ORIGINAL ARTICLE

Assessment of Awareness of Research Misconduct among Interns in Nigeria

Daha Garba Muhammad[1,*], Umar Bello[2], Fatima Bashir Shema[3], Zakariyya Muhammad Bello[3], Paul Gadzama[2]

[1]Physiotherapy Department, General Hospital Dutse, Jigawa State, Nigeria
[2]Chemical Pathology Department, Federal Medical Center Yola, Nigeria
[3]Department of Medical Laboratory Science, Faculty of Allied Health Sciences, Bayero University Kano, Kano, Nigeria

[*]General Hospital Dutse, Kiyawa Road, Dutse, 720212. Nigeria

Tel: +23 47066805746
Email: dahagarba@gmail.com

Background: Research is the source of evidence for all medical and allied procedures. Research misconducts are wrongdoings during the conduct of research which can be committed intentionally or ignorantly. Research misconduct includes plagiarism, falsification and fabrication of results. Novice researchers may commit misconduct unaware of it being an unwanted practice. Therefore, this study aimed to assess the awareness of interns of research misconduct.

Method: The present study was a cross sectional survey that utilized a questionnaire to obtain information on research misconduct among 53 interns at Federal medical center Yola, Nigeria using a purposive sampling technique. Data analysis was done using SPSS V20 utilizing frequency and percentage to summarize the data and chi-square to assess association between categorical variables.

Results: Majority (35.7%) of the participants were within the age range of 26-30. Males were 34 (65.4%) and mostly nurses were 17 (32.5%). Majority of the participants 45 (86.5%) were aware of informed consent but only less than two-fifth (2/5) were aware of declaration of Helsinki. More than 4/5 of the participants were aware of plagiarism (86.8%), fabrication (94.3%) and falsification (86.6%) of results in research.

Conclusion: Participants in this study showed a significant level of awareness of research misconduct.

Keywords: Awareness, Plagiarism, Salami slicing, Fabrication, Research misconduct

تقييم الوعي بسوء السلوك البحثي بين المتدربين في نيجيريا

الخلفية: البحث هو مصدر الدليل لجميع الإجراءات الطبية والحليفة. سوء السلوك البحثي هو مخالفات أثناء إجراء البحث يمكن أن ترتكب عن قصد أو عن جهل. يشمل سوء السلوك البحثي الانتحال والتزوير وتلفيق النتائج. قد يرتكب الباحثون المبتدئون سوء سلوك غير مدركين لكونها ممارسة غير مرغوب فيها. لذلك ، هدفت هذه الدراسة إلى تقييم وعي المتدربين بسوء السلوك البحثي.

الطريقة: كانت الدراسة الحالية عبارة عن مسح مقطعي يستخدم استبيانًا للحصول على معلومات حول سوء السلوك البحثي بين ٥٣ متدربًا في المركز الطبي الفيدرالي يولا ، نيجيريا باستخدام تقنية أخذ عينات هادفة. تم إجراء تحليل البيانات باستخدام SPSS V20 باستخدام التردد والنسبة المئوية لتلخيص البيانات ومربع كاي لتقييم الارتباط بين المتغيرات الفئوية.

النتائج: كانت الأغلبية (٣٥,٧٪) من المشاركين في الفئة العمرية ٢٦-٣٠. كان الذكور ٣٤ (٦٥,٤٪) ومعظم الممرضات ١٧ (٣٢,٥٪). غالبية المشاركين ٤٥ (٨٦,٥ ٪) كانوا على علم بالموافقة المستنيرة ولكن أقل من خمس (٥/٢) كانوا على علم بإعلان هلسنكي. كان أكثر من ٥/٤ من المشاركين على دراية بالسرقة الأدبية (٨٦,٨٪) ، والتلفيق (٩٤,٣٪) والتزوير (٨٦,٦٪) لنتائج البحث.

الخلاصة: أظهر المشاركون في هذه الدراسة مستوى كبير من الوعي بسوء السلوك البحثي.

