Bioethics in Nigeria: Knowledge and perception during a capacity-building workshop for Biomedical researchers.

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Abstract

Background: The need to assess the gaps in knowledge and perception on bioethics among biomedical researchers has become necessary considering the increasing numbers of researchers and research outputs in sub-Saharan Africa. This study, therefore, investigated the knowledge and perceptions of biomedical researchers in Osun State, southwest Nigeria.

Methods: Pre-tested semi-structured questionnaires were administered to consenting biomedical researchers during a capacity workshop conducted in November 2020. The questionnaire collected data on the attendee's demography, knowledge, awareness and perception on bioethics and ethical approvals for research. Quantitative data were analysed using descriptive statistics in SPSS. 20.0 software and expressed as frequencies and percentages. Associations between professional status of participants were performed using chi-square statistics, and confidence interval was set as 95%. However, qualitative data were obtained using open-ended questionnaires and analysed thematically.

Results: A total of 153 biomedical researchers across 33 academic and research institutions, comprising 58% males, and 42% females participated in this study. The age of the participants ranged from 20 to 60 years. Majority of the participants (60.8%) hold academic positions and about one-third of the population were graduate students (30.1%). Awareness on bioethics was high (91.5%), and more common in schools (61.4%), with majority of the participants (77.1%) describing it as a field that addresses the social and legal issues arising from medicine and life sciences ($p < 0.05$). However, participants' perception of the principles of ethics was poor, with about 16% of participants considering none or only part of the principles. Also, about 10% felt they could still obtain ethical permits while research is ongoing or completed, while only 13.7% affirms that all biomedical related researches require ethical approval. There were significant differences in the proportions across the professional status of participants ($p < 0.05$).

Conclusion: The study has revealed poor perception among participants and suggests the prioritization of bioethics capacity enhancement workshops to improve knowledge and perceptions of biomedical researchers. In addition, more detailed studies across institutions in Nigeria should be carried out to assess, monitor and reinforce knowledge gained by biomedical researchers.

Introduction

The word "Bioethics" was first coined by Fritz Jahr in 1927, and has gained considerable attention till date as it employs ethical theories derived from the considerations of philosophy, law and politics to address some of the problems encountered in the field of biology, including medicine (Gillon, 1998). Biomedical research or experiments targeted at advancing science and promoting societal development are expected to be performed according to established rules and standards known as Ethics, which basically involves doing what is right and acceptable within a specified context. The 1947 Nuremberg Code and 1964 Helsinki Declaration remained the point of reference for most ethical norms, which are implemented by ethical committees (EC) across various countries. EC are saddled with the responsibility of ensuring biomedical research or otherwise are guided and performed by researchers according to set standards (WHO, 2002).

National laws and regulations in several countries require mandatory review and approval of biomedical research before commencement of research studies (Andanda et al., 2011; Langlois, 2011). Unfortunately, the WHO Regional Committee for Africa in 2001 reported that some studies in the region were not undergoing any form of ethics review (Kirigia et al., 2005). In addition, a common misconception about ethics, is that ethical consideration are targeted at ensuring research participants are protected from exploitation and other forms of harm (Emanuel et al., 2000). However, beyond the concept of protection, biomedical research or experiments should be guided by other principles of autonomy, non-maleficence, beneficence, and justice (Rai et al., 2015). Refusals to submit research protocols for ethics review during biomedical research or experiments does not only vitiate the validity of the research but also dents the integrity of the researcher. In addition, biomedical research that poses risk, un-beneficial or with doubt to participants, have potentials to contribute to cohort fall-out, loss of public trust, and reduced community participation and engagement (Harkness et al., 2001; Merslin and Garba, 2011; Ursin, 2010).

It has therefore become imperative to consider investments that will encourage submissions of research protocols to EC for approvals, and ensure high ethical standard are maintained during investigations. However, the exponential growth in the numbers of biomedical researchers and the consequential increase in research activities in sub-Saharan Africa like most developing countries have not been complemented with capacity enhancement workshops on bioethics. (Andanda et al., 2011; Gordijn B, 2014; Blessing and Wassenaar, 2015). In South-west Nigeria, there are emerging evidence corroborating the lack of knowledge and practices of ethics among biomedical researchers (Ogunrin et al., 2016). This gap in knowledge suggest the need to invest in the training and re-training of biomedical researchers, either through the incorporation of a revised ethics module in curriculum of postgraduate students, or through more flexible medium such as seminars or short courses approach for other career researchers.

