Assessing Research Misconduct in Iran: A Perspective from Iranian Medical Faculty Members

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Abstract

Background

Research misconduct is a global concern in almost every scientific field. There is no comprehensive data regarding the prevalence of research misconduct among Iran's medical faculties. This study aims to conduct a nationwide survey regarding research misconduct in the faculty members of medical universities in Iran.

Methods

We used the Persian version of the research misconduct questionnaire (PRMQ) in an online survey on the Google Forms platform. Using Google Froms, the survey link was sent to a systematic random sample of medical faculty members in Iran (N = 4986). Descriptive analyses were performed on the individual items of PRMQ, with frequencies and percentages for categorical and Likert-type response items and means and standard deviation (S.D.) for continuous variables. Chi-square analysis was conducted to test hypotheses examining differences in frequency of responses related to factors influencing misconduct. All the analyses were performed using R 3.6.0.

Results

The response rate was 13.8% (692 responses). Nearly three-quarters (N = 499, 72.1%) of the respondents had first-hand witted some instances of research misconduct during the previous year. Academic scholars in various tenure categories rated investigator competitiveness differently (df:9, p = 0.008), with the highest difference in the mean scores between tenure categories one (TC1) (2.7, SD:0.87) and four (2.4, SD:0.77). Only 18.5% of participants perceived the effectiveness of their associated organization’s rules for reducing research misconduct to be high or very high. Pressure for tenure was identified as the most perceived as having a strong behavioral influence on engaging in research misconduct (80.2%).

Conclusions

Research misconduct is a living trouble among medical faculty members in Iran and needs a more proactive approach to tackle.

Background

Research misconduct has been a growing concern in almost every scientific field, including medical sciences (1). Two of the most recognised definitions for research misconduct are as follows: 1) the U.S. Department of Health and Human Services Office of Research Integrity defines it as "fabrication, falsification, or plagiarism in proposing, performing, or reviewing research, or in reporting research results" (2); and 2) the U.K. Research Integrity Office's definition includes "a) fabrication, b) falsification, c) misrepresentation of data and/or interests and/or involvement; d) plagiarism; and e) failures to follow accepted procedures or to exercise due care in carrying out responsibilities for subjects and private information" (3). Although these definitions introduce the most explicitly-affecting factors on misconduct, some other implicit factors such as conflicts of interest and misuse of funds have later been identified as deviations from acceptable procedures (4–6). Considering their detrimental effects on individuals' health status (e.g., patients, etc.) and extensive financial costs levied upon healthcare systems, such wrongdoings are of even more salience in medical sciences (7–9). In Iran, the National Committee for Ethics in Biomedical Research defines research misconduct as “any violation of the requirements, regulations, guidances, guidelines and codes to protect human participants, as approved by the Ministry of Health and Medical Education (MOHME) for designing, executing and reporting results of biomedical research, and abuse of intellectual property pertaining to practical and theoretical research findings of other parties” (10).

Even though many considering research misconduct as a matter of behaviour and attitude of the researchers, the strategies that dominate the research system should not be overlooked (11). Factors influencing the research misconduct occur in three levels: 1) research policies and strategies determined by policymakers (macro-level), 2) research development programs run by universities and academic organisations (meso-level), and 3) research projects conducted by individuals (micro-level) (12). Thus, a comprehensive, multilevel approach is needed to reduce the research misconduct and its mostly contributing causes in research systems (13, 14).

Current estimates of the prevalence of research misconduct differ in distinct countries. A multinational retrospective study on previously retracted studies in 2013 showed that Iran, India, and Turkey exhibited higher ratios of publication misconduct to distrusted data (and unreliable interpretations), while the USA, Switzerland, and Germany had higher distrusted data compared to the publication misconduct occasions in the retracted studies (15). Another retrospective study showed that countries with the most rapid growth in scientific publications (e.g., China, Malaysia, and Mexico) simultaneously exhibited the highest retraction rates (16, 17).