الكلمات المفتاحية: توعية ، سرقة أدبية ، تقطيع السلامي ، تلفيق ، سوء سلوك بحثي

نائیجیریا میں انٹرنز کے درمیان تحقیقی بدانتظامی کے بارے میں آگاہی کا اندازہ

پس منظر: تحقیق تمام طبی اور متعلقہ طریقہ کار کے ثبوت کا ذریعہ ہے۔ تحقیقی بدانتظامی تحقیق کے دوران غلط کام ہیں جن کا ارتکاب جان بوجھ کر یا لاعلمی میں کیا جا سکتا ہے۔ تحقیقی بدانتظامی میں سرقہ، جعل سازی اور نتائج کو گھڑنا شامل ہے۔ نوآموز محققین اس بات سے بے خبر کہ یہ ایک ناپسندیدہ عمل ہے بدتمیزی کا ارتکاب کر سکتے ہیں۔ لہذا، اس مطالعہ کا مقصد تحقیقی بدانتظامی کے انٹرنز کی بیداری کا اندازہ لگانا ہے۔

طریقہ: موجودہ مطالعہ ایک کراس سیکشنل سروے تھا جس میں فیڈرل میڈیکل سینٹر یولا، نائیجیریا میں ۵۳ انٹرنز کے درمیان تحقیقی بدانتظامی کے بارے میں معلومات حاصل کرنے کے لیے ایک سوالنامے کا استعمال کیا گیا تھا۔ ڈیٹا کا تجزیہ SPSS V20 کا استعمال کرتے ہوئے فریکوئنسی اور فیصد کا استعمال کرتے ہوئے ڈیٹا اور chi-square کا خلاصہ کرنے کے لیے کیا گیا تاکہ زمرہ وار متغیرات کے درمیان تعلق کا اندازہ لگایا جا سکے۔

نتائج: شرکاء کی اکثریت (۳۵٫۷%) ۲۶-۳۰ کی عمر کے اندر تھی۔ مرد ۳۳ (۶۵٫۳%) تھے اور زیادہ تر نرسیں ۱۷ (۳۲٫۵%) تھیں۔ زیادہ تر شرکاء ۳۵ (۸۶٫۵%) باخبر رضامندی سے واقف تھے لیکن صرف دو پانچویں سے بھی کم (۵/۲) ہیلسنکی کے اعلان سے آگاہ تھے۔ ۵/۳ سے زیادہ شرکاء تحقیق میں سرقہ (۸۶٫۸%)، من گھڑت (۹۳٫۳%) اور جعل سازی (۸۶٫۶%) سے واقف تھے۔

نتیجہ: اس مطالعے کے شرکاء نے تحقیقی بدانتظامی کے بارے میں آگاہی کی ایک اہم سطح کو ظاہر کیا۔

کلیدی الفاظ: بیداری، سرقہ، سلامی کاٹنا، من گھڑت، تحقیقی بدانتظامی

ارزیابی میزان آگاهی از تخلفات پژوهشی در بین کارآموزان پزشکی در نیجریه

زمینه و هدف: تحقیقات منبع موثقی برای همه روش های پزشکی و وابسته به آن است. تخلفات پژوهشی، تخلفاتی است که در حین انجام تحقیق صورت می گیرد و می تواند آگاهانه یا ناآگاهانه انجام شود. تخلفات پژوهشی شامل سرقت ادبی، تحریف و جعل نتایج است. محققان تازه کار ممکن است مرتکب این رفتار نادرست بشوند، غافل از اینکه این یک عمل ناخواسته است. این مطالعه با هدف سنجش آگاهی کارورزان از تخلفات پژوهشی انجام شد.

روش: مطالعه حاضر یک پیمایش مقطعی بود که با استفاده از پرسشنامه، اطلاعاتی در مورد تخلفات پژوهشی در بین ۵۳ کارورز در مرکز پزشکی فدرال یولا، نیجریه با استفاده از روش نمونه‌گیری هدفمند به دست آورد. تجزیه و تحلیل داده ها با استفاده از نرم افزار SPSS V20 با استفاده از فراوانی و درصد برای جمع بندی داده ها و کای اسکوور برای ارزیابی ارتباط بین متغیرهای طبقه بندی انجام شد.

