

Medical Students' Knowledge about Research Ethics

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Abstract

Medical students' concerns about research publishing increase the need for evaluate their knowledge about research ethics and misconduct issues. This study carried out through Facebook group contains all sixth year medical students at the University of Jordan to evaluate medical students' knowledge about research ethics using an adopted questionnaire of 3 parts. 158 (39.5%) out of 400 students answered the questionnaire 107 (67.3%) were females and 52 (32.7) were males, only 18 (11.4%) of them had attended extra courses, and 23 (14.6%) had co-authored published manuscript, 129 (81.6%) of them had heard about research ethics, while most of them knew that publication ethics in research are an essential elements of paper writing, their knowledge about other aspects vary from about 4.4% for the time researcher need to wait before resubmit the manuscript again and 42.8% for plagiarism definition. A score of ten had been calculated for each student with an average of 2.4 and median of 3. In conclusion, the students need more training on research ethics and misconduct as their knowledge about it was inadequate.

Keywords: Research Ethics, Medical Student.

(J Med J 2022; Vol. 56 (1): 55- 63)

Received

Accepted

August, 4, 2020

September, 6, 2021

Research and publication have become an important concern to many medical students, as they try to increase their opportunities for acceptance in post graduate studies. While the importance of research among medical students increased, the research ethics and misconduct has become an emerging field for studying.

The concern about research ethics started to arise since 1940s [1]. As the research committees and organization started to appear in multiple domains with multiple guidelines and codes that suit each discipline [2].

One of those organizations is International committee of medical journal editors (ICMJE) which has a yearly meetings and evaluations to put guidelines, authorship criteria and recommendations aiming to increase the attention toward research ethics and reduce research misconduct [3].

Research misconduct consists basically from three major concepts; falsification is changing the data result in order to support a certain hypothesis, fabrication is build up or assumption of a non-existing data, and plagiarism is using or representing the work of other as yours or not giving them appropriate credits [4].

Several studies have explored research misconduct and knowledge of ethics among postgraduate and undergraduate medical students. Knowledge about research ethics and misconduct among postgraduate doctors and undergraduate medical students was shown to be poor [5].

Postgraduate doctors' knowledge about research ethics and misconduct and their attitude had been studied [6], they appeared to have an adequate knowledge about research ethics and misconduct, gift authorship was the

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most issue that they reported in their career, while the least one is salami slicing.

Studies from the Middle East region are scares. Researchers have studied medical students knowledge about research ethics in Saudi Arabia [7]. Although medical students have heard about research ethics however most of them were unaware about many issues related to research misconduct including plagiarism and authorship criteria.

To our knowledge, there are no studies exploring neither undergraduate nor postgraduate medical doctors' knowledge about research ethics in Jordan.

This study aimed to determine the level of medical students knowledge about research ethics and misconduct at the University of Jordan.

Method:

This is a cross sectional online study that was carried out through a Facebook group for the sixth year medical students at the University of Jordan. The study was carried out from February to August 2018. There is a total of 400 students in their sixth year medical school at the University of Jordan, all are included in a closed Facebook group which has been previously created by them aiming specifically to announce news regarding issues related to their courses and rotations. The study included 6th year students because they all have already received two courses related to research and its ethics in their medical curriculum in their fourth and fifth medical year.

Data collection and Questionnaire

An online questionnaire was sent to the group on Facebook.

Before starting the study, brief information regarding this study and its aims was projected on the Facebook group, we encouraged all students to participate in this study.

The questionnaire used in our study is an internationally used questionnaire that was used previously to assess medical students' knowledge about research ethics [8][4][14].

The questionnaire consists of three parts. The first part is related to demographic data (gender and age), the second part is related to

knowledge about research ethics committees; it consist of six questions with either yes or no answer. The third part is related to perception of publication ethics, and it consists of ten questions with five choices to choose from them the correct answer; one choice included the answer "I do not know", for this third part we gave each student a score from ten; one score for each correct answer.

The response of students at the beginning was small so two alerts were sent to them, the first alert was through tagging by name, the second was a direct message to each student using Facebook messenger.

Data analysis

Excel version was used for analyzing of data, Chi-square test was used to correlate knowledge with the different variables (sex, attending extra courses and coauthoring published research. Differences were considered statistically significant if P value <0.05.

