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Do medical students require education on issues related to plagiarism?

JOE VARGHESE, MOLLY JACOB

Abstract

In the course of our professional experience, we have seen that many medical students plagiarise. We hypothesised that they do so out of ignorance and that they require formal education on the subject. With this objective in mind, we conducted a teaching session on issues related to plagiarism. As a part of this, we administered a quiz to assess their baseline knowledge on plagiarism and a questionnaire to determine their attitudes towards it. We followed this up with an interactive teaching session, in which we discussed various aspects of plagiarism. We subjected the data obtained from the quiz and questionnaire to bivariate and multivariate analysis. A total of 423 medical students participated in the study. Their average score for the quiz was 4.96±1.67 (out of 10). Age, gender and years in medical school were not significantly associated with knowledge regarding

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plagiarism. The knowledge scores were negatively correlated with permissive attitudes towards plagiarism and positively correlated with attitudes critical of the practice. Men had significantly higher scores on permissive attitudes compared to women. In conclusion, we found that the medical students' knowledge regarding plagiarism was limited. Those with low knowledge scores tended to have permissive attitudes towards plagiarism and were less critical of the practice. We recommend the inclusion of formal instruction on this subject in the medical curriculum, so that this form of academic misconduct can be tackled.

Introduction

Plagiarism is defined as "the practice of taking someone else's work or ideas and passing them off as one's own" (1). The Council of Scientific Editors defines it as "a form of piracy that involves the use of text or other items (figures, images, tables) without permission or acknowledgment of the source of these materials"(2). Plagiarism is now acknowledged as a serious form of academic and scientific misconduct. It is considered one of the three "high crimes" in academics and research,falsification and fabrication being the other two.

Plagiarism plagues many fields (e.g. science, literature, music, etc). It is also found at all levels of scholarship and has been discussed extensively in the literature (3–5). It continues to be a cause of serious concern in academia, both at the national and international levels(6,7).

It is accepted that plagiarism is widespread in education and academics (8,9). The practice has been documented among established researchers. Self-plagiarism, in which an author uses his/her own previously published work without attribution, is also common (10). The pressure to publish, the competition for tenured positions and the compulsions of academic advancement force individuals to take shortcuts and falsely claim credit.

While a lot of time and effort has gone into tackling the menace of plagiarism in research, the problem of plagiarism among students has received attention only in recent years (11,12). Plagiarism among students is reported to be high, though the documented rates vary (9).The practice is facilitated by easy access to the Internet, with its vast reservoirs of information (13). Students frequently copy and paste text, often large amounts of it, and are rarely aware of the implications of their actions. This trend is also encouraged by the fact that universities and teachers in many places require electronic submission of assignments, an environmentally-friendly measure. Students whose first language is not English are often tempted to resort to plagiarism as an easy solution to their writing problems (14).

Anecdotal evidence and high-profile cases from India suggest the widespread prevalence of plagiarism (15). However, there is very little information on the extent of the problem in India. Our experience as teachers has shown us that medical students often plagiarise. We hypothesised that they do so due to ignorance of the various issues related to plagiarism and that their ignorance perpetuates attitudes that are permissive to plagiarism. We, therefore, initiated efforts to educate them on these issues. Prior to these educational efforts, we assessed their baseline knowledge and attitudes towards various issues related to plagiarism. This paper presents our findings.

Methodology

The subjects of our initiative were undergraduate medical students at the Christian Medical College (CMC), Vellore, India. The initiative aimed to educate students and faculty members in the institution on plagiarism, the corrosive impact of plagiarism and the correct methods of citation in academic writing. The details of the initiative were explained to the subjects and their written consent was obtained.

