

Plagiarism Perceptions and Attitudes Among Medical Students in Saudi Arabia

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المعرفة والسلوك تجاه الانتحال الأدبي لدى طلاب كلية الطب في السعودية

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ABSTRACT: Objectives: This study aimed to determine attitudes towards and perceptions of plagiarism among medical students in Saudi Arabia. **Methods:** This cross-sectional, multicentre study was conducted between April and May 2018 and involved medical students enrolled in three medical schools in Riyadh, Saudi Arabia. The previously validated Attitude Towards Plagiarism questionnaire was used to evaluate approval (i.e. a positive attitude) and disapproval of plagiarism (i.e. a negative attitude) among medical students. Furthermore, this study evaluated whether attending medical writing courses or courses in medical ethics influenced medical students' attitudes towards plagiarism. **Results:** A total of 551 students participated in the study (response rate = 73.5%). A significant association was found between mean negative and positive attitude scores and grade point average (GPA; $P = 0.004$ and 0.007 , respectively). Students attending medical ethics courses had higher mean negative attitude scores compared to students who did not attend such courses (odds ratio = 2.369, 95% confidence interval: 1.540–3.645; $P < 0.001$). Attending medical ethics courses was associated with a significantly more negative attitude towards plagiarism ($P < 0.001$, each). **Conclusion:** The majority of medical students in Saudi Arabia included in this study indicated a highly negative attitude towards plagiarism. A higher GPA, the authoring of a published manuscript and attending courses in medical ethics were associated with negative attitudes towards plagiarism among medical students.

Keywords: Plagiarism; Attitude; Cross-Sectional Study; Medicine; Medical Students; Saudi Arabia.

المخلص: الهدف: هدفت هذه الدراسة إلى قياس المعرفة والسلوك تجاه الانتحال الأدبي لدى طلاب كلية الطب في السعودية. الطريقة: أجريت هذه الدراسة المقطعية متعددة المراكز في الفترة ما بين أبريل ومايو 2018 وضمت طلاب في ثلاث كليات طب مختلفة. تم استخدام استبيان سابق يقيس المعرفة والسلوك تجاه الانتحال الأدبي بالإضافة إلى علاقة ذلك بدراسة مواد كالأخلاقيات الطبية والكتابة العلمية. النتائج: شارك في هذه الدراسة عدد 551 طالباً (معدل استجابة = 73.5%). وجدت علاقة بين السلوك الرافض للانتحال الأدبي وارتفاع معدل درجات الطالب $P = 0.004$ وأيضا بين الطلاب الدارسين لمادة الأخلاقيات الطبية حيث وجد لديهم نتيجة أعلى رافضة للسلوك للانتحال الأدبي مقارنة بالطلاب الذين لم يدرسوا مواد مماثلة (نسبة احتمالات = 2.369، 95% معامل ثقة = 1.540–3.645; $P < 0.001$). الخلاصة: كان لدى معظم المشاركين في هذه الدراسة سلوك رافض للانتحال الأدبي. أظهرت النتائج أن الحصول على معدل مرتفع، المشاركة في نشر بحث علمي ودراسة مادة الأخلاقيات الطبية تساهم في ارتفاع السلوك الرافض للانتحال الأدبي لدى العينة المشاركة في هذه الدراسة.

الكلمات المفتاحية: الانتحال الأدبي؛ دراسة مقطعية؛ الطب؛ طلاب الطب؛ السعودية.

ADVANCES IN KNOWLEDGE

- This study suggested that the majority of medical students had a highly negative attitude towards plagiarism.
- A higher grade point average, the authoring of a published manuscript and attending courses in medical ethics were associated with negative attitudes towards plagiarism among medical students.

APPLICATION TO PATIENT CARE

- Addressing plagiarism and determining the factors that can decrease its occurrence among medical students can increase future physicians' awareness of the unacceptability of plagiarism.

PLAGIARISM AND CHEATING ARE TWO CONCEPTS with overlapping characteristics. Plagiarism can be defined as the unauthorised “appropriation of another person’s ideas, processes, results, or words without giving appropriate credit and usually claiming it to be one’s own”.¹ Others define plagiarism as “a continuum ranging from sloppy paraphrasing to

verbatim transcription without crediting sources”.^{2,3} While others have stated that plagiarism “involves stealing someone else’s work and lying about it afterward”.^{2,4}

The difference between plagiarism and cheating is based on the intent of the author; an author could either be negligent, resulting in accidental plagiarism

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(as seen with in-text citation problems) or acting intentionally, with actions stemming from dishonesty.^{3,5} Nevertheless, students can engage in unintentional cheating and not acknowledge it as academic dishonesty.