یافته‌ها: اکثریت شرکت‌کنندگان (۳۵/۷٪) در محدوده سنی ۳۰-۲۶ سال بودند. مردان ۳۴ نفر (۶۵,۴٪) و پرستاران ۱۷ نفر (۳۲,۵٪) بودند. اکثر شرکت کنندگان یعنی ۴۵ نفر (۸۶,۵٪) رضایت آگاهانه داشتند اما تنها کمتر از دو پنجم از اعلامیه هلسینکی آگاه بودند. بیش از چهار پنجم شرکت‌کنندگان از سرقت علمی (۸۶,۸٪)، تحریف یا نتایج ساختگی (۹۴,۳٪) و جعل نتایج تحقیق (۸۶,۶٪) آگاه بودند.

نتیجه‌گیری: شرکت‌کنندگان در این مطالعه سطح قابل‌توجهی از آگاهی از تخلفات پژوهشی را نشان دادند.

واژه های کلیدی: آگاهی، سرقت ادبی، برش سالامی، تحریف، تخلفات پژوهشی

INTRODUCTION

Research is a systematic process through which new findings are disseminated. In health care system, there is a shift to evidence based management of patient of which one of its components is best available evidence (1). Research is the source of evidence for all medical and allied procedures. Research misconducts are wrongdoings during the conduct of research. These misconduct might be done intentionally, ignorantly or unnoticed, in whichever case it stands as an unwanted practice (2). Doing intentionally might be commoner in expert and experienced researchers that may try to manipulate their findings to suite their intended findings (3). This can be found in an organizational funded research where the researcher finds it difficult to reveal findings that are against the funder and this is why some journals require a declaration of conflict of interest in the submission process for publication. An ignorant research misconduct might be more common in younger researchers as they may not be aware (2).

Plagiarism, falsification, salami slicing, gift and ghost authorship, failure to obtain consent, and fabrication are some of the identified misconduct in the process of conducting a research. Plagiarism is the use of someone's thoughts, ideas, or words without proper citations. Whereas, falsification is an alteration made to an obtained data and fabrication is the creation of data that does not exist (4). Salami slicing is the publication of similar findings in differently (5). The causes of the misconduct might be due to pressure from the supporting bodies, needs for promotion, and having many publications among other reasons (3).

To avoid these wrongdoings, ethical guidelines and other innovation were put in place to guide the conduct and reporting of research. These include international committee of medical editors (ICMJE) that focuses mainly on who deserves to be an author or to be included in acknowledgement (6), as well as the declaration of Helsinki to protect the rights of participants (7). Softwares to detect plagiarism were also innovated. Salami slicing and fabrication of result can be detected through systematic reviews and meta-analysis and asking an author to submit raw data (8) during submission respectively.

Health care delivery has now turned into an evidence-based and patient centered oriented, where high quality research is the bedrock for such purpose (1). Published updated literature is the major source for effective patient care and finding solutions for unanswered scientific questions is the main reason behind conducting a research (1). Insufficient knowledge and awareness of research misconduct were reported among undergraduate pharmacy students in Jordan (9). The majority of the responders were not aware of the main ethical aspects of research misconduct, including plagiarism, fabrication, and falsification (9). Another study showed poor knowledge of research misconduct among medical students (1).

Interns are just finishing their undergraduate project and are undergoing a mandatory one year internship training after they will become independent practitioners (10). One of their duty on becoming independent practitioners is conducting and disseminating research findings, in fact it's a criteria for promotion for those who later join academia (11). Therefore, it is worth knowing the level of research misconduct awareness of these individuals to ensure a high quality research output in the future.

METHODS

Study design and population

This study was a cross-sectional survey. The population of this study were all interns (Pharmacy, medical laboratory sciences, radiography, optometry and nursing) and house-officers (MBBS interns) at Federal Medical Center (FMC) Yola in the year 2021 (January-February).