A few studies have scrutinised the prevalence of various aspects of research misconduct among Iranian medical researchers. A survey on the dissertation of undergraduate and postgraduate medical students at a medical school in 2015 revealed that 19% of undergraduates and 25% of postgraduates had misconducts (18). Another study in academic members of a medical university in Iran showed that almost 43% of the respondents

had engaged in at least one of the so-called "top-ten misbehaviors" introduced by the paper (19). Another survey assessing the prevalence of publication misconduct among Iranian medical corresponding authors reported guest authorship, falsification of study methods, and plagiarism as the three most common wrongdoings in Iran during 2009–2011 (20). Granted that many local studies have addressed scientific misconduct in Iran, there has been no comprehensive data regarding the prevalence of research misconduct among the medical faculty members in the whole country. Without having these figures or at least an estimate of them, devising effective policies to manage medical research misconduct (either at macro-, or meso-level) in Iran will most probably be in vain. This study aimed to conduct a nationwide survey using the Persian version of the research misconduct questionnaire (PRMQ) in the faculty members of medical universities in Iran to evaluate their perceptions, beliefs, practices, and experiences related to scientific misconduct.

Methods

Devising the PRMQ

Two questionnaires were considered as sources to be translated to Persian and get their psychometric characteristics checked. Overall, 63 items were devised in seven following subscales: perception of the workplace environment, the prevalence of scientific misconduct, awareness of research misconduct, reporting research misconduct, beliefs about research misconduct, behavioral influences, and publication pressure. The final version of the questionnaire is accessible at https://drive.google.com/file/d/1nLhwovk7qVEL7Ztw-wm0PMIzyvKHRCDF/view?usp=sharing. The validity of the Persian version of the research misconduct questionnaire (PRMQ) was assessed qualitatively (face validity from experts and pilot testing) and quantitively (using content validity index and content validity ratio). Content validity indices were higher than 0.7 for all the items, thereby considered valid. Additionally, reliability was scrutinised using Cronbach's alpha coefficient, ranging from 0.61 to 0.87 for all these subscales. The detailed steps of translating, validating, and checking the internal consistency of PRMQ are expounded elsewhere (21).

Participants

The PRMQ items were uploaded as an online survey on the Google Forms platform. After estimating the sample size, we ordered all the medical faculty members in Iran based on their H-index. This resulted in a systematic random sample of 4986 medical faculty members in Iran —data gathered from the Iranian Scientometric Information Database (ISID). This online database provides an up-to-date pool of Scientometric information about the faculty members affiliated with the MOHME in Iran (isid.research.ac.ir). We sent the survey link twice to all of the Iranian medical scholars from March to November 2019. Based on their performance in education, research, and facilities, these universities are categorised into three types by the Ministry of Health and Education in Iran —type one as the highest-ranked and type three as the lowest-ranked. The target population was affiliated with either a type one, two, or three medical universities in Iran.

Data management and analyses

We gathered all data directly from the Google Forms responses. There was no time limit for putting in the answers or any sign-in times restrictions. Answering no question was compulsory in any section as well. Before the beginning of the first section of PRMQ, the following statements were given: the autonomy of respondents in participation, their responses not leading to any harms, no compensations or rewards provided for their participation, and maintaining the confidentiality of their information and answers. The answers were exported into Microsoft Excel (2019) data sheets; cleaning and sign-posting were conducted using the same software. Descriptive analyses were performed on the individual items of PRMQ, with frequencies and percentages for categorical and Likert-type response items (starting from one to higher integers) and means and standard deviation (S.D.) for continuous variables. Chi-square analysis was conducted to test hypotheses examining differences in frequency of responses related to factors influencing misconduct and reporting it or factors related to personally experienced publication pressure items based on the type of university, first-hand experience of a research misconduct occasion, or the length of serving as a tenured professor for each participant. These categories were defined as follows: 1) tenure category one (TC1) for those who worked in tenure conditions for less than or equal to five years; 2) tenure category two (TC2) for those who worked in tenure conditions for more than five years and less than or equal to 10 years; 3) tenure category 3 (TC3) who worked in tenure conditions for more than 10 years and less than or equal to 15 years; and 4) tenure category four (TC4) for those who worked in tenure conditions for more than 15 years. An overall cumulative score was defined for the publication pressure subscale as the average sum of scores for all items in all the respondents, which could range between 14 and 70. This study was approved by an institutional ethics committee with the code number IR.ACECR.IBCRC.REC.1397.011 in 2018. All the analyses were performed using R 3.6.0 (R Core Team, 2019), the Tidyverse package (v1.3.0, Hadley Wickham, 2019), and the Questionr package (v0.7.3, Julien Barnier, 2020).