Rennie and Crosby reported that 56% of US medical students have plagiarised at least once in their academic careers.⁶ A Croatian cross-sectional study evaluated the attitudes of pharmacy and medical biochemistry students on the subject of plagiarism and concluded that there was an insufficient level of seriousness and awareness in perceptions of plagiarism, as well as a lack of knowledge about scientific methodology and academic and scientific misconduct.⁷ Similarly, a Croatian study on the prevalence of plagiarism in writing essays among 198 second-year medical students found that only 9% of the students did not plagiarise.¹ Plagiarism is considered dishonest because the plagiariser uses someone else's ideas and takes credit for them; the plagiariser can advance in their career or be promoted on that basis. Such promotions can be a risk to others, especially in the medical field, as someone may be promoted to a position for which they would otherwise not have been qualified.

If undetected, plagiarism has a serious negative influence on educational feedback, defeating the purpose of instructional strategies.^{2,8} In the Saudi Arabian context, a recent study by Kattan *et al.* concluded that, even though the studied group of postgraduate medical trainees had attended courses in medical writing, were aware of research ethics and/or had published a scientific manuscript before, they were still susceptible to plagiarism. The study recommended increasing awareness among trainees to avoid this issue.⁹

Saudi Arabia's cultural backgrounds, religious beliefs and ethical values may be different from those in Western countries. Prior to entering medical school in Saudi Arabia, high school students generally attend Islamic-related courses that include topics that condemn and reject cheating while encouraging sincere and honest behaviour. Furthermore, most medical colleges in Saudi Arabia have a core ethics course in their curriculum in addition to clear and strict regulations that prohibit cheating and plagiarism.

This study aimed to evaluate the perceptions of and attitude towards plagiarism among undergraduate medical students in Saudi Arabia by using a validated questionnaire.

Methods

This cross-sectional, online, questionnaire-based study was conducted between April and May 2018 at medical schools in Riyadh, Saudi Arabia. All medical colleges in Riyadh (three public and two private schools) were contacted for permission to send the survey to their

students through their email lists. Of the five colleges that were contacted, three provided consent. The survey was distributed among the three colleges by student volunteers, most of whom were leaders of their batches, who then distributed the survey through the students' email lists. The estimated student population of the three medical schools at the time of the study was 1,250 and the required sample size, in order to achieve a 95% confidence interval (CI) with a 5% margin of error, was 295. In total, 750 undergraduate medical students were randomly chosen from first to fifth year from the three selected medical schools; 250 students from each university were approached. This sample size was chosen as it was within the researchers' financial budget. SurveyMonkey (SVMK Inc., San Mateo, California, USA) was used to gather responses.¹⁰

Attitudes towards plagiarism were assessed using the previously validated Attitude Towards Plagiarism (ATP) questionnaire.^{11,12} The ATP questionnaire is a standard method used to evaluate the attitudes towards plagiarism and has been validated using principal component analysis with a reliability score of >0.70.¹¹ The questionnaire consists of 29 questions divided into three main sections: approval of plagiarism (i.e. positive attitude), disapproval of plagiarism (i.e. negative attitude) and social and normative components that could change a person's thinking on the issue (i.e. subjective norms). All questions were self-reported and scored on a 1–5 Likert scale, with one indicating 'strongly disagree' and five indicating 'strongly agree'. Twelve statements self-measured positive attitude, with a score range of 12–60. The scoring system is summarised in Table 1. Demographic variables and characteristics (i.e. age, academic year, gender and grade point average [GPA]) were assessed. Participants were also asked if they had attended any medical writing and/or medical ethics courses or authored a published manuscript.