Settings

FMC Yola was established in 2006 with 550 bed spaces. It is one of the four governmental tertiary health institutions in north-eastern part of Nigeria that train interns across all health discipline. The only profession whose interns training is not obtainable in the institution is physiotherapy. The institution is the located in Yola capital city of Adamawa state. It is a multi-specialist hospital that provide healthcare to the indigene of the state and the nearby state. It serves as a referral hospital to public and private health facilities.

Sample Size and Sampling Technique

Census (All population sample size) was employed because the population was exhaustive. Purposive sampling technique was used to recruit participants into this study. Interns on extension (beyond 12 months), and interns that didn't consent to participate were excluded from the study.

Data Collection Instrument

The following instruments were used for data collection in this study :

- Consent form
- Questionnaire

Consent form: The purpose of the study was explained to the participants in the informed consent form to ensure maximum cooperation of the participant (Voluntarily) before distributing the questionnaire

Questionnaire: The questionnaire was adapted from Ababneh et al (9). The questionnaire composed of three parts as follows: Part I included demographics and general information of the participants, Part II enquired about the participant's knowledge and awareness of terminologies of research misconduct. Responses to knowledge questions were assessed using a 3-point likert scale (aware (I know), not aware (do not know), and not sure. Part III explored the experience and knowledge of research misconduct. In this section, participant's knowledge and experiences of specific characteristics and descriptions of research misconduct, such as fabrication, plagiarism, and falsification, were assessed. Responses to these questions were assessed using a 3-point likert scale (correct, not correct, do not know). A score of $6\geq$ was considered good knowledge, while a score < 6 was considered poor knowledge.The questionnaire was pretested to establish its psychometric properties for using in the setting and a chronbach alpha of 0.6 was obtained.

Data Collection Procedure

Ethical approval was soughed and obtained from the research and ethics committee of FMC Yola before the commencement of the study with reference number FMCY/HREC/20/102. Written Informed consent was obtained from each of the participants. The purpose of the study was explained to the participants along with informed consent form in order to ensure maximum cooperation of the participants before distributing the questionnaire. The questionnaire was given to any eligible participants that consented to participate. A window of one week was given before retrieving the filled questionnaire.

Data Analysis Procedure

Statistical analysis was conducted using SPSS V20. Descriptive statistics such as frequencies, and percentages were used to summarize the data obtained from socio-demographic variables and knowledge about research misconduct. An association between participant's characteristics and knowledge of research misconduct was analyzed using chi-square test. Statistical significance of *P* value < 0.05 was considered.

RESULTS

There were 65 interns altogether in the hospitals. Prior to data collection, 6 questionnaires were distributed for validation and as such were excluded during main data collection. During data collection 59 questionnaires were distributed where 53 were filled and returned giving a response rate of 89.9%.

Table 1 showed the demographic characteristics of the participants. Majority (35, 66%) of the participants were within the age range of 26-30, 11 (20.8%) within the age range of 20-25 and 7 (13.2%) were above >30 years of age. Male (34, 65.4%) predominated in the study. Nurses (17, 32.5%) were the majority of the participants followed by medical laboratory scientist and pharmacist (10, 18.9%). Seven (13.2) from participants were doctors, 5 (9.4%) were radiographers and 4 (7.5%) were optometrist. Most of the participants (36, 67.9%) were in the last quarter of their months of training and 12 (22.6%) were in their first quarter while only 3 (5.7%) were in the second quarter. Most of the participants (28, 53.8%) had heard of publication ethics and 22 (42.3%) haven't heard. Only few (11, 21.2%) heard of international committee of medical journal editors. Furthermore only 16 (30.8%) heard of committee of publication ethics. Majority (32, 60.4%) were aware of ethics review board in medical college and had 42 (79.2%) undergraduate research experience. In addition, most of the participants (28, 52.8%) had previous training in research ethics while only few (31, 58.5%) had training on research misconduct.