Results

Demographic and work setting features

Of 4986 faculty members, 692 responded (13.8% response rate); 393 (56.7%) were male, and 299 were female. The mean (S.D.) age of participants was 46.0 (8.15) years, with a range of 28–71 years. The mean (S.D.) of the years of working as a tenured scholar and H-index of our respondents were

11.2 (9.24) and 7.1 (6.05), respectively. Nearly half (50.3%) of participants were affiliated with type-1 universities; most of them (64.4%) had a Ph.D. degree, while specialty medical practitioners were the second most prevalent (27.1%). Table 1 depicts the participants' demographic information and works setting features in more detail.

Table 1
Demographic characteristics of the respondents at different university types.

Characteristic	Type 1	Type 2	Type 3
Respondents' No.	348 (50.3%)	246 (35.5%)	98 (14.2%)
Gender			
Male (%)	184 (26.5%)	140 (20.3%)	69 (9.9%)
Female (%)	163 (23.5%)	107 (15.5%)	29 (4.3%)
Age (mean, SD)	47.2 (7.80)	45.2 (8.27)	43.2 (8.11)
Tenure (mean, SD)	12 (8.84)	10.6 (8.61)	9.8 (7.35)
H-index (median, IQR)	7 (8)	4 (6)	4 (4)
Degree			
Master	5	21	30
MD	117	59	14
PhD	225	167	54
Total	347	247	98
No.: Number; SD: Standard deviation; IQR: Inter-quartile range.			

Almost one-third (31.6%) of people who answered did practice in clinical settings, and 80.4% of them did mention having served as a chair or vice-chancellor in their research organisations. The average period of working as a researcher was 7.9 (8.86). Among the involved researchers, 84.9% rated their understanding of rules and procedures related to research misconduct as high or very high.

First-hand knowledge of research misconduct

Nearly three-quarters (N = 499, 72.1%) of the respondents had first-hand witted some instances of research misconduct during the previous year by the time of answering. We found no evidence for a difference in the rate of the first-hand knowledge of misconduct among various scholars from differing university types or with disparate tenure experience categories (p = 0.62 and 0.48, respectively).

Perception of organisational influence on research misconduct

Among our participants, 78% deemed the investigator competitiveness high or very high in their workplaces. No substantiated difference was observed in pressure on investigators to obtain external funding among various university types (df:6, p = 0.054). However, academics in different tenure categories rated this pressure differently (df:9, p = 0.008), with the highest difference in the mean scores between TC1 (2.7, SD:0.87) and TC4 (2.4, SD: 0.77). Similarly, a distinction was noted among scholars in various tenure categories in their perception about workplace pressure to obtain tenure (df:9, p < 0.001). On average, respondents from TC1 (3.4, SD:0.718) rated this pressure more than the other tenure categories.

Only 18.5% of participants perceived the effectiveness of their associated organisations' rules for reducing research misconduct to be high or very high. Lower ratings were more likely to come from subjects in type 1 universities than others (df:6, p = 0.0078). Furthermore, people who had first-hand knowledge of misconduct were more likely to rate their institutional policies' effectiveness as lower compared to others (df:3, p < 0.001). Chances of getting caught were rated as low or very low by 80.6% of respondents. Based on university type or tenure category, no evidence of a difference was found in participants' ratings of chances of getting caught or severity of penalties in their workplaces. Those who had the first-hand experience of research misconduct were more likely to rate the chances of getting caught higher than those who did not (df: 3, p < 0.001).