To this end, a one-day workshop on bioethics for biomedical researchers in Nigeria was organized by Osun State University in partnership with the Global Health Network, University of Oxford to stimulate and promote the needs for healthy research culture while ensuring ethical standards and procedures are met. This study then investigated the knowledge and perceptions of participants at the workshop prior to the time the workshop facilitators began their presentations with the aim of profiling gaps in knowledge, perceptions and practices about bioethics.

Methods

Study Area

This study was conducted in Osun State. The State is one of the six states located in the southwestern part of Nigeria and is divided into 30 administrative regions known as the Local Government Areas (LGAs). The state has the second-highest number of tertiary institutions universities in Nigeria with one Federal University, one State University and eight privately run universities.

Planning and preparatory activities

This study was conducted during the one-day workshop on “Ethics in Biomedical Research and global best practices in the context of Preventive Chemotherapy Neglected Tropical Diseases (PC-NTDs) Elimination

strategy in Nigeria” organized by the Department of Zoology, Osun State University, November 2020. The workshop was advertised via the web (email, Twitter, WhatsApp and Facebook) and participants were invited to register before the workshop. However, only those who were in the field of biology or biomedical sciences were invited to participate in the workshop.

Questionnaire administration

The study was cross-sectional in design and involved the administration of already pretested semi-structured questionnaires to collect both quantitative and qualitative data from consenting participants. Participants were approached at the registration desk of the event and invited to participate in the study. Information such as participants’ demographic data, and their knowledge and perception about bioethics were assessed using the questionnaires. To prevent event-induced responses and biases, participants completed the questionnaires before proceeding with registration or gaining access to the event hall.

Data analysis

Data obtained were entered into Microsoft Excel 2019 software. Quantitative data were analysed using descriptive statistics in SPSS. 20.0 and expressed as frequencies and percentages. Cross-tabulations and Chi-square analysis were performed to investigate associations. The Confidence interval was set at 95%. However, qualitative data were obtained using open-ended questionnaires, manually coded based on emerging themes and summarized.

Results

Demographic characteristics of study participants

A total of 153 participants consented to the study procedures and participated in the study. By gender, majority of the participants were males 89(58%), and 64(42%) were females. The age of the participants ranges from 20 to 60 years, and those aged 36 and above were in abundance, 72(47.1%), followed by those between 26 and 35 years with 58(37.1%) and the least number of participants were those below the age of 25 years with 23(15.0%). By occupation, majority of the participants hold academic positions in tertiary institutions (60.8%), followed by students representing one-third of the population (30.1%) and the least were clinicians (1.3%) (Table 1).

The participants who were drawn from thirty-three (33) academic institutions across Nigeria responded to the questionnaire. The research scope of the participants ranged from basic science to molecular biology.

Table 1: Demographic information of study participants

	Number of respondents	Percentage
Gender		
Female	64	41.8
Male	89	58.2
Total	153	100.0
Age (in years)		
18-25	23	15.0
26-35	58	37.9
≥36	72	47.1
Total	153	100.0
Occupation		
Academia/Lecturer	93	60.8
Clinician	2	1.3
Government worker	12	7.8
Students	46	30.1
Total	153	100.0

Participants' awareness and knowledge about bioethics

Majority of the participants, 140(91.5%) have heard of bioethics. The clinicians have heard of bioethics prior the workshop 2(100%), and 44(96%) of the students who participated were aware of bioethics, followed by participants, 86(93%) who hold academic positions in tertiary institutions. There were significant differences in the proportions of participants who are aware of bioethics prior to the workshop across the occupational status ($p < 0.05$). Majority of the participants 94(61.4%) affirmed they learnt about bioethics while in schools, this was more common for the students 34(74%), followed by civil servants 7(58.3%) and those in academics 53(57%). An appreciable number of participants 19(12.4%) also affirmed that they learnt about bioethics on institutional review boards. The civil servants affirmed this in high proportions 4(33.3%) compared to those in academia 15(16.1%). The internet and advert of the event also contributed to awareness creation for 17(11.1%) and 10(6.5%) of the participants respectively. However, only 2.0% of the participants affirmed they learnt about bioethics on a radio program. There were significant differences in the proportions of where participants learnt about bioethics across the occupational status ($p < 0.05$). Majority of the participants 118(77.1%) ascribed the description of bioethics to social and legal issues arising from medicine and the life sciences, this was

followed by 25(16.3%) who described it as human understanding of well-being and about 10(6.5%) felt it is a critic reflection about ethical conflicts. There were no significant differences in the proportions of participants across the descriptions of bioethics and their occupational status ($p > 0.05$) (Table 2).

