ETHICAL ISSUES IN BIOMEDICAL RESEARCH: PERCEPTIONS OF RESEARCH MISCONDUCTS AMONG RESEARCH STAFF OF HEALTH RESEARCH INSTITUTES IN NIGERIA.

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ABSTRACT

The issue of misconduct in science, particularly biomedical research, has become a matter of concern to research institutes, individual scientists, sponsors of research and the general public worldwide, including Nigeria. It is consequent to the paucity of empirical data on knowledge, attitude and perception of biomedical researchers with regard to the existence of research misconduct in the country that it becomes imperative for this study to provide evidence on research misconducts in research institutes in Nigeria.

This study was conducted to assess biomedical researchers' perceptions of research misconduct in four research institutes in Nigeria. The aim was to determine their knowledge of research misconduct, and to investigate the existence and effectiveness of institutional policies and procedures put in place to control research misconduct in the selected institutes.

The study population comprised researchers of four selected Federal Government research institutes located in the northern and southern parts of Nigeria. Focus group discussions (FGDs) and key informant interviews were used for data collection in the study. Result analysis is based on verbatim transcripts and field notes of the FGDs and interviews.

The findings revealed that the researchers in these institutes have good knowledge of research misconduct but had mixed reactions on perceived causes(s) of research misconduct. The identified causes include selfish interest, greed, financial constraints, un-conducive research environment, poor training, technical deficiency and delay in provision of ethical approval by research ethics committees. The reaction of participants to the question of whether cases of research misconduct were reported in their institutions varied significantly. While some participants knew about cases of research misconduct in their institutions, others were not aware, particularly the junior researchers. It was however established that most cases reported

were authorship-related. The study also revealed that none of the research institutes had institutional policies guiding research misconduct thus there is no procedure for reporting research misconduct.

The results generated from the study have therefore expanded the knowledge on research misconduct in Nigeria; it has contributed to the growing body of literature on research misconduct. Apart from establishing the fact that the researchers have understanding of what research misconducts are, the study also showed that research misconduct exists among biomedical researchers in Nigeria. The information provided here will serve as a guide to the development of interventions to address the issues of research misconduct starting with preventive measures to enforcement.

In view of the danger posed by research misconduct to research, it is recommended that all research institutes in the country should have institutional policies and procedures on research misconducts. There should be standard rules and codes of conduct covering good scientific practices in all the research institutes backed up by national policy. All researchers must be thoroughly trained and retrained in scientific integrity principles and defaulting researchers must be seen to be adequately sanctioned.

Key words: Research Misconduct, Research Integrity, Perceptions, Ethics, Nigerian Research Institutes

CHAPTER ONE

INTRODUCTION

1.1 Background to the study:

Research and experimentation have been a major source of human development. For example clinical trials have been the key to discovering the effects of various pathological disease conditions and how they can be treated. Many of the researchers that were involved in these discoveries were driven by the passion to alleviate human problems. However, in a bid to achieve this lofty ambition in human development some of the researchers got involved in advertent errors or deliberate act of misconduct and fraud.

According to the US Office of Research Integrity, "Research misconduct became a public issue in the United States in 1981 when then Representative Albert Gore, Jr., chairman of the Investigations and Oversight Subcommittee of the House Science and Technology Committee, held the first hearing on the emerging problem. The hearing was prompted by the public disclosure of research misconduct cases at four major research centres in 1980. Some twelve cases of research misconduct were disclosed in this country between1974-1981" The Congress took action in 1985 by passing the Health Research Extension Act.

Fanelli (2009) in the paper titled "*How many scientists fabricate and falsify research? A systematic review and meta-analysis of survey data",* conducted a meta-analysis of published surveys that asked scientists whether they or a colleague had ever committed scientific misconduct. Approximately 2% of respondents admitted to have committed scientific misconduct and 14% reported knowledge of scientific misconduct. Steen (2011) in the paper; "*Retractions in the scientific*

literature: is the incidence of research fraud increasing?" wrote that the number of papers that are retracted yearly for fraud has increased sharply over the past decade, which may reflect either a real increase in the incidence of fraud or a greater effort on the part of journals to police the literature.

` Jonna et. al., (1991) in their paper "*Research Misconduct as a Dilemma for Nursing"* reported that, the NIH estimated there were 15-20 alleged cases of scientific misconduct each year from a pool of about 50,000 scientists. According to Smith (2006), Mike farthing, the chairman of the committee on Publication Ethics who has been the dean of three medical schools estimates that major institutions in Britain have roughly one serious case of research misconduct a year. That means about 50 cases a year. Smith said further that most cases are probably not recognized, covered up altogether; or the guilty researcher is urged to move to another institution or retire from research. Newman and Jones (2011) in their paper "*Authorship of research papers: ethical and professional issues for short-term researchers"* said that research in the higher education sector is increasingly conducted with an eye on the financial gain and not, as may naively be believed, with a selfless dedication in the pursuit of knowledge. Instead, the driving force is the quest for funding to support research, which in turn supports the career. Unfortunately these craze for fund at the expense of quality research are threatening health research by undermining the activities of research institutions.

However, integrity in research is the basis for the academic search for knowledge. It is therefore expected that those involved in medical research must guard the truth and protect the public trust that is attached to such an enterprise.

Creating and preserving an environment in which activities that interfere with an honest search for truth are not tolerated is the shared responsibility of every member

of the research community, each of whom must be dedicated to maintaining the highest standards in research. Institution regulation or law without individual's firm commitment to academic ideals cannot stop research misconduct, a shared understanding of expectations and responsibilities are therefore, critical not only to the quality of the research enterprise but also to the collegial life of this community. Academic misconduct can take many forms, including fabrication or falsification of data, theft of ideas or direct plagiarism, and deliberate interference with the integrity of the work of others. Hence it became imperative to understand the knowledge of researchers in research misconduct.

1.2 Gap in knowledge that the research seeks to address

Interest in issues concerning the maintenance of high ethical standards in the conduct of scientific research has been increasing. In recent years, the issue of misconduct in science has become a matter of concern to research institutes, individual scientists, sponsors of research and the general public. The goal of this study therefore was to assess the knowledge and understanding of Nigeria Biomedical Researchers working in research institutes in principle of research ethics vis-a-vis research misconduct, and their understanding of general principles of ethical conduct in health research. Most previous studies have focused attention on students alone. For instance, Flint et al (2006) and Nadelson (2007) identified the fact that various qualitative and quantitative studies have focused on student actions and moral decision making. While students have received much attention in previous research in this area relative few studies have examined faculty members and their influence on student conducts. Tore, et al., (2010) pointed out that a number of articles have been published on scientific dishonesty and other forms of

unethical conduct. For instance, when accessing PubMed, more than 3000 articles were found discussing scientific dishonesty and other forms of unethical conduct but very few of these were from empirical surveys of researchers' experiences or attitudes. Lynoe et al, (1999) said that "There are a few empirical studies concerning attitudes of students and the experience of researchers with regard to the existence of research fraud and misconduct" Also here in Nigeria there are few studies on responsible conduct of research particularly in the field of medicine and allied fields. Research Institutes are unlikely to be spared of unethical practices. Hence, this study was designed to provide baseline information on research misconducts in research institutes in Nigeria.

1.3 Objectives of study:

The objectives of the study were to:

1. Assess the knowledge and perception of research/scientific misconduct among biomedical researchers in selected Research Institutes in three geopolitical zones in Nigeria namely South West, North Central and North West.
2. Investigate the existence of institutional policies and procedures or any other mechanisms put in place to control research/scientific misconduct in selected institutes.
3. Explore the factors influencing research/scientific misconducts.
4. Evaluate the effectiveness of established institutional policies and procedures or any other mechanisms used in checking research/scientific misconducts.