Statistical analysis was performed using Statistical Product and Service Solutions (SPSS), Version 24 (IBM, Corp., Armonk, NY, USA). Student's t-test was used to assess associations between the participants' ATP scores and the variables set in the questionnaire. A one-way analysis of variance (ANOVA) was performed using two different approaches: a sum of squares contrast was used to compare the mean scores across ATP sections to demographic characteristics with more than two categories (i.e. age, academic year and GPA) and results for various ATP sections were summarised using means and standard deviation. In addition, a binary logistic regression test was performed to identify the independent predictors of low positive attitude, high negative attitude and low subjective norm attitudes towards plagiarism. Counts and percentages were used to summarise categorical variables as well as

Table 1: Scoring system used to evaluate attitudes towards plagiarism of medical students in Saudi Arabia

Attitude	Low	Moderate	High
Positive attitude	12–28	29–45	46–60
Negative attitude	7–16	17–26	27–26
Subjective norm	10–23	24–37	38–50

the attitude towards plagiarism after using the scoring system in Table 1. A value of $P < 0.05$ was considered statistically significant

Ethical approval was obtained from the Institutional Review Board (IRB) of the Medical Research Unit, College of Medicine, Imam Mohammad ibn Saud Islamic University, Riyadh, Saudi Arabia (IRB code: 0037/04/2018-55). Informed consent was obtained from the participants through the online questionnaire. Participants' anonymity was maintained by not asking for their names or university identification numbers; participation was entirely voluntary.

Results

A total of 551 students participated in this study (response rate = 73.5%) of which the majority were male (57%). Almost half of the participants had a GPA of 4.25–5.0 (47.5%). Most respondents (58.8%) had received courses in medical ethics and some (20.7%) had previously authored a published manuscript [Table 2].

Very few respondents had a high positive attitude towards plagiarism or low negative attitude towards plagiarism (2% each). Moreover, few participants (3.4%) had high subjective norms towards plagiarism. However, most students had a moderate score on all three scales (65%, 58.4% and 56.6%, respectively) [Table 3].

The mean positive attitude score was 31.34 ± 7.26 , the mean negative attitude score was 25.26 ± 4.61 and the mean subjective norm score was 25.16 ± 6.12 . All these scores indicate a moderate attitude towards plagiarism. The difference in positive attitude scores was statistically significant between females and males (32.05 ± 7.24 versus 30.8 ± 7.24 , respectively; $P = 0.046$). There was no significant difference in the mean negative attitude or subjective norm scores between males and females. Statistical analysis indicated no significant difference between age groups in mean attitude scores for all three scales ($P > 0.05$).

One-way ANOVA results indicated a statistically significant difference in the mean negative and positive attitude scores across various GPA groups ($P = 0.004$ and 0.007 , respectively). There was no significant difference in the mean subjective norm scores across GPAs [Table 4]. In addition, statistical analysis using one-way ANOVA showed no significant difference for any

Table 2: Characteristics and variables of medical students included in a survey to determine attitudes towards plagiarism in Saudi Arabia (N = 551)

Characteristic	n (%)
Gender	
Female	237 (43)
Male	314 (57)
Academic year	
First	84 (15.2)
Second	163 (29.6)
Third	114 (20.7)
Fourth	90 (16.3)
Fifth	100 (18.1)
Age in years	
18–19	43 (7.8)
20–21	192 (34.8)
22–23	191 (34.7)
24–25	92 (16.7)
>25	33 (6)
GPA	
<2.75	14 (2.5)
2.75–3.5	80 (14.5)
3.5–4.25	195 (35.4)
4.25–5.0	262 (47.5)
Have you attended any writing courses?	
No	256 (46.5)
Yes	295 (53.5)
Have you previously attended any courses on ethics?	
No	227 (41.2)
Yes	324 (58.8)
Have you ever authored a published manuscript?	
No	437 (79.3)
Yes	114 (20.7)

GPA = grade point average.

of the three scales between any of the academic years in mean attitude scores ($P > 0.05$).

The mean attitude score across students who had attended medical writing courses compared to students who had not attended medical writing courses was statistically different; a higher mean positive attitude score was found among students who had not attended medical writing courses compared to students who had attended medical writing courses (32.50 ± 6.84 versus 30.33 ± 7.47 ; $P < 0.001$). The mean negative attitude

Table 3: Scoring of attitudes towards plagiarism among medical students in Saudi Arabia (N = 551)

Attitude	n (%)		
	Low	Moderate	High
Positive attitude	182 (33)	358 (65)	11 (2)
Negative attitude	11 (2)	322 (58.4)	218 (39.6)
Subjective norm	220 (39.9)	312 (56.6)	19 (3.4)

Table 4: Attitude scores towards plagiarism across grade point average groups among medical students in Saudi Arabia