Table 2: Participants’ awareness and knowledge about bioethics

Occupation of study participants						χ^2 , df, p-value
	Clinician	Academia	Civil servant	Student/unemployed	Total	
Have you heard about bioethics before this event?						
Yes	2(100)	86(92.5)	8(66.7)	44(95.7)	140(91.5)	10.828, 3, 0.013
No	0(0)	7(7.5)	4(33.3)	2(4.3)	13(8.5)	
Total	2(1.3)	93(60.8)	12(7.8)	46(30.1)	153(100)	
Where did you first learn about bioethics?						
Institutional review boards	0(0)	15(16.1)	4(33.3)	0(0)	19(12.4)	76.889, 18, 0.000
Internet	0(0)	10(10.8)	1(8.3)	6(13.0)	17(11.1)	
National ethics board	0(0)	0(0)	0(0)	4(8.7)	4(2.6)	
Schools	0(0)	53(57)	7(58.3)	34(73.9)	94(61.4)	
Radio program	0(0)	3(3.2)	0(0)	0(0)	3(2.0)	
Hospital/clinics	2(100)	4(4.3)	0(0)	0(0)	6(3.9)	
Event advert	0(0)	8(8.6)	0(0)	2(4.4)	10(6.5)	
Total	2(1.3)	93(60.8)	12(7.8)	46(30.1)	153(100)	
Which of the following best describes bioethics						
Critic reflection about ethical conflicts	0	3(3.2)	1(8.3)	6(13.0)	10(6.5)	9.526, 9, 0.390
Human understanding of well-being	0	16(17.2)	4(33.3)	5(10.9)	25(16.3)	
Social and Legal issues arising from medicine and the life sciences	2(100)	74(79.6)	7(58.3)	35(76.1)	118(77.1)	
Total	2(1.3)	93(60.8)	12(7.8)	46(30.1)	153(100)	

Majority of the participants 140(91.5%) perceived it is necessary to obtain ethical approvals before the study, with the highest proportion of responses recorded among clinicians 2(100%), followed by those holding academic positions 88(94.6%), students 41 (89.1%) and civil servants 9(75%). About 25% of the participants that were civil servants felt they could still obtain ethical permits during the study process, and some students 2(4.4%) and academic staff 2(2.2%) felt they can obtain a permit after the study. There were no significant differences in the proportions of participants across the time when approvals should be sought and their occupational status ($p > 0.05$) (Table 3).

Furthermore, the perception of participants varied regarding the bioethics principles to be considered while planning for research. Majority of the participant 128(83.6%) affirmed that issues surrounding the need, respect, risk and benefits of the research should be considered. Clinicians and civil servants affirmed totally to this, with 2(100%) and 12(100%) respectively. However, some academic staff, 12(12.9%) and students, 6(13%) felt on the risk and benefits of the study to the participants should be considered. Also, 2(2.2%) of the academic staff felt none of these principles should be considered. There were significant differences in the proportions of participants across their perceptions about bioethics principles and their occupational status ($p < 0.05$) (Table 3).

The perceptions of participants varied around the type of research that requires ethical approvals. Majority of the participants felt only clinical research 47(30.7%) and Animal experimental research 46(30.1%) should apply for ethical approvals. This was followed by research involving collection of human bio-samples, 37(24.3%) and the least was behavioural studies with 2(1.3%). Only 21(13.7%) affirmed that all these types of studies needs ethical approval, with responses from those holding academic positions 19(12.4%), civil servants 1(8.3%) and students 1(2.2%). There were no significant differences in the proportions of participants across their perceptions about the type of study that requires ethical permits and their occupational status ($p < 0.05$). Majority of the respondents, 144(94.1%) agreed that a manuscript can be rejected if the underlying study has no ethical approval. However, some academic staff 7(7.5%) and students 9(5.9%) felt such manuscripts can still be accepted. There were no significant differences in the proportions of participants across their occupational status ($p < 0.05$) (Table 3).