1.4 Significance of the study

The study is expected to generate information on the knowledge and perception of research misconduct among researchers, information on the existence and

effectiveness of institutional policies, procedures and other control mechanisms for research misconduct and factors promoting or discouraging research misconduct in selected research institutes in the country, to influence institutional policy on research misconduct so that malpractice, unethical behaviours and criminal conducts are not seen as normal.

CHAPTER TWO

LITERATURE REVIEW

2.1 Definition of Research Misconduct

Encarta Dictionaries defines ethics as a system of moral principles governing the appropriate conduct for a person. In organisations including educational institutions, ethics can be defined as a set of formal and informal standards of conduct that people use to guide their behaviour (Wood, 2002). Generally, these standards are derived from core values such as honesty, respect and trust and formalised in mission and value statements.

Scientific misconduct according to the United States (US) Office of Research Integrity (ORI) is defined as fabrication, falsification or plagiarism in proposing, performing or reviewing research or in reporting research results. Research misconduct is adjudged so if committed intentionally, knowingly, or recklessly and there must be a significant departure from accepted practices. Therefore, misconduct involves intentional misrepresentation and misappropriation. Nineteen ninety five (1995) report of the commission on Research Integrity in United States of America (USA) defines research misconduct as follows "Research misconduct is significant misbehaviour that improperly appropriates the intellectual property or contributions of others, that risks corrupting the scientific record or compromising the integrity of scientific practices". The Medical Research Council United Kingdom(UK) defines misconduct as "fabrication, falsification, plagiarism or deception in proposing carrying out or reporting results of research and deliberate, dangerous, or negligent deviations from accepted practice in carrying out research". Tore et al., 2010 said "Scientific dishonesty' implies actions or omissions in connection with research, which leads to false or distorted scientific results or gives misleading information about an individual contribution to the research'. According

to Geggie (2001), research fraud takes many forms. These range from subtle biased patient selection and fraudulent statistical manipulation to the complete fabrication of results and evidence. Lock (1994) in his paper "Research misconduct: a brief history and a comparison" said "misconduct is not homogeneous, there is a wide spectrum, ranging from sloppy science and inappropriate authorship, through self-delusion, bias and conflict of interest to the most egregious: piracy (the deliberate exploitation of other people's ideas without permission): plagiarism (stealing data or text without permission or acknowledgement); and fraud (deliberate deception, usually the invention of data)". Looking at research misconduct from the angle of research publication, Anderson et al., (2011) pointed out that plagiarism is a form of research misconduct and a serious violation of the norms of science. This could be a misrepresentation of another's ideas or words as one's own without proper acknowledgement of the original source. According to Anderson et al. (2011) over the past 30 years, the U.S. Federal Government has developed and refined its policies on misconduct, and federal agencies, as well as research institutions, have established approaches to responding to allegations and instances of plagiarism. At present, efforts to avert plagiarism focus on plagiarism-detection software and instructional strategies. These tend to justify the inclusion of plagiarism in the US definition of research misconduct which captured plagiarism along with fabrication and falsification. Schreier et al., 2006 in their paper titled "Academic Research Record-keeping Best Practices for individuals, Group Leaders, and Institutions" said that research misconduct scandals in the 1980s and 1990s involving falsification and fabrication of research records provoked the federal government to require universities to implement research misconduct policies.

Smith (2006) while describing research misconduct, revealed that fabrication is making up data or results and recording or reporting them while falsification is manipulating research materials, equipment, or processes, or changing or omitting data or results such that the research is not accurately represented in the research record and plagiarism is the appropriation of another person's ideas processes, results or words without giving appropriate credit.

2.2 Causes of Research Misconducts

An act of misconduct in research is an instance of moral failure, where an individual makes an intentional choice to behave badly. The detailed examination and causal explication of any such act is inherently difficult. Given identical circumstances, one scientist would commit misconduct, whereas a hundred others would not. According to Weed (1998) in the paper titled: Preventing Scientific Misconduct said there are causes *external* to the individual scientist, such as publication pressure, competition, the large size of science (reducing opportunities for effective mentoring), and mentors setting bad examples. There are also internal causes, such as personal financial gain, ego or vanity, and psychiatric illness.

A more reasonable hypothesis is that, some individuals have a propensity (or susceptibility) to misbehaviour, which can be aggravated (and lead to concrete acts of misconduct) by external factors. Such factors were identified at the workshop organised by the Organisation for Economic Cooperation and Development Global Forum (OECD) on Best Practices for Ensuring Scientific Integrity and Preventing Misconduct, held between 22-23 February 2007 in Tokyo, Japan which are as listed below:

1 Pressure of severe competition for funds.

2 Requirements to achieve significant positive results (and to publish extensively) in order to obtain and secure a staff position in a research institution, or to receive favourable consideration for future funding of research.

3 Lack of knowledge/preparation about the realities and stresses of a scientific career

4 Pressure to achieve a desired result in the case of sponsored applied research.

5 Assorted personal failings (e.g., a craving for fame, a desire to hurt colleagues, a general lack of moral rectitude).

6 Misapplication of the mission-oriented research paradigm (where concrete, usable results are expected in the relatively short term) to the traditional curiosity-driven research process.

7 Expectations and pressure from supervisors, sponsors or publishers for positive, unambiguous and significant results.

Factors relating primarily to the evolving nature of science and of the research enterprise:

8. The negative aspects of fragmentation, isolation and specialisation. In some scientific domains, researchers work for long periods without adequate contact or interaction with colleagues who would be in a position to scrutinise and review their results. This can result in the proliferation of "lone wolf" researchers who may lose their grip on proper standards of conduct. But it can occur in large collaborations as well, if the project brings together individuals

from vastly different scientific domains, and if collaborators do not adequately monitor one another's work.

9. The proliferation of highly specialised, custom-built scientific instruments that can only be meaningfully operated by one researcher, thus making it difficult to independently verify that measurements are untainted or, in the event of controversy, to reproduce questionable measurements.

10 The ready availability of complex, opaque software for statistical analysis and other manipulations (notably, image processing) that make it easier to commit and conceal falsification and fabrication.

11. Lack of awareness of the rules and standards of proper scientific conduct, of the investigative processes that are in place, and of the penalties that can be imposed on those found guilty of misconduct. In some cases, individuals (especially students) may be truly unaware that certain behaviours (notably plagiarism) constitute misconduct.

12. Misapplication of the mission-oriented research paradigm (where concrete, usable results are expected in the relatively short term) to the traditional curiosity-driven research process.

In general, the prevalence of misconduct can be aggravated by an unsupportive or indifferent environment where integrity is ignored or downplayed.

Barnett and Dalton (1981) determined that environment, personality characteristics and moral commitment were related to ethics. Kibler (1993) found that disciplinary policies and faculty assistance were factors that affected a student's level of ethics. Pryor et al., (2007) remarked that many factors have been postulated as contributing

to the occurrence of scientific misconduct. The ethical climate of the organisation in which the research takes place is one such factor. Other relevant environmental factors include the amount of oversight existence of explicit versus implicit rules, penalties and rewards attached to such rules, access to resources and extent of ongoing training. On an individual level, pressures for promotion and tenure, competition among investigators, need for recognition, desire for financial gain, ego and conflicting personal and professional obligations are cited as factors that may influence certain individuals to engage in misconduct. Hawley and Jeffers (1992) reported that limited guidance and supervision of the young scientist may be a factor in scientific misconduct. According to them in many disciplines the novice scientist is part of a large research team, generally funded through numerous federal and private grants, and headed by senior researchers. Senior investigators may develop large research programs but may gradually cease direct involvement with studies being conducted by the team. Guidance and supervision of the young scientists may lax. Likewise, paper may be published with the senior person as author but without that individual's involvement in the manuscript. Such an environment may provide opportunities for scientific misconduct for the novice. Hawley and Jeffers (1992) further emphasised that inadequacies and bias in the peer review system within the publication industry and the grant review process have been reported as an additional reason for scientific misconduct.