The following data on the subjects were obtained:

i. *Sociodemographic characteristics:* Age, gender and year of study.

ii. *Extent of knowledge regarding plagiarism:* We administered a quiz, developed and used by Indiana University, USA for educational purposes, to assess knowledge(16). We obtained the requisite permission for the use of the quiz. The quiz consisted of 10 multiple-choice questions,which presented scenarios characterised by the presence or absence of plagiarism. The students were required to identify whether plagiarism was present or absent. Such scenario-based questions are commonly used to assess knowledge regarding plagiarism and several studies have used similar tools in the past(17–19).

iii. *Attitudes towards plagiarism:* We used the Attitude Towards Plagiarism (ATP) Questionnaire (20), with certain modifications (*vide infra*). The questionnaire employs a five-point Likert scale to record attitudes towards different aspects of plagiarism. The psychometric properties of the scale have been evaluated.

The questionnaire used has three scales: (i) a component that assesses "positive" or permissive attitudes to plagiarism (items 1 to 12) (section 1), (ii) a scale that evaluates "negative" or critical attitudes to plagiarism (items 13 to 19) (section 2), and (iii) a component that evaluates subjective or personal norms (items 20 to 29) (section 3).

Minor modifications were made to the language in the questionnaire to reduce ambiguity and to tailor the questions to the context of Indian students. These minor changes were made to some questions (Qs.3,7,8,10,11,16,17 and 27), while three statements in the questionnaire (Nos. 20, 21 and 24 in the scale on subjective norms)were not included, as they were ambiguous. A committee examined the scale and the modifications made, and found them to have face validity. The members of the committee were medical teachers and academics trained in medical education technology. Their disciplinary backgrounds included biochemistry, psychiatry, epidemiology and anthropology. They have experience in developing and standardising original questionnaires and interview schedules, and also, in translation and validation of research tools in Indian languages.

Responses, which "agree" or "strongly agree" with statements 1 to 12 in the questionnaire (section 1), expressed opinions that demonstrated a permissive attitude to plagiarism. Such responses were counted and tabulated as a score out of 12. Responses which were in agreement with statements 13–17 or disagreement with statements 18–19 (section 2) were deemed to express disapproval of plagiarism and those who indulge in plagiarism, and also a critical attitude towards the practice. Such responses were counted and tabulated as a score out of 7. The statements in section 3 assessed subjective norms, and the personal thoughts and opinions of the students regarding their own practices and those of others in their academic or scientific community. These were considered as possible proxy for practice. Agreement with items 22, 23 and 25 to 29 constituted unethical responses; these were counted and tabulated as a score out of 7. This score indicated permissive personal norms towards plagiarism. Higher scores in section 1 were, thus, indicative of greater permissiveness towards plagiarism; higher scores in section 2 denoted a more critical attitude towards the practice; and higher scores in section 3 indicated lax personal norms, possibly reflecting potential practice.

The Statistical Package for the Social Scientist (SPSS), version 16, was used for statistical analysis. We calculated descriptive statistics for continuous variables and obtained frequency distributions for categorical data. We employed the one-way analysis of variance (ANOVA) to look for significant differences in scores obtained by students across different years in medical school. The Student's t-test was used to analyse differences in scores obtained by men and women. Pearson's correlation coefficient was used to analyse the statistical significance of bivariate associations. Multiple linear regression analysis was carried out for multivariate statistics to adjust for age, gender and years of medical education.

The administration of the quiz and questionnaire was followed by an interactive teaching session, during which the answers to the quiz and related issues were discussed. The important principles to be kept in mind to avoid plagiarism in academic writing were highlighted and emphasised.

The institutional review board of Christian Medical College, Vellore, approved the protocol of the educational initiative.

Results

Four hundred and twenty-three medical students (92% of the total number of medical students enrolled) participated in the study. Their mean age was 19.25 years (SD 1.79; range 17–26). The majority were women (55.6%). The year-wise distribution was as follows: first year, 205 (48.5%); second year, 53 (12.5%); third year, 56 (13.2%); fourth year, 57 (13.5%); and final year, 52 (12.3%).

Table I records the scores for knowledge, for permissive and critical attitudes towards plagiarism, and for potential practice. The overall mean score for knowledge was 4.96%±1.67%. Only a minority of students obtained more than 60% in the assessment of knowledge (158/423; 37.4%). Even fewer scored 71% or more (69/423; 16.3%).