Table 2 reveals the responses about the terminologies of research misconduct. In general, majority of the participants (45, 86.5%) were aware of informed consent but only less than two-fifth (2/5) were aware of declaration of Helsinki. Majority 29(56.9%), 42(79.2%), 34(64.2) were aware of Institutional Review Board (IRB), Ethics committees and Disclosure of conflict of interest respectively. More than 4/5 of the participants were aware of plagiarism (86.8%), fabrication (94.3%), and falsification (86.6%) of results in research.

Table 3 shows the responders answers regarding their knowledge and awareness of research misconduct. Majority of the participants (49, 96.1%) considered publication ethics as an essential part of research writing. Likewise 41 (80.4%), 46 (90.2%), 41 (80.4%) were aware of negative consequences of research misconduct, meaning of plagiarism respectively. In addition, 44 (86.3%), 42 (84%) and 47 (92.2%) were aware of the meaning of paraphrasing, falsification and fabrication in research.

There was no significant association between participant age, gender, awareness of research ethics, previous research ethics, and knowledge of research misconduct ($p>0.05$). There was significant association between months of internship training, profession, and knowledge of research misconduct ($p<0.05$) (table 4).

Table 1a. Demographic characteristics of the participants

Variables	n	%
Age (Years)		
20-25	11	20.8
26-30	35	66
>30	7	13.2
Gender*		
Male	34	65.4
Female	16	30.8
Profession		
Medicine	7	13.2
Radiographers	5	9.4
Medical lab. Scientist	10	18.9
Optometrist	4	7.5
Nurses	17	32.5
Pharmacist	10	18.9
Months of internship training (months)*		
1-4	12	22.6
5-8	3	5.7
9-12	36	67.9
Heard of publication ethics		
Yes	28	53.8
No	22	42.3
Heard of ICMJE*		
Yes	11	21.2
No	41	78.8
Heard of COPE*		
Yes	16	30.8
No	35	67.3

ICMJE= international committee of medical journal editors, COPE= committee of publication ethics.
* contain missing responses

Table 1b. Demographic characteristics of the participants

Variables	n	%
Awareness of research ethics review committee/board in the medical college		
Yes	32	60.4
No	13	24.5
Don't know	8	15.1
Undergraduate research experience		
Yes	42	79.2
No	9	17
Previous research ethics training		
Yes	28	52.8
No	23	43.4
Previous research misconduct training		
Yes	20	37.7
No	31	58.5

DISCUSSION

The study found a good awareness of research misconduct among interns at FMC Yola, Nigeria. Submission of an article for publication is the transition between author's effort in research and disseminating the findings for public consumption which needs to be an honest process (12) and hence the need for future scientist to be aware of the wrongdoings during the conduct of research (13).

Only few of the participants were aware of COPE and IJCME that provided criteria for authorship and other publication process. This meant that most of the participants were not aware of authorship criteria. Consequently, some of the participants might have unknowingly being victims of ghost authorship during university days. This is similar to the findings of Mubeen, (1), but in contrast to the findings of Nylenna (14). Mubeen (1) attributed the differences to better awareness and responsiveness in developed countries.

Participants in this study had good knowledge in falsification and fabrication of data. This is in contrast to the findings of Mubeen, (1), whose majority of the participants were not

Table 2. Knowledge about the terminologies of research misconduct

Variables	not aware n(%)	not sure n(%)	Aware n(%)
Informed consent	5(9.6)	2(3.8)	45(86.5)
Declaration of Helsinki	30(56.6)	3(5.7)	20(37.7)
Institutional Review Board (IRB)	19(37.3)	3(5.9)	29(56.9)
Ethics committees	8 (15.1)	3(5.7)	42(79.2)
Disclosure of conflict of interest	13(24.5)	6(11.3)	34(64.2)
Plagiarism	5 (9.4)	2(3.8)	46(86.8)
Fabrication	2(3.8)	1(1.9)	50(94.3)
Falsification	6(11.3)	1(1.9)	46(86.6)