There is no dispute that research and scholarship undertaken at a research institute by its members must be pursued in an environment in which high ethical standards are the norm. Research institutes exist and operate on trust and abuse of such trust destroy the fabric of the enterprise. However as the NIH guide noted in 1986 "In recent years the issue of misconduct in science has become a matter of concern to

research institutes, individual scientists, sponsors of research and the general public. Examples of such misconduct are fabrication of research results, plagiarism and misrepresentation of findings. Although instances of verified misconduct are rare, virtually every instance raises serious questions about the integrity of research." A survey of 3247 US, NIH- funded scientists, reported that 15.5% changed the design, methods, or results of a study in response to pressure from a funding source; 10% withheld details of methods or results in papers or proposals(Martinson et al., (2005)) Furthermore, the US Office of Research Integrity has on average, only 24 cases of misconduct presented to it annually, but in a direct survey of NIH- funded scientists, within the limitations of the study, it was calculated that the scientists observed, as an absolute minimum, 2325 incidents per year; Titus et al., (2008).

Researchers sometimes do not know what research misconduct is. Ashworth, Bannister and Thornes (1997) wrote that "research data indicate that students are often uncertain regarding expected behaviour. Many were not clear about what plagiarism was or when to use citations. Thus the lines between academically honest and dishonest behaviour were not clear to students" There is evidence on hand that academic dishonesty is widely prevalent in many Indian medical colleges and that a proportion of students seem to think that there is nothing wrong in participating in such acts (Gitanjali, 2004). According to Mitchell and Carroll, (2008), there are many pressures upon PhD students not least the requirement to make an original or significant contribution to knowledge. Some students confronted with complex research processes, might adopt practices that compromise standards that are unacceptable within a research community. Hrabak et al., (2004) revealed that academic misconduct is widespread among medical students at the largest medical school in Croatia and its prevalence is greater than that reported for developed

countries. This may be related to social and cultural factors specific to a country in the midst of a post communist transition to a market economy, and call for measures to be instigated at an institutional level to educate against and prevent such behaviour.

Lock (1994) identified greed and craze for fame as two principal backgrounds to research misconduct in medicine, according to him some family doctors in the UK and some hospital physician in the USA, are into research without much experience usually their research is part of a multicentre trial and the motive for their participation is because of the money involved because for each patient entered into a study may attract several hundreds of dollars in payment. On the other hand are the energetic middle-grade research scientists working in prestigious research institutions under distinguished but often distant head of department these researchers are often under peer pressure to publish and produce positive results.This tend to support Donna et al, (1992) observation that limited guidance and supervision of the young researchers is another reason for research misconduct

Scientific misconduct is not new, but increasingly competitive research and educational environments compound the pressure on authors, funders, and institutions to publish. Furthermore, electronic methods of faking data and images are increasingly available (Luther, 2010)

2.3 Consequences of research misconducts

The costs of research misconduct are enormous According to Michalek et al., (2010) in their paper "*The Costs and Underappreciated Consequences of Research Misconduct: A Case Study*'' said the costs associated with scientific misconduct can be divided into three domains: conduct of the fraudulent research, investigation, and

remediation. These costs include all monetary investments (institute start-up funds, grant funding) made in the fabricated research as well as intangibles such as loss of productivity of the associated research group, loss of trust, the demoralization of faculty/trainees, and misdirection of the research efforts of other labs. In some cases, the institution may be required to reimburse the funding agency for costs of the fraudulent research as well as pay penalties, and in certain instances, temporarily suspend other studies during the investigation.

Other costs could be in terms of injury to patients and to health delivery as a result of following fabricated recommendations based on fabricated findings, there is also waste of resources, money and time spent and the resources lost by researchers trying to replicate data that never existed in the first place. It is also to be noted that once an instance of medical misconduct surfaces, the previous work of the author or researcher in question will be doubted and scrutinised. All the past work of a guilty scientist will be called into doubt.

Justifying the reason why Scientists are concerned with misinformation Steen (2011) wrote in a paper titled "*Misinformation in the Medical Literature: What role do errors play?"* that It is obvious why scientists care about minimising misinformation in the literature. Future progress can only be built upon a solid foundation of rigorously tested, carefully replicated science. It may be less obvious why other entities such as pharmaceutical companies, medical writers and marketing consultants to mention a few must have the same goal, because financial interests are not as obviously contingent upon minimising misinformation. Yet medical misinformation harms everyone, not least because it reduces public trust in the enterprise.

Harold and Rennie (2006) in their paper "*Research Misconduct Retraction, and Cleansing the Medical Literature: Lessons from the Poehlam Case"* stated that scientific literature is a record of the search for truth. Publication of faked data diverts this search. The scientific community has a duty to warn people to ignore an article containing faked data and must try to prevent inadvertent citation of it.

Plagiarism is another form of research misconduct that has both moral and legal implications with serious consequences. Instances of plagiarism can have dire consequences for the guilty student or researcher. As a student, the repercussions are enormous. One may receive only a warning, or receive 0% credit for a particular assignment, or in certain cases, a student can be expelled from his or her institution. Plagiarism in the professional world can be career threatening. Once a plagiariser has been identified, it is likely that his/her reputation will follow her indefinitely, and her work will never again be trusted.

Plagiarism breaks the connection between a researcher's ideas and the credit justly deserved for those ideas, but it also distorts the record as to who is responsible for those ideas. It introduces false information into the scientific system, which is fundamentally based on truth.

Plagiarized findings that are republished more or less intact take up valuable publication space that could otherwise be used for original research. They also skew the research record by appearing to show further evidence of already published results, thereby distorting meta-analyses. Small changes that plagiarizers make to escape detection may also introduce errors or inaccuracies.

Misconduct and fraud can have major impact on a drug trial leading to serious consequences in compromising data accuracy and validity. Regardless of the

differences between errors, misconduct and fraud: they all lead to deviation from the truth. Misconduct unlike error, is a more serious situation and is not taken lightly. This is because it involves intentional wrong doings (Woodin and Schneider, 2003). However in Sweden according to Tore et al., 2010 the state of affairs and not the intention is important.

According to Columbia University's "statement on professional ethics, Faculty obligations and Guidelines for Review of Professional Misconduct" (April 1986) makes the point as follows:

"In modern collaborative research, the implications of academic misconduct or fraud go far beyond the individual, they also affect collaborators whose own work has been committed to objective search for truth---Joint authorship requires joint responsibility: each author claiming credit for the entire work must also be aware of joint discredit. Arthur et al., (2010) reported that fall out from scientific misconduct can be pervasive. From the broadest perspective, current and future patients, funding agencies and even the course of research may be adversely affected by scientific misconduct. At the local level members of the perpetrator's laboratory, colleagues, trainees and the financial resources and reputation of the home institution may become tainted. In a clinical setting, the consequences of misconduct are terrible according to Woodin and Schneider (2003). When faced with misconduct or fraud the consequences can be disastrous for a sponsor the data from the fraudulent site would no longer be useable, the study itself would be ineffective and the site may even be ultimately terminated. Hence it is very important that once any fraudulent act is noticed, sponsor should promptly report because apart from other consequences it could lead to huge financial loss because it could delay or totally

stop the drug from reaching the market. Parrish (1996) in the paper titled "*Falsification of credentials in Research setting; Scientific Misconduct?"* revealed that for being found guilty of scientific misconduct, a researcher can be subject to various sanctions, from a letter of reprimand to department from receiving federal funding for a stated period to termination of appointment of an employee to denial of pay increase and report of the employee to a relevant professional association or state licensing board. Michelle et al., (1999) discussing the consequences of research misconduct concluded that, every act of scientific misconduct degrades the morale of other scientists, taints the reputation of the researchers, and destroys public trust in the research enterprise. The deleterious effects of these transgressions on the scientific knowledge base cannot be overstated. A poignant example was related by Shafer (2009) in his review of Scott Reuben's fraudulent research, which comprised 21articles and abstracts spanning 15 years. These articles focused on the long-term beneficial effects of perioperative nonsteroidal anti-inflammatory drug administration. As Shafer (2009) stated misinformation is deeply woven into many review articles, meta-analyses, lectures, summaries, and the memories of individuals exposed to information. The obvious questions are: can we re-educate everyone who has been swayed, consciously or unconsciously, by fraudulent research and, if so, how?