The students' ages and years of medical education did not correlate with any specific attitude towards plagiarism, potential practice or the scores on knowledge. While there was not much of a difference between men and women so far as the scores on knowledge or scores reflecting a critical attitude towards plagiarism were concerned, there was a considerable difference with regard to a permissive attitude towards the practice, with men obtaining significantly higher scores than women (t=3.152; df=417; p=0.002). This relationship remained statistically significant (B=0.658; SE=0.220; t=2.985; p=0.003) after adjusting for age, years of education and knowledge of plagiarism, using multiple linear regression.

Permissive attitudes towards plagiarism were inversely correlated with attitudes that were critical of the practice (Pearson's correlation coefficient=–0.251; p=0.000). Knowledge of plagiarism had a significantly negative association with scores on attitudes permitting plagiarism (Pearson's correlation coefficient =–0.152; p=0.002) and positive association with scores on attitudes censuring the practice (Pearson's correlation coefficient =0.130; p=0.007). Knowledge of plagiarism was also negatively correlated with personal norms that were taken as proxy for the practice (Pearson's correlation coefficient =–0.191; p=0.000). The relationship between the scores on knowledge and permissive attitudes (B=–0.111; SE 0.36; t=–3.044; p=0.002), attitudes that were critical of plagiarism (B=0.136; SE=0.051; t=2.681; p=0.008) and permissive practice (B=–0.203; SE=0.053; t=–3.846;p=0.000) remained statistically significant when adjusted for age, gender and years of medical education, using multiple linear regression.

Scores on personal statements about subjective norms that permitted plagiarism and were considered as proxy for potential practice had a significantly positive correlation with scores on permissive attitudes (Pearson's correlation coefficient=0.487; p=0.000) and a significantly negative one with scores on critical attitudes towards plagiarism (Pearson's correlation coefficient =–0.239; p=0.000), as well as with the scores on knowledge (Pearson's correlation coefficient=–0.191; p=0.000). These relationships between the scores on subjective norms and the scores on knowledge (B=–0.166; SE=0.044; t=–3.74; p=0.000), scores on attitudes critical of plagiarism (B=–0.220; SE 0.046; t=–4.835; p=0.000) and scores on a permissive outlook (B=0.336; SE=0.029; t=11.489; p=0.000) remained statistically significant after adjusting for age, gender and years of medical education, using multiple linear regression.

Discussion

The data obtained show that medical students have limited knowledge of issues related to plagiarism. The mean score obtained by them in the knowledge quiz (4.96±1.67 out of a maximum of 10) was less than 50% of the maximum obtainable marks. Fifty percent is usually the minimum percentage required for a pass grade in the medical course.

Such a score indicates that they were unable to recognise instances of plagiarism in more than 50% of the scenarios presented. The significant positive correlations between poor knowledge and permissive attitudes and personal norms (possibly reflecting potential practice) and the association of higher grades in the knowledge quiz with critical attitudes towards plagiarism suggest that increasing knowledge may result in attitudinal changes, alterations in behaviour and improvements in practice.

The fact that the scores on knowledge did not increase with increasing age and with year of study suggests that good practice in terms of avoiding plagiarism does not seem to be "caught" in medical schools. We are not aware of the existence of any attempts to provide systematic education on plagiarism in educational institutions and have reason to believe that such instruction in medical schools in India is rare, if not completely absent. The lack of fluency in written English seems to result in the acceptance of the practice as a necessity. The Indian tradition of rote learning does not help either. In addition, it is possible that many faculty members in medical colleges are equally unaware of the issues involved. The lack of good role models among the faculty probably also contributes to the paucity of education on the subject and allows the practice to flourish. The inability to recognise plagiarism as a serious form of academic misconduct and the lack of education in the correct methods of citation complicate issues(8). Special focus may be required for men students, who with their probable tendency to a sense of entitlement and to breaking boundaries within our patriarchal society, seem to have a more permissive attitude towards plagiarism.