Table 3: Participants’ perception about bioethics and ethical approvals

Occupation of study participants						
	Clinician	Academia	Civil servant	Student/unemployed	Total	χ^2 , df, p-value
When do you think it is necessary to obtain ethical clearance for your study?						
Before	2(100)	88(94.6)	9(75)	41(89.1)	140(91.5)	10.193, 6, 0.117
After	0(0)	2(2.2)	0(0)	2(4.4)	4(2.6)	
During	0(0)	3(3.2)	3(25)	3(6.5)	9(5.9)	
Total	2(1.3)	93(60.8)	12(7.8)	46(30.1)	153(100)	
Which of the following bioethics principle should be considered while planning for research?						
Justification to participants	0(0)	3(3.2)	0(0)	0(0)	3(2.0)	76.889, 18, 0.000
Respect for participants	0(0)	2(2.2)	0(0)	0(0)	2(1.3)	
Risk and benefits to the participants	0(0)	12(12.9)	0(0)	6(13)	18(11.8)	
All of the above	2(100)	74(79.5)	12(100)	40(87)	128(83.6)	
None of the above	0(0)	2(2.2)	0(0)	0(0)	2(1.3)	
Total	2(1.3)	93(60.8)	12(7.8)	46(30.1)	153(100)	
Which type of research do you need ethical clearance?						
Animal experimental research	2(100)	26(27.9)	6(50)	12(26.1)	46(30.1)	25.115, 12, 0.14
Behavioral studies	0(0)	0(0)	1(8.3)	1(2.2)	2(1.3)	
Clinical research	0(0)	24(25.8)	3(25)	20(43.4)	47(30.7)	
Human bio-samples	0(0)	24(25.8)	1(8.3)	12(26.1)	37(24.2)	
All of the above	0(0)	19(12.4)	1(8.3)	1(2.2)	21(13.7)	
Total	2(1.3)	93(60.8)	12(7.8)	46(30.1)	153(100)	
Do you think that a manuscript can be rejected due to a lack of proper ethical review?						
Yes	2(100)	86(92.5)	12(100)	44(95.7)	144(94.1)	1.525, 3, 0.677
No	0(0)	7(7.5)	0(0)	2(4.3)	9(5.9)	

Total	2(1.3)	93(60.8)	12(7.8)	46(30.1)	153(100)
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Participants' perception about capacity building in bioethics

Although majority of the participants 89(58.2%) have had a need for bioethics certification before, about half, 64(41.8%) of the participants have not had any need for bioethics certification before the event, with an appreciable number from civil servants 8(66.7%), students 29(63%) and those holding academic positions 27(29%). There were significant differences in the proportion of participants across their need for a bioethics certification and their occupational status ($p < 0.05$). Majority of the participants, 147(96.1%) felt there should be regular mid-career training on bioethics for biomedical researchers, and 151(98.7%) of them were willing to participate in future workshops (Table 4).

Occupation of study participants						
	Clinician	Academia	Civil servant	Student/ unemployed	Total	χ ² , df, p-value
Have you had a need for bioethics certification before?						
Yes	2(100)	66(71)	4(33.3)	17(37)	89(58.2)	19.248, 3, 0.000
No	0(0)	27(29)	8(66.7)	29(63)	64(41.8)	
Total	2(1.3)	93(60.8)	12(7.8)	46(30.1)	153(100)	
Do you think that there should be a regular mid-career training on bioethics?						
Yes	0(0)	92(98.9)	12(100)	43(93.5)	147(96.1)	52.315, 3, 0.000
No	2(100)	1(1.1)	0(0)	3(6.5)	6(3.9)	
Total	2(1.3)	93(60.8)	12(7.8)	46(30.1)	153(100)	
Will you wish to participate in future training on bioethics?						
Yes	2(100)	91(97.9)	12(100)	46(100)	151(98.7)	1.307, 3, 0.727
No	0(0)	2(2.1)	0(0)	0(0)	2(1.3)	
Total	2(1.3)	93(60.8)	12(7.8)	46(30.1)	153(100)	

Table 4: Participants' perception about capacity building in bioethics

Discussion

This study investigated the knowledge and perceptions of biomedical researchers on bioethics, with the aim of profiling gaps in knowledge, perceptions and practices. Our finding contributes to the emerging evidences on poor knowledge and practices among biomedical researchers in the south-western part of Nigeria (Ogunrin et al., 2016). The awareness about bioethics among the study participants was high, and expected, since bioethics has gained popularity in academic environments where students and biomedical researchers are required to submit protocols for ethics approval before field or laboratory experiment. In addition, the popularity of bioethics in field of medicine is higher since the interactions with human subjects are more pronounced when compared to other biomedical disciplines. Our findings therefore show an increased awareness among the study participants on social and legal issues upon which the principles of bioethics are built. However, the assumption that awareness would translate to improved knowledge and practices is faulty, since the training process for bioethics among biomedical researchers is usually passive (Ogunrin et al., 2013). This can be attributed to the fact that there is paucity of postgraduate programs focusing on bioethics in Nigeria. As such, awareness creation and knowledge transfer occur subconsciously via interaction with advisors, institutional review boards, workshops or in some instances on radio program as expressed by the participants of this study. The importance of open symposiums, workshops and radio program as important advocacy medium have been previously discussed (Advocacy Partnership, 2012; Mogaji et al., 2021), and should also be considered in promoting awareness, improved knowledge and practices among biomedical researchers. However, these modes of knowledge transfer cannot provide exhaustive information on the background, principles of bioethics and requirements for ethical approval within the short period of time stipulated for delivery (Xu et al., 2020).