Behavioral influences on research misconduct

Pressure for tenure was identified as the most commonly perceived as having a strong behavioral influence on engaging in research misconduct, with a rate of 80.2% among Iranian medical academic scholars. Three other factors were also deemed to have strong behavioral effects on doing misconduct by more than half of our respondents, including the need for publication (71.1%), insufficient censure (punishment) for misconduct occasions (60%), and need for recognition and getting reputed (56.5%). Figure 1 shows the behavioral influences of the scholars on research misconduct.

Perceived prevalence of scientific misconduct

The most frequent response in each category of the faculty members' perception of the prevalence of misconduct in their workplaces was "occasionally." Disagreement about authorship averagely scored the highest among all the presented misconducts (31.2%). Plagiarism and falsified data were rated to be faced either occasionally or frequently by 66.2% and 66.5% of the participants, respectively. Respondents with first-hand knowledge of misconduct were more likely to report higher rates of perceived prevalence of protocol violations related to subject enrolment (df: 3, $p < 0.001$). Figure 2 shows the perceived prevalence of scientific misconduct among our participants.

Reporting of research misconduct

In answer to the question, what a typical research coordinator would do if they were aware that a principal investigator (PI) or coinvestigator violated research integrity rules, 72.9% of scholars responded that the coordinator would do nothing or opts not to report the occasion. The figure for the same question only regarding a member of the research team or staff member engaging in the wrongdoing was 69.6%. Respondents who rated the effectiveness of their organisational policies in tackling the misconduct as high or very high were more likely to indicate higher chances of the coordinator to report the misconduct (df: 3, $p < 0.001$). However, participants with the first-hand experience of misconduct were more likely to indicate that a typical research coordinator would probably do nothing (df:3, $p < 0.001$). Those affiliated with type 3 universities were more likely to rate the chance of coordinators reporting the misconduct to be higher (df:6, $p = 0.012$).

Publication pressure

The overall cumulative score to all the items in the publication pressure section was 49.5. Nearly 70% of the respondents agreed that their publication output would be of higher quality if there were no publication pressure. Among them, 80.9% suspected that publication pressure leads to data manipulation in some colleagues. The scholars in TC1 were more likely to believe that without publication pressure, their scientific output would have been of higher quality (df:12, $p = 0.017$). Additionally, scholars with no first-hand knowledge of misconduct were more likely to find the university's scientific output criteria for their appointment and reappointment as stimulating (df:4, $p = 0.001$). For more details about the responses' statistics in each section of the PRMQ, please note Additional Tables 1 to 5.

Discussion

As concerns have been growing about the erupted cases of medical research misconduct globally (22), efforts have been exerted to measure the extent of such wrongdoings, whereby counteracting this issue will be more effective. As a part of medical research, Iranian medical researchers have noticeably contributed to publishing articles, albeit showing some cases of research misconduct in the previous years (20, 23). This indicates a need for more information about measuring scientific misconduct in Iran. Accordingly, after devising a reliable and valid questionnaire in Persian (PRMQ), we conducted a national survey in Iran's medical universities to assess the status quo about scientific misconduct in faculty members.

This study is the first interactive survey of medical faculty members in Iran about their perceptions of research misconduct on a national scale to the best of our knowledge. Our study tried to reach a random sample of the faculty members, hence validating our survey sample's representativeness among different university types and scholars in Iran. We are uncertain whether the obtained prevalence of misconduct in this study accurately reflects the true prevalence of misconduct in the work settings of the participants. Presuming that the 499 instances of misconduct identified by respondents represented all instances of known research misconduct among the 4986 faculty members receiving the questionnaires, then this would represent an overall prevalence of 10%. This is quite implausible since our response rate was only 13.8% —less than a third of that of a similar study in the U.S. which reported the perceptions of research coordinators in 2006 (4). On the other hand, we indirectly asked the scholars about various instances of misconduct (i.e., plagiarism, data fabrication, etc.), as if they have seen such wrongdoings in their workplaces (and not necessarily conducted by themselves). This could expand the coverage of misconduct identifications as one individual in each department would suffice to report the cases.