Result

From the total of 400 students only 158 responded (39.5 %), 107 (67.3%) of them were females and 52 (32.7%) were males. The average age of students was 22 year.

While all students had attended the courses related to research and its ethics during their fourth and fifth year, 18 (11.4%) of students had attended extra courses. Furthermore, 23 (14.6%) have co-authored published manuscripts.

Most students (129; 81.6%) had heard about research ethics, however only few of them heard about committees related to research ethics (table1).

While many students knew that Publication ethics in research are essential elements of paper writing, only few of them have knowledge about the other aspects of research ethics. The most common knowledge was regarding plagiarism. However, the concepts of salami slicing, gift author, fabrication, and time to resubmit to a second journal had the least knowledge among students (<10% answered correctly). In addition, knowledge about qualification of authorship, ghost author, and falsification was also poor as less than 30

% of students answered correctly (table 2 shows the details of correct answers).

The number of correct answers about research ethics and misconduct for the 10 questions in table 2 was calculated for each student and ranged from 0 to 8 with an average of 2.4 and a median of 3 correct answers per student.

Neither gender nor attending extra courses or co-authoring published manuscript had any significant statistical correlation with better knowledge scores.

When taking each question alone, out of the ten questions related to research ethics and misconduct including: authorship criteria, gift authorship, ghost authorship, time that researcher needs to wait before resubmit the manuscript, salami slicing, falsification and fabrication, only the answers of questions related to time to resubmit to a second journals and the question related to fabrication had significant statistical correlation with gender (male better than female), attending extra courses and co-authored published manuscript (table3).

Discussion

In this study we explored the 6th year medical students 'knowledge about research ethics and misconduct using social media. Social media is a platform where people share their news, data, thoughts, opinions and photos, and communicate with each other [9]. Facebook is the most popular platform as they have 2.27 billion monthly active members [10].

Social media platforms, including Facebook, are now replacing the e-mail in conducting research surveys reaching wider samples, with more confidentiality and privacy for the participant and more time, effort and cost effectiveness for the researchers [11].

With the increased duties of medical students during their final year a need for time and efforts saving methods of collecting data is emerged, thus Facebook could be an ideal option for them. Although in our study not all the medical students responded however the 39.5% who responded answered all the questions projected.

Attending extra courses in research ethics had a significant change in students' behaviors toward plagiarism, never the less in our study attending extra courses did not correlate with better knowledge about plagiarism [7], those students who received extra courses get an average score of 2.8 in comparison with 2.3 for those who did not, despite their higher score, this was not significant as the *P* value was 0.79.

However, one study found that receiving extra courses and trainings about research and it is ethics increase the students' knowledge about it significantly [5]. While other study did a comparison between two colleges found that students who receiving extra courses and attending more conferences have had a higher scores that measure their knowledge [12].

Also, co-authored published manuscript had no significant effect in students' score out of 10. In study done on Greece there is also no difference [5]. Other study found that students who are familiar with research publishing and presentation in conferences have better knowledge about ethics in comparison with students who did not [12].

Although most of our students have heard about research ethics only few of them have heard about committees related to research ethics including the International committee of medical journal editors (ICMJE) that was known to 19% and the committee on publication ethics (COPE) known to 17%. Our results are comparable to the study at Hamdard University - Karachi with 10.8% and 9% of students have heard about ICMJE and COPE respectively [13].

Many students (58.5%) in our study knew that publication ethics in research are an essential element of paper writing in comparison to 74% of Saudi Arabia students [14]. Previous studies about medical students 'knowledge about research ethics have shown variable results. While 42.8% of our students knew about plagiarism, a 61% of medical students in Saudi Arabia and only 11% of Karachi medical college students knew about it [13][14]. However, 80% of participants in one study agreed that plagiarism is the second

severe form of publication misconduct; falsification was the first according to them [5].

Only few of our students were aware about the concepts of qualification of authorship, fabrication, falsification and salami slicing. Previous studies have shown that Salami slicing was a known concept to most students but was believed to be the least severe misconduct [13][5].

Gift authorship is to give a credit for someone who did not participate in the study, 16 (10.1%) students had answered the question related to it correctly, on the contrary of that, ghost authorship is excluding someone who meets the authorship criteria from the list of author, and only 40 students (25.5%) had answered it correctly. Karachi students' knowledge about gift and ghost authorship was little bit better with 17.9% and 38.2% of corrected answers respectively [13], while Saudi Arabia results were better with 36% and 55% respectively [14].