Our results are corroborated by those of Shirazi et al (12), who have also shown that medical students' knowledge of plagiarism is poor. Their study, which covered a much smaller number of students (114), also shows that the faculty members' knowledge of the subject was poor. Students who see the examples set by their teachers, who are sloppy with their references or who borrow ideas and teaching aids from others without acknowledgement, are led to believe that there is nothing wrong with such practice. Consequently, they are neither able to recognise plagiarism in practice, nor see that it is ethically unacceptable.

The complexity of defining plagiarism makes the task of communicating the issues concerned a difficult one. Many studies have shown that a significant proportion of plagiarism is unintentional. A lack of awareness of what constitutes plagiarism lies at the heart of the problem (21,22). While most would agree that plagiarism is not acceptable in academics, there is wide disagreement among students and educators with regard to what constitutes plagiarism. Differentiating "serious" from "trivial" plagiarism is not easy. The line between "sloppy referencing" and "intention to cheat" can be fine. The extent of plagiarism also needs to be considered.

While we believe that educating the students and faculty, improving their knowledge and empowering them will change their attitudes towards plagiarism, evidence suggests the need for concomitant punishment for those who persist with the practice (23,24). However, there are serious differences of opinion among students and teachers on the quantum of punishment for students caught plagiarising (25). While many Indian universities now routinely check graduates' dissertations and theses for plagiarism, using computerised software, there is a need to educate and empower the students and faculty to raise institutional and national academic standards. Today's medical students will be tomorrow's doctors and academics

Table 1

Knowledge of and scores on aspects of plagiarism

Characteristic	Knowledge score (Max. score=10) Mean (SD)	Permissive attitude score (Max. score=12) Mean (SD)	Critical attitude score (Max. score=7) Mean (SD)	Permissive personal norms score (Max. score=7) Mean (SD)
Gender				
–Men	4.80 (1.61)	4.95 (2.23)*	4.45 (1.72)	2.15 (1.64)
–Women	5.11 (1.71)	4.26 (2.22)	4.67 (1.48)	1.87 (1.41)
Age [1]				
–19 years or less	4.97 (1.59)	4.65 (2.33)	4.51 (1.55)	1.95 (1.55)
–20 years or more	4.98 (1.76)	4.47 (2.14)	4.67 (1.64)	2.04 (1.49)
Year in medical school				
–First	4.93 (1.57)	4.82 (2.26)	4.57 (1.59)	1.97 (1.51)
–Second	4.89 (1.77)	4.13 (2.43)	4.57 (1.47)	1.98 (1.67)
–Third	5.05 (1.94)	4.32 (2.11)	4.20 (1.55)	2.16 (1.36)
–Fourth	5.00 (1.77)	4.07 (1.97)	4.49 (1.73)	1.91 (1.42)
–Final	5.02 (1.57)	4.73 (2.34)	5.10 (1.58)	2.02 (1.71)

*1= divided on median age; *p=0.002 when compared with mean score of women*

Scores in each column have been calculated as described under "Methods".

and it is imperative to inculcate high standards of ethical practice in them.

The steps to combat the malaise in India include acknowledging its prevalence, taking into account the cultural environment that promotes the practice, educating students and faculty members, developing clear guidelines, enforcing mechanisms for the detection of plagiarism and penalising those who resort to the practice. Compulsory courses, which discuss the process of writing, define plagiarism and teach the correct methods of citation, would be crucial to success (24). Educating faculty members is a necessary first step to set an example for students.

An office for research and academic integrity would need to be set up within institutions of higher education to oversee mechanisms to handle fraud in general and plagiarism in particular. Such measures would go a long way in producing students, professionals and academics with high standards in ethical practice. While statutory bodies and university administrations are attempting to improve the situation (26,27), it is not clear whether the reality on the ground has changed substantially.

Our efforts to provide education on plagiarism at CMC, Vellore have highlighted the issues involved and their negative impact on intellectual standards and personal growth. We found that the students' and faculty members' response to our efforts was very favourable. Their enthusiastic participation in the sessions conducted, the horror they felt on learning that plagiarism (which they took for granted) is a punishable academic infringement, and their eagerness to learn correct methods of citation were encouraging. We believe that education on plagiarism will reduce the occurrence of the practice, and enhance ethical practices and academic standards. It will, in addition to pointing out errors, equip students and faculty members to use correct methods of citation in academic writing (28).