A recent survey of plagiarism among various demographics of researchers in Iran reported the percentage of plagiarism at around 30% —based on experts' opinions (24). Be that as it may, a survey by Hadji et al. in 2018 (20) directly assessed the prevalence of publication misconduct among corresponding Iranian researchers who had published in Scopus-indexed journals during 2009-2011. Prevalence rates for plagiarism, methodology falsification and data fabrication were reported at 4.9%, 12.65%, and 4.15%, respectively. However, our survey participants claimed to have frequently faced similar misconducts (plagiarism, data falsification, and data fabrication) with a frequency of 12.3%, 20.8%, and 12.4%, sequentially. Both ours and Hadji and her colleagues' surveys have represented authorship issues as the most common misconduct in Iran. Hadji et al. reported 18.1% of guest authorship in their findings, while we found that 31.2% of medical faculty members deemed to have frequent disagreements about authorship.

Pressure for obtaining tenure ($p<0.001$) and external funding ($p<0.05$) were found to be more heeded to by younger medical academic members (TC1) compared with the older scholars (TC4). Early-career scholars were also more likely to believe that without publication pressure, their scientific output would be of higher quality ($p<0.05$). This is previously addressed by Holtfreter et al. (25), who claimed that professional strains and stressors like publication pressure and pressure to secure external funds are among the most important causative factors of research misconduct. Medical faculty members in Iran are monitored and ranked merely based on the quantity of their publications and their Scientometric indices. In the absence of any qualitative indices in the current academic system of Iran to assess the faculty members, these professional strains tend to notably aggravate.

The low perception of institutional policies' effectiveness against the misconducts in type 1 universities could be due to higher numbers of running research projects and better communication settings for researchers, whereby one perceives the policies not to be sufficient to control the occasions of

misconduct (26). In other words, they are more likely to get aware of misconducts in their workplaces arbitrarily. Predictably, people with first-hand knowledge of misconduct were more likely to rate this effectiveness as low ($p<0.001$) and more likely to rank the chances of getting caught higher than those who did not experience such direct occasions of misconduct ($p<0.001$). Moreover, participants with first-hand experience of misconduct were more likely to indicate that a typical research coordinator would probably do nothing when witnessing misconduct by their team members ($p<0.001$). These are alarming perceptions that need to be effectively addressed before getting entrenched in the early- and mid-career medical researchers in Iran. It is imperative to hold awareness programs in faculty members, aiming to reinforce research ethics and inform them about the probable consequences of such actions. This is in line with the findings of Mardani et al. (12), who reiterated the importance of addressing organisational and managerial monitoring interventions (meso-level activities) to achieving research integrity at the individual level among Iranian medical researchers (micro-level activities).

Our study's figures should be interpreted with caution since the disposition of the misconduct was not specified in the questionnaire, and not all reported instances may have matched the same definitions. They were also subjective to the respondents' understanding of each type of fraud (27). As a limitation, our response rate was only 13.8%. Nevertheless, this figure might be acceptable, considering the busy schedule of medical faculty members in Iran. Given that our survey was anonymous, the only intervention to boost the response rate was a second round of emailing to non-respondents. As some items in the publication pressure section assessed the respondent's experienced stress, and considering the COVID-19-imposed stresses on individuals in general (28), we did not do a third round of emailing during the COVID-19 pandemic.