The fabrication definition as mentioned in question 8 table4 had answered correctly by only 11 (8.0%) students, males were better than female with 9.80% corrected answers in comparison with 5.60 with a significant P value of 0.0002. those who Co-authored published research or attended extra courses were also better with a P value of 0.0002 for both. Other study found that only 16.4% of students knew about fabrication and males' knowledge were better than females [13]. The ICMJE authorship criteria that had mentioned in question number 7 table 2 had been known to 40 students (25.2%) [15], ICMJE currently set group of determinations of authorship; the author must participate in all steps of research started from conception, then design,

collecting and analyzing data, and writing the final manuscript.

A study compared students' knowledge between two colleges found that students who had had an extra training about research ethics and participated in scientific conference had a statically significant better knowledge ICMJE authorship criteria with an average score of 2.08/6 in compare with 1.8/6 with P value of 0.016 [12].

Students' awareness about falsification definition was inadequate; as only 45 students (28.3%) answered it correctly, although falsification had been considered the worst form of misconduct in one study [5]. Gender, attended extra courses or co-authored published research did not affect the answers.

There was no effect of gender on students' answers in general, as the P value was not significant to prove a correlation between students' gender and their scores out of 10. However, other study found that males performed better than female with P value <0.05 [13].

Limitations: this study is limited by the number of students who participated in this study. Larger studies including students from all the medical schools in Jordan are needed to explore the gaps and needs.

Conclusion

This is the first study that explores Jordanian medical students' knowledge about research ethics through using social media. Although medical students are aware about the presence of research ethics, however their knowledge is inadequate about the details and applications of ethics while conducting research .Future delivered courses should take into consideration the weakness revealed in this study.

Table 1 demographic of students, knowledge about research ethics committees, extra courses and their co-authored published manuscript

Variables	Numbers
Student has published an original research	
Yes	23 (14.6%)
No	135 (85.4%)
Student Heard about publication ethics	129 (81.6%)
Yes	
No	29 (18.4%)
Student Heard about ICMJE*	
Yes	30 (19.0%)
No	128 (81.0%)
Student Heard about COPE**	
Yes	27 (17.0%)
No	131 (83.0%)
Student heard about research ethics review committee/board in the medical college	
Yes	86 (54.4%)
No	32 (20.3%)
Don't know	40 (25.3%)
Student attended extra courses about research ethics	
Yes	18 (11.4%)
No	140 (88.6%)
* International Committee of Medical Journal Editors	
** Committee on Publication Ethics	

Table 2 the percentage of students' correct answers about research ethics

Question	correct answer	Percentage of correct answer
Publication ethics in research are an essential elements of paper writing	93	58.5%
If a person is involved extensively in data collection does not qualify for authorship.	38	23.9%
Salami slicing is defined as Breaking up or segmenting a large study into two or more publications.	15	9.4%
If a person does not meet accepted authorship criteria but is listed as a personal favor or in return for payment, he/she is a gift author.	16	10.1%
If someone who made substantial contributions to the research or that merited authorship and fails to listed as an author, he/she is a ghost author	40	25.2%
The author who already sent a manuscript to a journal need to wait for the decision irrespective of time frame before send it again to another journal.	7	4.4%
Authorship credit should be based on substantial contributions to conception and design, acquisition of data, or analysis and interpretation of data, drafting the article and final approval of the version to be published	45	28.3%

Question	correct answer	Percentage of correct answer
Fabrication defined as; Cite a source that has not actually been read or consulted, pay someone to write a paper for you, or provide two or more references for a contradictory statement	11	6.9%
Falsification defined as omitting data such that the research is not accurately represented, manipulating research materials Changing data or results	45	28.3%
appropriation of another person's ideas, processes, results, or words without giving appropriate credit is known as plagiarism	79	42.8%

Table 3 the correlation of gender, co-authored published research and attended extra courses with the answer of each question