Furthermore, about 10% of the study participants believe that ethical approval for research protocols can be obtained while the experiment has started, and some affirmed that approvals can be obtained when the experiment has been completed. An appreciable number of participants also felt, only the risk and benefits of a research should be taken seriously, while others felt none of the principles should be considered. This finding corroborate with the reports of Ogunrin et al., (2016) and Ateudjieu et al., (2019), that only few researchers are aware of ethical principles guiding the conduct of a research. These observations reflect a gap in knowledge and in-depth understanding of bioethics and re-iterate the need to consider a more robust medium for training and/or re-training of biomedical researchers. We therefore propose that bioethics module be incorporated in the curriculum of graduate students, and other flexible medium such as short courses or seminars can be used to complement or reinforce knowledge or skills acquired.

There were also discrepancies in the participant's view about the type of research that requires ethical approvals, with majority of the participants placing more importance on clinical and animal experimental studies, while neglecting behavioral studies. This perception might be influenced by the erroneous believe that ethical approvals are only associated with experimental studies, unlike research involving the use of questionnaires or interviews (Bowling, 2005). Researchers may therefore evade or refuse to seek ethical permissions prior to the commencement of their study, and may do otherwise after or during the research to satisfy manuscript submission requirements as clearly expressed by some of the participants. It is therefore

imperative that the proposed bioethics module should offer biomedical researchers opportunity to learn the need for ethical approvals and the range of research study that require such approvals in addition to the basic principles of bioethics. Such trainings should lead to certifications that should accompany protocols that are submitted for ethical approvals (Yakubu and Adebamowo, 2012)

Conclusion

This study has revealed the poor understanding and practice of research ethics among biomedical researchers. Hence, there is a need for continuing and expanded support from the international bioethics' community such as the Global Health Network that sponsored this workshop to develop capacity for training of researchers in developing countries. The initiatives to provide training grants for bioethics programmes within and outside Africa by the National Institute of Health of the United States and the support of other institutions and bodies like the Wellcome Trust, African Malaria Network Trust (AMANET) and European Forum for Good Clinical Practice (EFGCP) among others, to the course of bioethics in Africa are noteworthy (Ogundiran, 2004). The prioritization of bioethics workshop and training across universities in Nigeria is highly recommended and more detailed studies across institutions in Nigeria should be done in order to assess, monitor and improve the knowledge of health researchers on research ethics.

Declarations

Ethics approval and consent to participate

This study received ethical approval from the Ethics Review Committees of Faculty of Basic and Applied Sciences, Osun State University. Those who agreed to participate were given informed consent forms to complete after the purpose of the study has been explained to them. Formal consent was obtained through a duly completed consent form with the name and signature of the attendee. All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Consent for publication

No personally identifying information was included in this research.

Availability of data and materials

The datasets generated and analyzed during this study may be requested from the authors.

Competing interests

The authors declare that they have no conflict of interest related to this work.

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Authors' contributions

OAS, HM, MAA, and SOS designed of the survey, interpretation of the data and preparation of the manuscript; BSA and SOO, LOB, OGD contributed to data collection. OF, MR, OAS and HM contributed to the analysis, of the data. All authors have read and approved the final version of the manuscript before submission. All authors have agreed both to be personally accountable for their own contributions and to ensure that questions related to the accuracy or integrity of any part of the work, were appropriately investigated, resolved, and the resolution documented in the literature.

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Disclaimer

The views expressed here are those of the authors and are not necessarily a reflection of the knowledge of Bioethics in Nigeria.

Abbreviations

EC: Ethical Committee

WHO: World Health Organization

The Global Health Network: TGHN

Local Government Areas: LGAs

Preventive Chemotherapy-Neglected Tropical Diseases PC-NTDs

African Malaria Network Trust: AMANET

European Forum for Good Clinical Practice: EFGCP

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