Conclusions

Perceived rates of research misconduct among Iranian medical faculty members are alarmingly high, necessitating a need for more effective policies to counteract such wrongdoings in the future. Granted, there exists a viable need to consistently educate medical researchers about the repercussions of misconduct, yet more adaptive approaches to mitigate the professional strains on early-career researchers are advisable.

List Of Abbreviations

COVID-19
Coronavirus disease 2019;
PRMQ
Persian version of the research misconduct questionnaire;
ISID
Iranian Scientometric Information Database;
TC
Tenure category;
PI
Principal investigator;
SD
Standard deviation.

Declarations

Ethics approval and consent to participate

The project was approved by the research ethics committee of the Motamed Cancer Institute with the code number IR.ACECR.IBCRC.REC.1397.011 in 2018. All methods were carried out in accordance with relevant guidelines and regulations and a consent form was obtained from all the participants.

Consent for publication

Not applicable.

Availability of data and materials

The datasets generated and analysed during the current study are not publicly available but are available from the corresponding author on reasonable request. The codes applied in this study are publicly available on the GitHub platform (https://github.com/ErfanShamsoddin/ResearchMisconductIran).

Competing interests

The authors do not have any conflicting or competing interest to disclose.

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The authors did not receive any financial support in conducting this survey.

Authors' contributions

ES interpreted the data, wrote and revised the manuscript. ZT conducted the study and interpreted the data. AS-M wrote and revised the manuscript. LJ conceived, designed, and supervised the study, interpreted the data, and revised the manuscript. PK conceived and supervised the study. ESG designed and supervised the study and revised the manuscript. BM conceived, designed, and supervised the study and wrote and revised the manuscript.