Attitude	Mean \pm SD				P value
	<2.75	2.75–3.5	3.51–4.25	4.26–5.0	
Negative attitude	22.14 \pm 4.72	24.94 \pm 4.55	24.87 \pm 4.72	25.82 \pm 4.46	0.004
Positive attitude	34.64 \pm 8.76	33.63 \pm 7.20	31.01 \pm 7.15	30.71 \pm 7.13	0.007
Subjective norm	27.14 \pm 8.55	26.38 \pm 6.57	25.14 \pm 6.03	24.70 \pm 5.87	0.107

SD = standard deviation.

score was higher in students who had attended medical writing courses compared to those who had not (25.66 ± 4.63 versus 24.81 ± 4.65 ; $P = 0.03$). The mean subjective norms score was significantly higher in students who had not attended medical writing courses compared to those who had (26.03 ± 5.87 versus 24.41 ± 6.25 ; $P = 0.002$). Attending medical ethics courses was significantly associated with more negative attitudes towards plagiarism ($P < 0.001$ for all scales). Mean positive attitudes and subjective norm scores were higher in individuals who had not attended medical ethics courses compared to those that had (33.37 ± 6.54 versus 29.92 ± 7.41 and 26.86 ± 5.70 versus 23.98 ± 6.14 , respectively). Mean negative attitude scores were

higher in individuals who had attended medical ethics courses compared to those that had not (25.93 ± 4.70 versus 24.32 ± 4.32). Respondents who had authored a published manuscript were significantly associated with negative attitudes only ($P = 0.02$) and the mean negative attitude score was lower in individuals who had previously authored a published manuscript compared to those who had not (24.37 ± 4.37 versus 25.50 ± 4.56) [Table 5].

Attending courses in medical ethics was associated with a low positive attitude (odds ratio [OR] = 2.469, 95% CI: 1.570–3.883; $P < 0.001$), high negative attitude (OR = 2.369, 95% CI: 1.540–3.645; $P < 0.001$) and low subjective norms towards plagiarism (OR = 2.181, 95% CI: 1.426–3.337; $P < 0.001$). Having authored a published manuscript was associated with high negative attitudes towards plagiarism (OR = 0.577, 95% CI: 0.366–0.911; $P = 0.018$). Gender, age, GPA, academic year and having taken medical writing courses were not significantly associated with high negative attitudes, low positive attitudes or low subjective norms towards plagiarism [Table 6].

Discussion

Continuous assessment and education in the medical field represents the essence of learning. Medical students in their early years are less familiar with the concept of plagiarism as has been indicated by past studies, and therefore tend to have a more permissive attitude towards plagiarism.¹³ Educating and training students on how to appropriately cite academic literature and research may change the attitude towards plagiarism of students who are starting their medical careers. In a Middle Eastern study, which aimed to explore academic integrity among medical students, researchers found that plagiarism was considered a minor offense and

Table 5: Attitude scores towards plagiarism based on having attended medical writing courses, medical ethics courses or having authored a published manuscript among medical students in Saudi Arabia

Attitude	Mean \pm SD											
	Attended a medical writing course				Attended a medical ethics course				Authored a published manuscript			
	No	Yes	P value*	Effect size	No	Yes	P value*	Effect size	No	Yes	P value*	Effect size
Positive attitude	32.50 \pm 6.84	30.33 \pm 7.47	<0.001	0.3	33.37 \pm 6.54	29.92 \pm 7.41	<0.001	0.49	31.64 \pm 7.23	30.20 \pm 7.28	>0.05	0.198
Negative attitude	24.81 \pm 4.56	25.66 \pm 4.63	0.03	0.299	24.32 \pm 4.32	25.93 \pm 4.70	<0.001	0.357	25.50 \pm 4.56	24.37 \pm 4.73	0.02	0.24
Subjective norm	26.03 \pm 5.87	24.41 \pm 6.25	0.002	0.268	26.86 \pm 5.70	23.98 \pm 6.14	<0.001	0.486	25.32 \pm 6.10	24.56 \pm 6.20	>0.05	0.12

SD = standard deviation. *Using Student's *t*-test.