The questions	The gender			Co-authored published research			Attended extra courses		
	male	female	P-value	Yes	No	p-value	Yes	No	p-value
Publication ethics in research are an essential elements of paper writing	57%	60%	5.43	65%	58%	5.84	56%	59%	7.76
If a person is involved extensively in data collection he does not qualify for authorship.	26%	23%	7.24	26%	24%	5.26	11%	26%	4.61
Salami slicing is defined as Breaking up or segmenting a large study into two or more publications.	5.90 %	11%	1.56	17%	8%	2.07	11%	9.30%	1.60
If a person does not meet accepted authorship criteria but is listed as a personal favor or in return for payment, he/she is a gift author.	12%	9.30%	8.08	17%	9%	8.54	17%	9.30%	8.45
If someone who made substantial contributions to the research or that merited authorship and fails to listed as an author, he/she is a ghost author	33%	21%	3.02	26%	25%	2.22	44%	23%	2.03

The questions	The gender			Co-authored published research			Attended extra courses		
	male	female	P-value	Yes	No	p-value	Yes	No	p-value
The author who already sent a manuscript to a journal need to wait for the decision irrespective of time frame before send it again to another journal.	7.80 %	2.80%	0.003	8.70%	3.70%	0.003	5.60%	4.30%	0.003
Authorship credit should be based on; Substantial contributions to conception and design, acquisition of data, or analysis and interpretation of data, drafting the article and final approval of the version to be published	33%	26%	1.01	39%	27%	6.61	56%	25%	9.56
Fabrication defined as; Cite a source that has not actually been read or consulted, pay someone to write a paper for you, or provide two or more references for a contradictory statement	9.80 %	5.60%	0.0002	8.70%	6.70%	0.0002	11%	6.40%	0.0002
Falsification defined as; Omitting data such that the research is not accurately represented, manipulating research materials Changing data or results or	33%	26%	1.01	30%	28%	9.69	33%	28%	7.53
appropriation of another person's ideas, processes, results, or words without giving appropriate credit is known as	49%	40%	4.85	48%	42%	5.06	39%	44%	2.68

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مدى معرفة طلبة كلية الطب بأخلاقيات البحث العلمي

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الملخص

الأهداف: تهدف هذه الدراسة إلى تقييم مدى معرفة طلاب الطب في الجامعة الأردنية بأخلاقيات البحث العلمي والنشر والقضايا المتعلقة به؛ نظراً لزيادة اهتمام الطلبة بالبحث العلمي والنشر وذلك باستخدام موقع الفيسبوك للتواصل الاجتماعي **المنهجية:** أُجري هذا البحث المقطعي إلكترونياً عبر موقع الفيسبوك، من خلال مجموعة مغلقة تضم كل طلبة السنة السادسة في كلية الطب في الجامعة الأردنية لتقييم مدى معرفتهم بأخلاقيات البحث العلمي في الفترة الواقعة من شهر شباط وحتى آب من سنة 2018 وقد تم استخدام استبيان مستخدم مسبقاً ومكوّن من ثلاثة أجزاء، وقد تم تحليل النتائج عبر برمجية اكسل بربط مدى المعرفة لدى الطلاب بالجنس، دراسة منهاج إضافي، والمشاركة في بحث منشور. **النتائج:** شارك في الاستبيان 158 طالباً وطالبة من أصل 400 (39.5%)، (67.3%) 107 منهم كنّ إناث فيما 52 (32.7%) كانوا ذكوراً، وفقط 18 طالبا كانوا قد درسوا منهاج إضافي و 23 منهم (15.6%) شاركوا في بحث منشور، 129 (81.6%) منهم سمعوا عن أخلاقيات البحث العلمي وفيما معظمهم يعتقدون أن الالتزام بأخلاقيات النشر هو أمر أساسي في كتابة البحث العلمي تفاوتت مدى معرفتهم ببعض أوجه هذه الأخلاقيات، حيث أنه فقط 4.4% منهم يعرف الوقت الواجب انتظاره قبل إعادة إرسال البحث للنشر مرة أخرى وحوالي 42.8% منهم يعرف تعريف السرقة الأدبية. واتضح أن الجنس ودراسة منهاج إضافي والمشاركة في بحث منشور لم تؤثر على النتائج. **الخاتمة:** أظهرت النتائج أن مدى معرفة الطلاب بأخلاقيات البحث العلمي والنشر ضعيفة وعليه هم بحاجة إلى مزيد من التدريب والدراسة في هذا الخصوص

الكلمات الدالة: طلبة كلية الطب، أخلاقيات البحث العلمي.