2.4 Prevention of research misconduct

An intelligent and effective strategy for dealing with research misconduct is that of prevention. Weed (1998) in the paper titled preventing Scientific Misconduct said Primary prevention is typically conceived as identifying and removing causes of

events and as identifying factors whose presence (rather than absence) actively reduces the occurrence of those events.

Nylennaa and Simonsen (2006) in their paper titled *"Scientific misconduct: a new approach to prevention"* reflected that, "If we think of scientific misconduct as an unhealthy condition that has different grades of seriousness and is diffused through the scientific community, we can apply Rose's strategy for mass prevention. Moving the whole research community in the right direction should then reduce the number of serious cases. The most important outcome of our suggestion is to impose a heavier responsibility than currently applied on all institutions and their leaders for ensuring ethical and sound research environments, and avoiding minor breaches of good scientific practice. The research community must take a collective responsibility even for its deviants." According to Nylennaa and Simonsen(2006) the practical results of this approach are manifold. First, the existence of scientific misconduct should not be downplayed. Its occurrence cannot and should not be hidden. All research institutions must hold regular seminars and discussions on the causes, outcomes, and consequences of scientific misconduct. Second, a strict definition (restricted to fabrication, falsification, and plagiarism) might be suitable for legal action against individuals. However, a wide definition (e.g, all breaches of accepted scientific practice) should be used for prevention. Third, current guidelines and regulation should be simplified and made readily available to researchers. Research training must include ethical and legal issues. Supervision of young researchers should be improved. Senior researchers serve as models and examples for their juniors, and they have a particular responsibility for demonstrating sound ethical behaviour. Attention should be paid to issues such as open declarations of conflicts of interest and, crucially, guidelines for authorship. Inappropriate

authorship is an underestimated example of grey-zone activities. A fifth of reports in prestigious international journals name people who do not fulfil authorship criteria (guest authors), whereas individuals who should have been included (ghost authors) are missing in a tenth. Fourth, effective and independent mechanisms for investigation of suspected incidents of serious scientific misconduct should be set up at a national level in all countries. Clear and open methods to manage whistleblowers should be in place, with a designated disinterested individual to complain to when needed. Finally, most important is perhaps a thorough discussion of the academic system of reward and merit. How can the emphasis on productivity and the number of publications be reduced, and how can a more healthy culture of transparency and ethics be established?

In order to curb the excesses of scientist particularly when it has to do with research misconduct various measures have to be in place. Committees and working parties should be set up to help tackle the issues resulting from inaccuracy and fraud. Barnes et al., (2006) explained that in response to public concerns about the consequences of research misconduct, academic institutions have become increasingly cognizant of the need to implement comprehensive, effective training in the responsible conduct of research (RCR) for faculty, staff, students, and external collaborators.

Friedman (2007) is of the view that honour codes don't always work and that what cannot be done through policing can be achieved by education. He suggested sensitization of young researchers and their mentors about unacceptable research practices while Wells (1994) said that one of the first and perhaps most obvious things to do to prevent fraud is to ensure that doctors who are recruited as investigators understand what is expected of them. Given that there are accepted

standards of Good clinical (research) Practice (GCP) throughout Europe and the developed world, doctors doing clinical research must be appropriately trained and aware of what the relevant GCP guidelines require. According to him an investigator who understands what GCP is all about is much less likely to believe he can get away with fiddling or frank deception than an investigator who is unaware of the commitment of the research-based pharmaceutical companies to upholding the highest possible standards. Wells (1994) went further to say that unsuitable investigator should not be recruited

In Britain, the Committee of Publication Ethics (COPE) has been established to serve in a manner similar to the FDA's office of Research Integrity in the United States (Feton, 2002). In Scandinavia, research misconduct committees have been in operation since 1992 in Denmark, 1994 in Norway and 1997 in Sweden (Rogers, 2002). The main work of Research Ethics Committee or Institutional Review Board is to review and approve quality research involving human subjects. They are to watch over a study to see that it is carried out smoothly with no ethical infringement or exploitation. Three proactive steps suggested by Hawley and Jeffers (1992) is that there should be careful socialisation of the young scientist; adjustment in guidelines for tenure and promotion; and increase in the number of replication studies.

Prevention of research misconduct according to Breen (2003) should therefore cover steps such as (i) making ethical standards very clear, (ii) providing education and training to researchers, (iii) encouraging practices which might reduce publication pressures on researchers, (iv) having adequate deterrents including

publicly conducted investigations and adequate sanctions and (v) imposing better controls on industry sponsors of research.

The first step in research misconduct prevention therefore is the promotion of good research practice. The second important step is when new researchers join an institution; it must be made clear that misconduct in their research will not be tolerated. Third, the researchers should be given a guide or manual on good research practice that defines their responsibility and also that of their supervisors. Fourth, all researchers should attend an induction course on the basic principles of research. Fifth, regular meeting should be conducted between researchers and their supervisors. Sixth, free access to research raw data for all participants concerned. If such an environment is created researchers will be less liable to commit any form of research misconduct.

Finally, and most positively, promote research integrity. Do so by teaching it in your classes and laboratories. Explicitly teach the standards of conduct in research psychology. Review cases of scientific fraud and the ramifications for the researchers, the field, and the public trust. Be sure that you explain what to do if misconduct is suspected at your institution. Hold laboratory meetings to explain that some rules are not firm across laboratories or disciplines (e.g., authorship, ownership of data, and conflicts of interest) and present the rules that your laboratory follows.

CHAPTER THREE

METHODOLOGY

3.1 Study Design

A qualitative research method was used for this study. Focus group discussion (FGDs) and key informants interview were employed for data collection in the study. Four FGD sessions were conducted in each of the research institution making a total of 16 focus group discussion sessions. The participants comprised of Senior Research staff, male and female, Junior Research staff, male and female. Each group

is made up of minimum of 7 participants and maximum of 9 participants. Four Key-informant interviews were conducted, one in each institution; the focus was a senior member of the editorial Board of any scientific publication published in each of the institution or a member of the research ethics committee. Each of the institutions used for the study was officially written seeking for permission to conduct focus group discussion and in-depth interviews with their research staff and official permission was granted by each of the institution.

3-2 Study Population

The study population are the research staff of the four selected Research Institutes established by the Federal Government of Nigeria. These Institutes are parastatals under Federal Ministry of Health and Federal Ministry of Agriculture and Rural Development respectively; located in the Northern and Southern part of the country. The researchers are designated as Research Fellows and Research Officers; they are the core staff of the institutions. Among them are Clinicians and other biomedical personnel. Other research staffs are the Laboratory Scientist and Laboratory Technologist; these groups of staff are to assist the researchers in their research work.