It is possible that regular educational efforts and continuous reinforcement of knowledge related to plagiarism will be required throughout the medical course. At a later point, we propose to re-assess the students who attended our teaching sessions to determine whether their knowledge and attitudes have improved, and thus, to determine whether regular educational efforts are required. The results of this planned future initiative will help shape our future strategy to combat the problem of plagiarism.

While plagiarism is often addressed as an individual issue, it is actually a systemic problem within educational and academic institutions. Systems, which place greater value on qualifications, papers and grants for employment and career advancement over intrinsic learning and knowledge creation, will find it difficult to root out the problem (9). Nevertheless, this needs to be done to maintain high academic standards. There is a need to change the prevalent malaise towards plagiarism within our society. This calls for a nuanced and multi-pronged approach, which is targeted and context-specific. The approach should aim to change entrenched attitudes, educate those in academia and encourage ethical practice. It should be broad-based and go beyond deterrence, detection and punishment (9). Combating plagiarism in India will improve not only the ethical standards of students and the faculty, but also educational norms and the academic culture. Taking effective measures to do away with plagiarism should be a priority for Indian academia.

The results of this study add to Indian literature on plagiarism. Among the strengths of the study are a large sample size and the use of multivariate statistics to adjust for common confounders. The weaknesses include cross-sectional assessments and the use of a less-than-perfect instrument to evaluate issues. The relationships between knowledge, attitudes, behaviour and practice are tenuous, and the use of components of an attitude scale as a proxy measure of potential practice is problematic (29). Another limitation is that we used a questionnaire that has been validated in the Croatian language. The authors of the original paper made the English translation using three independent translations of the original questionnaire. The final synthesis was done with the help of a professional translator (20). Despite the limitations of this questionnaire, we decided to use it as it was the best published standardised questionnaire we could find that has been used to assess attitudes towards plagiarism. We introduced minor modifications in certain questions to make them relevant to the context of Indian students. While the questionnaire was not systematically validated in the Indian population, we nevertheless believe that its use has served the purpose of enabling us to determine attitudes and potential practice among our students. The dearth of data for the Indian student population and the lack of serious attempts to combat plagiarism in academia lead us to consider the results as preliminary. Nevertheless, the findings support anecdotal reports and the experience of medical teachers and academics, adding to the scant literature on the subject in India.

In conclusion, it was found that medical students have limited knowledge of issues related to plagiarism. Low scores on knowledge were associated with attitudes that were permissive towards plagiarism and less critical of the practice. In view of these findings, we recommend that formal teaching on issues related to plagiarism be made part of the medical course in order to tackle this form of academic misconduct.

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The process of justifying assisted reproductive technologies in Iran

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Abstract

Infertility is medically defined as one year of unprotected intercourse that does not result in pregnancy. Infertility is a noticeable medical problem in Iran, and about a quarter of Iranian couples experience primary infertility at some point in their lives. Since having children is a basic social value in Iran, infertility has an adverse effect on the health of the couple and affects their well-being. The various methods of assisting infertile couples raise several ethical questions and touch upon certain sensitive points. Although the present Iranian legislative system, which is based on the Shi'a school of Islam, has legalised some aspects of assisted reproductive technologies (ARTs), given the absence of a general officially ratified act (official pathway), such medical interventions are usually justified through a fatwa system (non-official pathway). Officially registered married couples can access almost all ART methods, including third-party gamete donation, if they use such pathways. The process of justifying ART interventions generally began when in vitro fertilisation was given the nod and later, Ayatollah Khamenei (the political-religious leader of the country) issued a fatwa which permitted gamete donation by third parties. This open juristic approach paved the way for the ratification of the Embryo Donation to Infertile Spouses Act in 2003.

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Introduction

Traditionally, having children is one of the basic values cherished by Iranian society (1). Infertility is usually defined