Table 6: Logistic regression analysis of independent predictors of low positive attitude, high negative attitude and low subjective norms towards plagiarism among medical students in Saudi Arabia

Independent predictor	Low positive attitude (R ² = 0.289)		High negative attitude (R ² = 0.255)		Low subjective norm (R ² = 0.256)	
	OR (95% CI)	P value	OR (95% CI)	P value	OR (95% CI)	P value
Gender	0.952 (0.639–1.419)	0.810	1.242 (0.847–1.822)	0.267	1.005 (0.687–1.427)	0.978
Age	0.919 (0.726–1.164)	0.485	0.860 (0.684–1.083)	0.201	0.866 (0.689–1.089)	0.218
GPA	1.240 (0.978–1.572)	0.076	1.253 (0.999–1.572)	0.05	1.171 (0.936–1.464)	0.168
Academic year	1.052 (0.883–1.252)	0.570	1.078 (0.909–1.278)	0.389	1.029 (0.870–1.218)	0.735
Attended a medical writing course	1.126 (0.739–1.715)	0.581	1.003 (0.668–1.508)	0.988	1.287 (0.861–1.922)	0.219
Attended a medical ethics course	2.469 (1.570–3.883)	<0.001	2.369 (1.540–3.645)	<0.001	2.181 (1.426–3.337)	<0.001
Authored a published manuscript	1.514 (0.973–2.354)	0.066	0.577 (0.366–0.911)	0.018	1.132 (0.732–1.750)	0.576

OR = odds ratio; CI = confidence interval; GPA = grade point average.

many medical students believed that it was not their responsibility to report it.¹⁴

In the present study, the ATP questionnaire was used to evaluate the attitudes of medical students towards plagiarism.¹¹ In addition, this study analysed whether GPA influences attitudes of medical students towards plagiarism; results from a one-way ANOVA showed a statistically significant difference in the mean positive and negative attitude scores across GPA groups ($P = 0.007$ and 0.004 , respectively). The impact of GPA on cheating has been previously investigated, although with mixed results.^{15–17} A study involving Saudi Arabian medical students showed that students with higher GPAs are less likely to be involved in cheating and a study on pharmacy students showed a similar association.^{15,16} However, Hrabak *et al.* did not find significant differences between GPA scores and academic misconduct.¹⁷

Interestingly, in the present study, 58.8% of the respondents had attended medical ethics courses and 20.7% had authored a paper prior to the survey. Most students had a moderate score for the scales of positive attitude, negative attitude and subjective norms (65%, 58.4% and 56.6%, respectively); this suggests that Saudi medical students in this study were aware of plagiarism. However, only 39.6% of the respondents had a high negative attitude towards plagiarism. Attending medical ethics courses had a positive impact on students' attitudes towards plagiarism; those who had not attended medical ethics courses had a significantly higher positive attitude towards plagiarism. This finding is in agreement with the results of Brkic *et al.*, who reported that a short

lecture focusing on the negative impact of plagiarism contributed to creating awareness among students on types of plagiarism and that plagiarism is a violation of scientific ethics.¹⁸ In addition, few participants in the current study had high subjective norms towards plagiarism (3.4%) indicating a low inclination towards plagiarism. Attending medical ethics courses was found to be an independent predictor associated with low positive attitudes and high negative attitudes towards plagiarism as well as low subjective norms. These results are in agreement with Abdulghani *et al.*'s study which also found that students with high GPAs were less likely to cheat.¹⁵ However, the current results were not in line with Kattan *et al.*'s findings, who found no significant correlation between attitudes and attendance in ethics courses but did find that medical trainees who had previously authored scientific publications and attended writing courses tended to lean positively towards plagiarism.⁹

Educating students and faculty can help change their attitudes toward and perceptions of plagiarism, but it is also important to have a standard institutional policy against plagiarised content, mandating punishment for repeat offenders.^{19,20}

The strengths of the present study include its multicentre approach and detailed correlations related to different student characteristics. Some of the limitations of the present study include the cross-sectional nature of assessments. The interplay between students' knowledge, attitudes and behaviours with regards to a complex subject such as plagiarism is a complicated evaluation to engage with via a survey, which can only be treated as a proxy measure. In addition, there is a possibility of

response bias which is a known limitation in survey-based studies.

Conclusion

Most medical students in Saudi Arabia were found to have a negative attitude towards plagiarism. Higher GPAs, the authoring of a publication and attending courses in medical ethics were associated with negative attitudes towards plagiarism among medical students. To increase the students' awareness of plagiarism, structured courses related to the practice of plagiarism should be implemented. Medical students should be familiar with issues and consequences related to plagiarism. Future studies should investigate the content of ethics courses in medical schools and whether different medical schools give equal attention to plagiarism and academic dishonesty in their curricula.

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CONFLICT OF INTEREST

The authors declare no conflicts of interest.

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