3-3 Study Sites

The study sites are located in the Northern and Southern parts of Nigeria as follows:

- Nigerian Institute of Medical Research (NIMR) Yaba, Lagos,
- Nigerian Institute of Pharmaceutical Research and Development (NIPRD) Abuja,
- National Institute of Tryponomiasis Research (NITR) Kaduna

- Nigerian Institute for Oceanography and Marine Research (NIOMR) Victoria Island, Lagos

The Nigerian Institute of Medical Research (NIMR) is located in Lagos; it was established through an enabling Act of 1977. The Act stipulates that it shall conduct research into health problems in the country essentially communicable diseases of public health importance, non-communicable diseases prevalent in the country, basic, applied and operational research for the prevention and control of diseases endemic in the country. These functions are to be carried out in cooperation with the Federal and State Ministries of Health. The Institute is also to develop human and infrastructural capacities for clinical and biomedical research in collaboration with Medical Schools, Universities and other health-related Institutions, in and outside Nigeria. The researchers are designated as Research Fellows and are assisted by laboratory scientists and Laboratory Technologists. (Presently there are 78 Research Fellows including those on project works.)

The National Institute for Pharmaceutical Research and Development (NIPRD) was established under the Science and Technology Act of 1980. It was sited in Abuja in 1987 with the primary objective of developing drugs, biological products and pharmaceutical raw materials from indigenous resources. It does this by undertaking research and development work on drugs, biological products including vaccines and pharmaceutical raw materials from indigenous natural resources and by synthesis using appropriate science and technology methodologies. The Institute is a parastatal under the Federal Ministry of Health.

Here the researchers are also designated as Research Fellows. (There are 42 of them on the nominal roll).

The Nigerian Institute for Trypanosomiasis Research (NITR) a parastatal under Federal Ministry of Agriculture, was established in 1947 and sited in Kaduna to conduct research and development for the control and eradication of Trypanosomiasis and Onchocerciasis in all the geo-ecological zones of Nigeria in order to promote food security, rural development, improve human and animal health and facilitate sustainable agriculture practice through optimum land use. There are 78 researchers on the institute list and they are designated as Research Officers.

The Nigerian Institute for Oceanography and Marine Research (NIOMR) was created from the Marine Research Division of the Federal Department of Fisheries by the Research Institutes Establishment Order (1975) with effect from 1st November, 1975. The Institute is now a parastatal under the Federal Ministry of Agriculture and Rural Development; the head quarter is located in Lagos.

NIOMR's statutory research responsibilities include: Genetic improvement of marine and brackish water living resources in Nigeria bracket and marina waters, studies of abundance, distribution and biology of aquatic resources in Nigeria brackish and marine waters, establishment of the physical and chemical characteristics of Nigerian territorial waters, determination of the effects of pollution of Nigerian Coastal waters and its prevention, extension Research and Liaison Services in areas of her mandate. The institute also has a non -research

function which is to provide vocational training in Fisheries, Oceanography and Aquaculture.

3.4 Instrument Development and data collection

3.4.1 Focus group discussion (FGD)

The participants were Research fellows or Research officers with 2 to 33 years in service. The experienced and senior researchers have worked for about an average of 20 years as research staff, while the junior participants worked for an average of 8 years. Participation in the FGDs was voluntary as participants consented after they have gone through the informed consent document. The discussion was moderated by the investigator using an FGD guide and assisted by a note taker. The sitting arrangement with each of the group was such that gave room for the moderator (investigator) to see the participants at once and also provide a free atmosphere for the participants to freely express their opinion. The participants were introduced to the topic of discussion by the moderator (investigator) and were duly informed that the discussions were being recorded by the investigator, note taker and use of an electronic tape recorder. Discussion with each of the group lasted for a minimum of forty minutes and a maximum of fifty minutes. All the participants were urged to contribute meaningfully and no one was allowed to dominate the discussion.

3.4.2 Key informant interview

Key informant interviews were conducted in each of the institution. The interviews were conducted after the participants had gone through the informed consent documents and given their consents. The participants were very senior

research staffs who are either the editor in chief or member of editorial board of an existing publication in the institutions. As senior member of staffs in their various institutions the interviews were conducted in their offices providing an enabling environment for free discussion because there was a relative degree of privacy for the participants.

Before the commencement of the interviews the participants were briefed about the topic of discussion by the moderator. They were also informed that the discussion was being recorded by a note taker and by use of an electronic tape recorder. The investigator used the key informant interview guide to conduct the interview. However, the informants were encouraged to talk through extensively probing questions on research misconduct. Each of the interview lasted between 45minutes and 1 hour.

3.5 Ethical Considerations

The proposal was submitted to the National Health Research Ethics Committee for review and ethical clearance before the commencement of the project. At one of the study sites, the Nigerian Institute of Medical Research the Institutional Review Board requested to see the proposal before their institution could be used for the study. Apart from the ethical clearance from NHREC and the permission received from Nigerian Institute of Medical Research Institutional Review Board, official permission was in addition obtained from each of the study sites. Informed consent was given by all the participants and none of the participants withdrew from participating throughout the duration of the discussions and the

interview. The discussion and interview were trecorded in the recorder guide notes.

3.6 Data Management

The tapes and notes of responses from participants of the FGDs and in-depth interviews were analysed by first transcribing the tapes and then the transcriptions were typed using computer. Responses to the questions in typed texts were thereafter saved as ASCII text files and subsequently summarised, categorised, coded and sorted into text segments according to similarities and differences in individual opinions and views. These were done using the textual analysis programme Text base Beta.

CHAPTER FOUR

RESULTS

Research/Scientific Misconduct

(1) Socio-demographic characteristics of participants

A total of 16 focus groups and key informant interview were conducted. These were made up of 108 participants. They comprised of both males and females researchers as presented in Table 1..

Table 1 Sex distribution of participants

Sex of participant	Frequency	%
Male	59	54.6
Female	49	45.4
Total	108	100.0

Table 2 Rank of participants according to sex

Rank	Male		Female		Total	
	Frequency	%	Frequency	%	Frequency	%
Junior staff	40	67.8	34	69.4	74	68.5
Senior staff	19	32.2	15	30.6	34	31.5
Total	59	54.6	49	45.4	108	100.0

Majority (68.5%) of the participants were junior researchers as shown in Table 2 where their ranks are presented according to sex.

Table 3 Distribution of participants according to their Institute

Name of Institute	Frequency	%
NIMR, Lagos	35	32.40
NIPRD, Abuja	18	16.67
NITR, Kaduna	28	25.93
NIOMR, Lagos	27	25.00
Total	108	100.00

The ages of the FGD participants and key informants ranged from 25years to 62 years. All the participants are scientist with university degree ranging from BSc degree to PhD.

(2) Knowledge and perception of research/scientific misconduct

The FGDs and interviews revealed high knowledge of research misconduct in all the five research institutes as summarised in box 1 below. Though the participants had divergent views in their description of research/scientific misconduct that pervades all aspects of the research continuum from research conception, to data collection, analysis and even to after completion of study, the pattern of discussion in most of the FGDs and interviews was similar.

Majority of the research scientists who participated in these groups agreed and

> Described research/scientific misconduct as any research activity that does not follow good scientific procedures; and data falsification/fabrication; use of or copying other people's research ideas or data without any due acknowledgement (plagiarism), while some participants were of the view that research/scientific misconduct is mismanagement of research grants provided by funding organisations, and the coercion and or misinforming potential study participants to be involved in a study without the choice to decide for themselves whether to participate or not through due informed consent. A few others however were of the opinion that research misconduct involves reporting a research not conducted, inclusion of people's names as authors of a manuscript based on a research conducted without their prior knowledge and or approval (complimentary authorship), and misuse of animal models in laboratory experiments.