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Figures

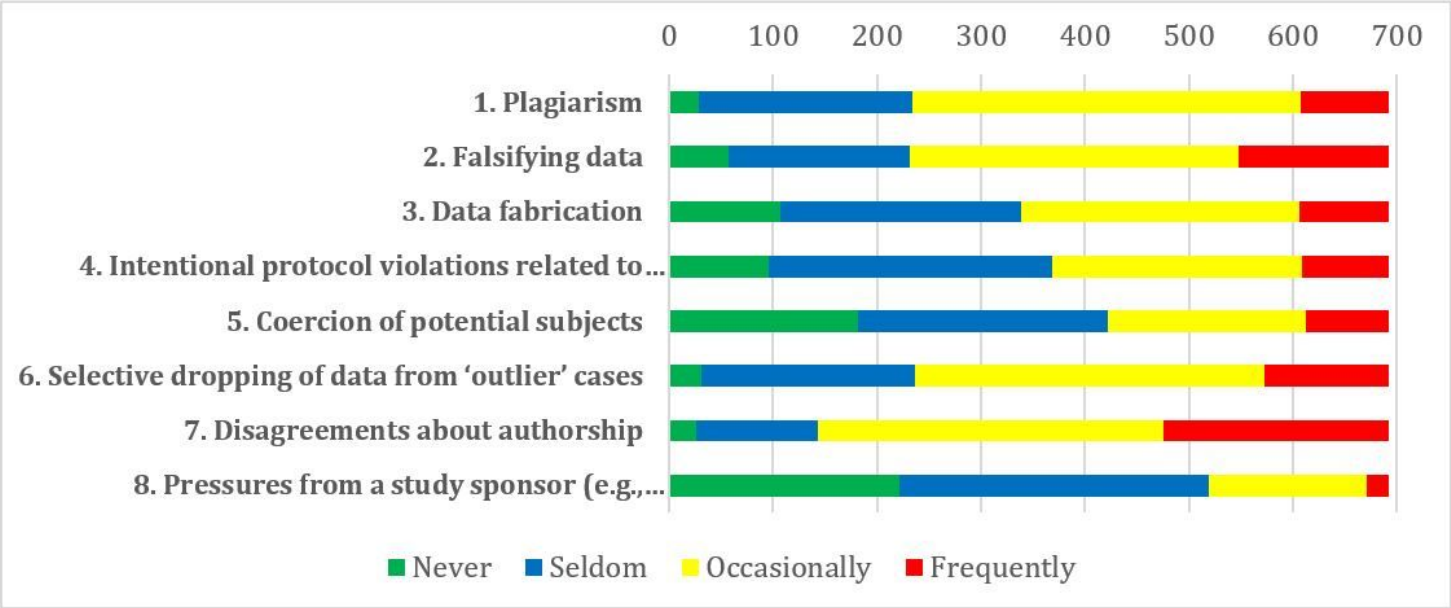

Figure 1

Number, mean score and median score of responses to each item in "behaviora influences on scientific misconduct" section.

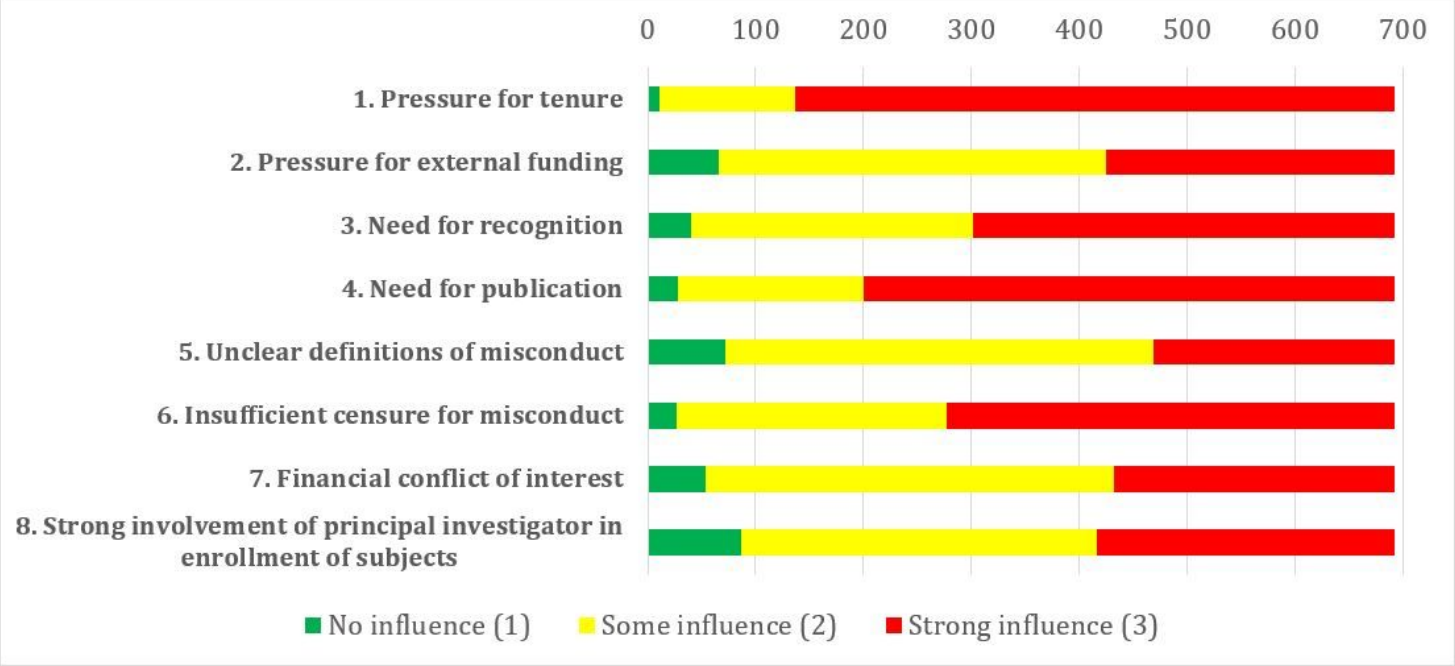

Figure 2

Number, mean score and median score of responses to each item in "prevalence of scientific misconduct" section.

Supplementary Files

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- AdditionalTables.docx