrity issue. The need for governance frameworks to support accountability and autonomy in research as well as effective governance across multi-level collaborations on a range of issues, including international codes of conduct (e.g., ALLEA, UNSCO), national regulatory frameworks, and institutional policies, is highlighted by variation across areas and disciplines.

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## Authors' Contribution Statement

Jateendra Das: Conceptualization, Methodology, Formal analysis, Writing - Original Draft. Sarat Kumar Rout: Supervision, Validation, Writing - Review & Editing. Bikshyatsib Sardar: Formal analysis, Writing - Review & Editing. Pranayini Sahoo: Visualization, Writing - Review & Editing. Soumyabrata Mahapatra: Conceptualization, Writing - Original Draft. Subhashree Dash: Resources, Data Curation. All authors have read and agreed to the published version of the manuscript.

## Conflict of Interest

The author declares no conflict of interest. Relevant affiliations were disclosed during the consent process and noted in the methodology.

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