It also needs be emphasised that

The focus groups had a common belief that research misconduct is an unethical research conducted without following a standard protocol that is duly approved by an ethics review committee.

The views expressed in the following quotation by a senior female research scientist at NIMR are a description of the research/scientific misconduct as mentioned in all FGDs and interviews:

> "…research or scientific misconducts are steps taken contrary to expectations of science integrity. The other issue is not observing some components on ethics such as providing relevant information to research participants to enable him or her to decide whether or not to identify and participate in such research and these are at different levels. There are those group of research participants who do not have a voice - children who cannot take a decision for whom parental consent is required. There are also illiterates within communities who because of cultural practices are not used to taking decisions on their own except through their husbands or community leaders and if such issues are not complied with it conforms to malpractices in research. There are so many components, the other one is when you publish or report on something you actually did not do such as plagiarism where you copy other people's work and present it as your own. The other one is not even doing the work at all or claiming to undergo some procedure or use some instruments which you didn't do and publishing such and in this context there is a need for oversight and a need for ethical review board in health institutions."

A senior research scientist interviewed at NIPRD provided more light on research/scientific misconduct to mean:

> "…tampering with data using results of others without acknowledging them, wholesale falsification of research information or generating data without research."

In a focus group of junior male research scientists at NITR, a participant described research/scientific misconduct as:

> "…the mismanagement of research funds and the manipulation of research results."

Box 1: Participants Definition of Research Misconducts
Research activity that does not follow good scientific procedures Falsification and fabrication of data Plagiarism Mismanagement of research grants Misinformation to coerce into research participation Reporting research not conducted Complimentary authorship Misuse of animals in research Conducting research not duly approved by research ethics committee

There were mixed reactions on perceived cause(s) of research misconduct by the focus group participants and those interviewed, as these vary from concerns over selfish interest which is influenced by greed and the desperate desire for fame and promotion at work, to delay in provision of ethical approval by research ethics committees as summarised in Box 2 below. Some of the other

perceived causes of research/scientific misconduct mentioned by respondents included financial constraints, poor incentives to conduct research, un

conducive research environment, poor training on basic research methodology, poor preparation by researchers not envisaging challenges that might come up during their investigations, greed and laziness, inadequate and obsolete equipment and infrastructure.

Other perceived causes expressed as reasons for research/scientific misconduct mentioned by many focus group participants and those interviewed were: lack of integrity, technical deficiency on how to conduct research, lack of confidence, ignorance and or absence of rules guiding research conduct consequent to poor mentorship, the desire to excel by all means, delay of ethics research committees in giving approval, lack of institutional policy on research misconduct to restrain defaulters, and pressure from research sponsors.

The repeated reference to "pressure on research scientists to publish or perish" by their institutions expressed virtually by focus groups in all the research institutes perhaps reveals a linkage to the indulgence in research misconducts by their colleagues as a way of cutting corners. In summing perceived cause of research/scientific misconduct, a senior research scientist at NIMR observed and stressed that:

> "One of the causes [of research misconduct] is lack
> of oversight i.e. if you have a research programme or project
> which rightfully should have been subjected to ethical approval
> and is so approved without a system by the ethical review board
> whereby monitoring of conduct of such research is absent thereby

making it possible for people to make research claims which they actually did not undergo in the course of their work. Another is this pressure on researchers to publish or perish and in a situation where there's no close oversight on research operations, such a thing will allow for unnecessary claim to works that were not done. Sometimes such people may not even have the skills or the capacity. Also if there is no process for addressing such issues such as rules and punitive measures, it will continue."

Another senior researcher from NIPRD attributed research misconduct to intellectual laziness. He sum up is view thus

> "I think it is intellectual laziness linked with over ambition, one trying to go beyond what he or she is capable of doing. This could also be looked at from reward perspective when you looked at the way academic community rewards you. Promotion is based on papers. You are respected based on the numbers of papers. The pressure that came from the reward can tempt researcher but this should not be an excuse to get involved in misconduct"

A junior female researcher in NITR Kaduna attributed research misconduct to lack of interest in research by the research staff. According to her,

> "Some of the researchers found themselves in the field of research by chance and not out of interest in research. They only took up research work as a survival instinct a means of livelihood, hence anything goes when it comes to research"

Box 2: Participants Views About Factors That Contribute To Research Misconduct

Desperate desire for fame and promotion Personal financial interests Delay in securing research ethics committee' approval Lack of or poor financing of research Poor incentives to conduct research Un-conducive research environment Poor or lack of basic training prior to starting research career Greed and laziness Inadequate and obsolete equipment and infrastructure Absence of institutional policy on research misconduct Pressure from research sponsors. Pressure to publish or perish

In all the group discussions the same opinion about research misconduct prevailed, strong views were expressed in opposition and condemnation of research/scientific misconduct.. These views are summarised in Box 3 below.

Virtually all FGD participants and those interviewed opposed research misconduct in its entirety. It was a consensus among many FGD participants that research misconduct is bad

it violates the principles of ethics guiding scientific research conduct and cases should be taken seriously by reporting known cases

and those involved should be punished accordingly too. Some FGD participants condemned the practice of research misconduct because they believed it "will dent the image and integrity of researchers and their institutions" and most importantly it misleads programme design and policy formulation which are mostly based on evidences generated from research. In echoing the strong concerns of many of the groups

a junior female FGD participant at NITR reiterated that "…it is annoying bad…it dampens the morale of other researchers around."

One junior female FGD participant at NIMR was so agitated by the discussion that she sternly stated that: "…no (research) misconduct is justifiable and it is not pardonable…" On the contrary, another junior male FGD participant at NITR was lenient in his condemnation of the practice stating that: "… (research/scientific misconduct) is bad and should be stopped by all means, although it (research/scientific misconduct) is pardonable due to poor funding." A female senior research scientist interviewed at NIMR expressed strong view of research misconduct thus:

> "Sometimes they (researchers) make certain assumptions, particularly the junior ones that go into the field of research, we should have zero tolerance to research misconduct. To do this, machinery must be in place to check and balance and deal with cases immediately whenever such occurs. Also, review of study protocols such that specific issues are looked at to detect research misconduct. Also research must be monitored and be reproducible to know if the process and result complied with set standards."

Box 3: Participants opinions about research misconduct
Research misconduct is bad Research misconduct violates the ethics of research It dents the image and integrity of researchers and their institutions It misleads programme design and policy formulation Research misconduct dampens the morale of other researchers

It however needs be emphasised that most FGD participant were of the view that cases of research misconduct are usually not reported to the appropriate authorities for necessary sanctions or punishments. The participants view about reported cases of research misconduct is summarised in Box 4 below. A senior male FGD participant in NIPRD in a sober reflection pointed out that: "…research misconducts are usually unreported and thus go un

investigated and unpunished." One senior female FGD participant in NIPRD believed that "research misconduct should not be encouraged and there should be campaign against it." A female junior researcher in NITR said "There would be but it was not reported or it was not even identified, nobody was challenged we are trying to cover up for one another you chop I chop"

(3) Cases and level of occurrence of research/scientific misconduct according to participants

Reactions were mixed among participants over whether cases of research misconduct have been reported in their research institutes studied or not as well as on the level of occurrence where reported. While some participants on the one hand knew about cases of research misconduct in their institutions, others on the other hand were unsure of the occurrence of such malpractices in their institutions because none to their knowledge had neither been officially reported nor declared so. Many participants in the latter category of research scientists mostly at NIPRD, Oceanography and NITR however were cautious to state that: "None to our knowledge because the practice has not been reported officially...though it could exist but it is

very rare." Similarly, a senior male FGD participant at Oceanography also echoed this view thus: "None (is) reported… but there could be cases not reported."