Table 3. Knowledge and awareness of research misconduct

Variables	not aware n(%)	not sure n(%)	Aware n(%)
Publication ethics in research is an essential element of paper writing.	2(3.9)	0(0)	49(96.1)
The main consequences of research misconduct are, losing public trust, placing research subjects at risk and wasting resources.	9(17.6)	1(2)	41(80.4)
Plagiarism involves the use of writings belonging to others or copying part of own previous published work, without appropriate citation	4(7.8)	1(2)	46(90.2)
Plagiarizedpublicationsdonotaddtoscientificvalueofthematerialpublished. They increase the amount of published papers without justification and gain undeserved benefit to authors.	8(15.7)	1(2)	41(80.4)
Paraphrasing means to express someone else's ideas in your own language and to summarize means to write down the essence of someone else's work	4(7.8)	3(5.9)	44(86.3)
Falsification in research is defined as omitting data such that the research is not accurately represented, manipulating research materials, and changing data or results.	7(14)	1(2)	42(84.0)
Fabrication in research can be described as to pay someone to write a paper for you, or provide two or more references for contradictory statement, or cite a source that has not actually been read or consulted.	4(7.8)	0(0)	47(92.2)

Table 4. Association between participant characteristics and knowledge of research misconduct

Variables	Good	Poor	X^2/exact	p-value
Age			**0.93**	**0.72**
20-25	11	0		
26-30	29	3		
>30	7	0		
Gender			**1.38**	**1.00**
Male	30	2		
Female	16	0		
Profession			**7.72**	**0.48**
MBBS	3	2		
BRAD	5	0		
BMLS	9	0		
DOPT	4	0		
BNSc	17	0		
BPHARM	9	1		
Months of internship training			**10.43**	**0.017**
1-4 months	12	0		
5-8 months	1	2		
9-12 months	34	1		
Awareness of research ethics			**4.31**	**0.09**
No	11	0		
Yes	30	1		
Don't know	6	2		
Previous research ethics			**4.33**	**0.19**
No	18	3		
Yes	29	0		

aware of these terms. This might not be unconnected to the differences in population for the two studies. Mubeen, (1), recruited medical students including 4^{th}, 5^{th} and final year student. Whereas in this study, the participants were interns whose majority had undergraduate research experience that might have exposed them to be aware of these terminologies or due to interaction with supervisors, readings and other colleagues. There is no doubt that undergraduate project is attached with many benefits (15) and hence the reason for the differences in awareness level. It is also in contrast to a Jordanian study by Ababneh (9) which was also carried out on students.

Using someone's idea, initiatives, or sentences without giving proper credit to the owner is termed plagiarism. Majority of the respondents in this study were aware of this ethical issue in the conduct of research. This is in contrast to the finding s of two Pakistan studies by Mubeen (1) and Shirazi (16). This might be linked to the geographical location. In addition, respondents in this study were aware of the concepts of avoiding plagiarism and paraphrasing of information. The study also contradicts Ababneh et al (9) finings that could be linked to the fact that their study was mainly on Pharmacy students unlike the present study that involves other interns.

Research involving humans is guided by declaration of Helsinki to protect the participants from potential harm. Participants in this study showed a very poor knowledge of this concept. This is in tandem to the findings of Mallela et al (17). However, despite poor knowledge of declaration of Helsinki, the participants held a good knowledge about what informed consent is. One of the criteria of conducting a research is obtaining a voluntary acceptance by participants after receiving an explanation on benefits and dangers to participation without any rewards. This is the informed consent. One of the features of an ethically conducted study is a utilization of a good informed consent (18). Similar to this are some other findings (17-19).

Significant association was seen between months of internship training, profession and knowledge of research misconduct. The difference seen might be linked to the effect size as the majority of participants were almost done with their training and nurse intern respectively.

One of the limitations of this study is that, it only assessed the participant's awareness to research misconduct without

assessing their prior involvement in research misconduct. This study was conducted using purposive sampling techniques with small sample size in one teaching hospital and such cannot be generalized to Nigerian interns.