Many of the FGD participants at NIMR revealed high number of cases of research/scientific misconduct among research scientists in their institution. This revelation is betrayed by the observation that "many of the cases they knew of were not reported officially to the management of the institution over the years." Some of the FGD participants who were mostly junior research scientists at NIMR on the other hand were of the opinion that acclaimed cases of research misconduct in the institution "were actually mere rumours". Explaining cases and occurrence of research/scientific misconduct in his institution, a senior male FGD participant in NIPRD made reference to a case that involved "a parallel submission of manuscripts prepared using same data from same study to different peer-reviewed journals for publication." Similarly, a senior female research scientist interviewed in NIMR pointed out that:

> "Recently a researcher was said to have offered money to other researchers to put their names in publications they did not contribute to perhaps to ensure they have enough publications for progression. This is highly unacceptable, unthinkable and should not be encouraged! Another was a publication where somebody said they carried out research using the brain of a monkey. Yes NIMR used to keep monkeys but nobody could attest to that research in this institute…Another was when a member of staff designated as a support staff being a laboratory scientist, was custodian to the data gathered by a researcher, and he went ahead to publish papers based on the data gathered by the

researcher. There could be others that I'm not aware of but they are sure to abound."

In his attestation to the existence of research misconducts in his institution where many of the FGD participants were of the view that the research malpractice is rare probably due to lack of official reporting of such cases, a senior male researcher at NIPRD pointed out that:

> "…Yes, there was a work done on a medicinal plant and published data generated from the investigation was copied and published by another researcher in another journal listing the names of the investigators of the earlier published paper as co-authors. One of the investigators (co-author) of the former investigation reported the case."

Another senior male FGD participant at NIPRD was emphatic in his response stating that:

> "…there was one case in which there was suspicion and disagreement on the content of a paper published by one of the authors."

4 Types of reported research/scientific misconduct

A useful point of convergence is found between the interviews and FGDs on the common types of reported research misconduct at the institutions studied. Those who revealed they knew cases of research misconduct that were either reported or not to the authorities in their institutions unanimously agreed and revealed the different types of the scientific malpractice that have been recorded in their institutions as summarised in Box 5 below The most prominent cases of research misconduct mentioned in the interviews and FGDs particularly among participants at NIMR and NIPRD were authorship-related disputes particularly as it relates to exclusion of names of one or more contributors to the work, plagiarism, and falsification of

data. The types of reported research misconduct are poignantly captured by a senior research scientist at NIMR:

> "…there is plagiarism, falsification of data, using other people's data. Even works that are beyond the mandate of this institute, people publish. Disagreement on authorship has also been an issue. The understanding of researchers does not agree with international standards. The international definition of authorship is not adhered to here. Particularly the junior ones will have their names included on papers as co-authors just to help them move up the ladder. The data here is gotten through routine service delivery but such data is now presented as if it was a well-organized research effort and this ends up misinforming the reader of the outcome of such operation. Falsification of thesis is also a possibility. Because of pressure to get grants, some grants are sourced from within the country and these companies have an expectation of what the outcome of such activities will be to prosper their own organisation thus, it won't be surprising if the findings are tailored to meet the need of such organisations rather than academic needs."

Another female senior research scientist in a focus group in NIMR revealed that "submission of same papers to different journals with little modifications" is the common research misconduct in the institution. At NIPRD, a male senior research scientist mentioned in the FGD that "disagreement on authorship" is the common research misconduct in the institution. The expression of a male senior research scientist interviewed in NIPRD that "falsification of data and disagreement on authorship" further confirmed the similar view expressed by the male FGD participants in the institution about the common research misconducts among research scientists in their institution.

In the description of their experiences as victims of research/scientific misconducts, some participants felt agitated, cheated, sad, and unhappy while others felt estranged believing their rights were violated. They emphasised that the experience has made them become secretive and suspicious of their colleagues. A senior female research scientist interviewed at NIMR, apparently with pent-up feelings, stressed that "…there was the case of plagiarism by a research scientist where the party wanted to go to court over it…nepotism came into play in influencing aggrieved party through lobbying." A participant in a senior female focus group at NIMR also expressed her feelings relating to her experience thus: "…I felt cheated and robbed." Another junior female FGD participant who felt cheated through research/scientific misconduct by a senior colleague pointed out that: "…I was sad and unhappy."

It was repeatedly heard in one of the focus groups that "some communities that realised to have been violated by the misconduct of some research scientists in the past threatened research scientists not to come to their locality for any research. 'The community felt used by previous research scientists"

Box 5 Types of reported research misconducts known to participants

Authorship-related disputes Plagiarism Falsification of data Submission of same papers to different journals with little modifications Violation of rights of research participants Research community felt used by researchers

5 Knowledge of institutional actions on reported cases of research/scientific misconduct

The consensus among most of those interviewed and many participants of the focus groups (in NIPRD, Oceanography, NIMR and NITR) was that

> There is currently no system or structure in place to address cases of research/scientific misconducts in their institutions when there are reports of such. The study findings about this is summarised in Box 6 The discussions revealed that most of the institutions are rather reactive than being proactive in their response in taking actions on reported research misconducts.

A senior research scientist interviewed at NIMR for example pointed out that, "…there is no policy or procedure…you really don't see any tangible action taken in this regard… (there are) no disciplinary actions that I'm aware of."

On the other hand, a few of the respondents (NIPRD and NIMR) pointed out that

> Administrative actions on reported cases of research misconducts taken ranged from setting up of disciplinary committees by the management withdrawal of the publication(s) arising

from the contentious research blacklisting of the affected research scientist(s) to the dismissal of affected parties.

Sharing his experience, a participant in the senior male FGD at NIPRD whose view received the approval of other participants pointed out that: "…a panel was set up to investigate the case, and a report submitted to guide decision. The Editor of the Journal in which the article was published was contacted to withdraw the publication." Another senior male interviewed reemphasised that, "…it (reported research misconduct) was handled administratively by the management disciplinary committee."

Box 6 Knowledge of institutional actions on reported cases of research misconduct.
All the institutions are rather reactive than being proactive in their response to cases of misconduct Administrative actions taken on reported cases were setting up of disciplinary committees, withdraw of publications, blacklisting of affected researchers and dismissal of affected scientists.

6 Knowledge and perception of organisational policies and procedures of checking and reporting research/scientific misconduct among participants

There were mixed reactions on the availability of organisational policy or reporting structure for research/scientific misconducts and these are summarised in Box 7 below Many of those interviewed as well as the FGD participants revealed that they had no knowledge of any existing policy or reporting structure targeted at addressing issues of research misconducts. On the other hand, a very few reported knowing about the existence of such policy and structure in their institutions.

In the views of many of the former category of those interviewed and the FGD participants, it was agreed that effectiveness of such policy and reporting structure cannot be assessed consequent to the unavailability of any of these control mechanisms in any of their research institutions. According to a senior female FGD participant at NIPRD, "…there is no reporting procedure; hence, the procedure cannot be assessed." Similarly a male senior FGD participant whose assertion received the approval of other participants at Oceanography rhetorically emphasised that, "…there is no institutional policy to check research/scientific misconducts." In her response, a senior female FGD participant at NIPRD said: "…there is no policy to check research misconducts except probably the Institutional Review Board and Research Development Committee." A senior Male key informant at NIPRD said " The closet thing we have is the intellectual Property policy" Another senior female research scientist at NIMR in her emphatic response on perceived effectiveness of the mechanisms in place to check research/scientific misconducts responded thus: "…there is no reporting system, so what is there to rate? Really…there is no policy or procedure."