Participants in this study showed a significant level of awareness in research misconduct. To harness this, a study should be conducted to assess the young professional perceived involvement in research misconduct. This is because being knowledgeable does not always guarantee influence practice (18). Undergraduate curriculum of research methodology should focus well on guidelines protecting participants such as declaration of Helsinki.

Ethical considerations

Ethical issues including plagiarism, informed consent, misconduct, data fabrication and/or falsification, double publication and/or submission, redundancy, etc. have been completely observed by the authors.

Conflict of Interest: We declare no potential conflicts of interest.

REFERENCES

1. Mubeen SM, Qu, Ghayas R, Adil Rizvi SH, Khan SA. Knowledge of scientific misconduct in publication among medical students. Educ Health. 2017; 30:140-5.
2. Gupta A. Fraud and misconduct in clinical research: A concern. Perspect Clin Res 2013;4: 144-7.
3. Anonymous. My Professor Demands to be listed as an Author on Many of my Papers. The Guardian [Online Edition]. 5 June, 2021. Available from: https://www.theguardian.com/higher-education-network/201
4. Juyal D, Thawani V, Thaledi S. Plagiarism: An egregious form of misconduct. N. Am. J. Med. Sci. 2015; 7:77-80.
5. Habermann B, Broome M, Pryor E.R, Ziner K.W. Research coordinators experiences with scientific misconduct and research integrity. Nurs. Res. 2010;59: 51-57.
6. Albert T, Wager E. How to handle authorship disputes: a guide for new researchers. The COPE Report 2003. Available online at, https://www.publicationethics.org/files2003pdf. Accessed 30th September 2018.
7. World Health Organization. Declaration of Helsinki-Ethical Principles for Medical Research Involving Human Subjects. 59th WMA General Assembly. Seoul, Republic of Korea; 2008.
8. Teixeira da Silva J. A., Helmar Bornemann-Cimenti H, Tsigaris P. Optimizing peer review to minimize the risk of retracting COVID-19-related literature. Medicine Health Care and Philosophy. 2020 DOI: 10.1007/s11019-020-09990-z
9. Ababneh RA, Alzoubi KH, Ababneh MA. Evaluation of Pharmacy Students' Knowledge and Perception of Scientific Integrity. Educ. Sci. 2020; 10: 41. doi:10.3390/educsci10020041
10. Muhammad DG, Adesina MA. Effect of Covid-19 pandemic on internship training in Nigeria. Yen Med J. 2021;3(2):83-84.
11. Sismondo S, Doucet M. Publication ethics and the ghost management of medical publication. Bioethics 2010;24: 273-83.
12. Jain AK. Ethical issues in scientific publication. Indian J Orthop. 2010;44: 235-7.
13. Chadha M, Jain AK. Ethical issues while reporting in scientific journals. Indian Spine J 2020;3: 1-3.
14. Nylenna M, Fagerbakk F, Kierulf P. Authorship: Attitudes and practice among Norwegian researchers. BMC Med Ethics 2014;15: 53.
15. Seymour E, Hunter A-B, Laursen S.L, DeAntoni T. Establishing the benefits of research experiences for undergraduates in the sciences: First findings from a three-year study. Science Education. 2004; 91: 36-74.
16. Shirazi B, Jafarey AM, Moazam F. Plagiarism and the medical fraternity: A study of knowledge and attitudes. J Pak Med Assoc. 2010;60: 269-73.
17. Mallela KK, Walia R, TM CD, Das M, Sepolia S, Sethi P. Knowledge, Attitudes and Practice about Research Ethics among Dental Faculty in the North India. Journal of International Oral Health 2015; 7(Suppl 2):52-56.
18. Hussain A, Nirgude AS, Kotian H. Knowledge, attitude and practice of informed consent process in biomedical research among postgraduate medical students. Int J Community Med Public Health 2019;6: 213-6.
19. Al DemourS, Alzoubi KH, Alabsi A, Al Abdallat S, Alzayed A. Knowledge, awareness, and attitudes about research ethics committees and informed consent among resident doctors. International Journal of General Medicine. 2019;12: 141-45.