On the contrary, the few respondents in the latter category of those interviewed and the FGD participants pointed out the existence of established machinery such as the Institutional Review Boards, Monitoring and Evaluation Unit and the Research Development Committee that check against research/scientific misconducts. A senior male FGD participant at NIMR for example pointed out that, "… there is the Institutional Review Board and Monitoring and Evaluation Unit." Corroborating this view, a senior female FGD participant at NIMR further rhetorically emphasized that: "…there is an Institutional Review Board, a Monitoring and Evaluation Unit, the Anti-corruption and Transparency Monitoring Unit (ACTU) and the civil service scheme of service that check against research/scientific misconducts here." At NIPRD, a senior male FGD participant who received the approval of the focus group also pointed out that "there is quality management procedure through the IRB Quality Management System."

On the issue of perceived effectiveness of organisational policies in and procedures and of checking and reporting research/scientific misconducts, all those who mentioned the operations mechanisms for checking and reporting research/scientific misconducts in their institutions particularly at NIMR and NIPRD virtually agreed and adjudged the reporting procedure to be effective to a large extent. They however shared the strong optimism that the status quo could be improved. The depth of this perceived effectiveness of the reporting procedures is borne out by the similarity of the views of the participants:

> "…it is fairly effective." **[FGD with Junior female, Oceanography]**

> "…the IRB is effective…the scheme of service is also applied where applicable though the Monitoring and Evaluation Unit is just starting." **[FGD with Senior female, NIMR]**

The optimism demonstrated by those who shared it that the present level of the perceived effectiveness of the organisational policies in and procedures of checking and reporting research/scientific misconducts in their institutions could be better reflects in view of a senior male key informant interviewed at NIPRD who said, "…there is room for improvement both in the detection and handling of issues of research misconducts."

7 Perceived ways of controlling research/scientific misconducts

On the issue of perceived ways of controlling the incidence of research/scientific misconducts among research investigators and other related stakeholders, the views expressed were

expectedly varied. And is summarised in Box 7 below In general, however, most of those interviewed as well as the focus groups suggested the need for awareness creation about the problem and its scientific and policy implications. It was emphasised that this can be achieved through good guidance, mentorship, and regular training and re-training of researchers, particularly the young ones, on ethics of research.

Some of the FGD participants emphasised the significance of creating conducive environment that will enable effective conduct of research. This category of participants suggested the provision of functional and adequate state-of-the-art infrastructure and equipments for research, good incentive and welfare package to motivate researchers, and adequate and timely funding of research activities. It is believed that provision of research-enabling environment for researchers will motivate them to do their work with high commitment and dedication without necessarily indulging in practices that will be inimical to the integrity of science with particular reference to research misconducts.

A few others particularly the junior ones suggested the need to de-emphasise the 'publish or perish' syndrome that usually put undue pressure on research investigators working in research institutions. The respondents believed this pressure to publish or perish lead some of them to indulge in research misconducts as a means of surviving the challenge. In addition, it was opined that institutional policy and frameworks to guide and guard against research misconducts such as the Research Ethics Committee or Institutional Review Board, Monitoring and Evaluation Unit and Disciplinary Committee on research misconduct in the research institutions should be established where they are non-existent and strengthened where such exists. The respondents expressed their belief that this would help set the standard guidelines for research conduct and reporting of any deviant of the set guidelines. They further emphasised that where such institutional policy is in existence, it is important that the "existing policy and

guidelines should be made open for all to know" according to the junior female focus group at NIMR who in addition stated that having the policy and guidelines with attached sanctions or penalties for offenders in place is just not sufficient to curb the problem of research misconducts,

"Enforcement of the rules and policies on misconducts as stipulated" is similarly as important.

A summary of the opinions of those interviewed and the FGD participants in this study is reflected in the positions of the following focus groups and key informants:

> "Every research institution should have a well-structured Research Ethics Committee…and adequate sanctions should be given to offenders." **[FGD with Junior female, NITR]**

> "…there should be adequate funding of research, training and re-training of researchers particularly on research ethics…enforceable sanctions for offenders…supervision and monitoring of research projects…having proper procedure for reporting research misconducts…there should also be institutional policy and procedure with guidelines for reporting research misconducts." **[FGD with Senior male, Oceanography]**

"There should be a system known to all researchers recruited in the institutions and all necessary instruments in this regard should be made available to all. Second, there should be a system in place to monitor all researches embarked upon by the research staff. The institutions should have a mentoring and evaluation body responsible for this." **[Key Informant Interview, Senior female, NIMR]**

"We have to find a way, may be under mentoring scheme the morality of this knowledge, you don't look at what you are doing in isolation especially for those of us in biomedical sciences. The ultimate definition of our work is to have an impact on life, so if you have that sense of morality it will help reduce misconduct" **[Key Informant Interview, senior male, NIPRD**

Box7: Perceived ways of controlling scientific misconducts
Creating awareness about research misconduct Guidance and mentorship of researchers Creating conducive environment that will enable effective conduct of research De-emphasise the 'publish or perish' syndrome Establishment of institutional policy and framework on research misconducts Enforcement of the rules and policies on misconducts Training and re-training of researchers on ethics of research

CHAPTER FIVE

DISCUSSION OF FINDINGS OF THE STUDY

The findings of this study showed that the researchers in all the four research institutes have a good knowledge of research misconduct as majority of them agreed and described research misconduct as any research activity that does not follow good scientific procedures and data falsification/fabrication use of or copying other people's research ideas or data without any due acknowledgement (plagiarism). Another finding of the study mentioned by the participants of the study is authorship-related disputes, particularly as it related to inclusion or exclusion of name(s) of those who did not or did make any intellectual contribution on manuscripts respectively. The descriptions based on their knowledge and perceptions of research misconduct by the focus group participants and the key informants are in agreement with previous descriptions and definitions by Lock (1994), United States (US) Office of Research Integrity (1995), Smith (2006), Tore et al (2010) and Anderson et al (2011).

The trend of the discussions showed that more experienced participants with longer years of research work knew more and could express their perception of research misconducts than the younger and less experienced ones in the various institutions. As regard the view of the focus group participants about research misconduct, they all agreed that research misconduct is bad and that it is condemnable. According to most participants culprit should be punished

accordingly because they believe that it will dent the image and integrity of researchers and their institution.

Causes of Research misconduct

View expressed by a junior female researcher in NITR attest to one of the causes of research misconduct when she said that "some of the researchers found themselves in the field of research by chance and not out of interest in research. They only took up research work as a survival instinct a means of livelihood, hence; anything goes when it comes to research". This factor was identified as a cause of research misconducts by focus group discussion participants and those interviewed. This corroborates previous findings by Burnett and Dolton (1981) Kibler (2993), Pryor et al (2007), Howley and Jeffers (2992), Donna et al (1992) Lock (1994), HJowley and Dalton (1981) that opined that environment, personality characteristics and moral commitment were related to ethics. People that take up the job of research without interest in it are prone to research misconduct. Therefore, it is pertinent for research institutes to put in place recruitment policy that will screen out candidates that are not genuinely interested in research at the point of entry. This is to ensure that the right people are employed as research staff.

Poor training on basic research methodology and ignorance are other causes of research misconduct identified by the participants; this corroborates Howley and Jeffers (1992), Donna et al (1990) and Lock (1994) that reported that limited guidance and supervision of the young scientist may be a factor in scientific misconduct. Howley and Jeffers (1992) averred that in many disciplines the novice scientist is part of a large research team and headed by senior researchers. Senior investigators may develop large research programs but may gradually cease direct involvement with studies being conducted by the team. Guidance and supervision of the young scientist may lax. Likewise, paper may be published with the senior person as author

without the senior person involvement in the manuscript such an environment may provide opportunities for scientific misconduct for the novice. A situation like this was attested to by a senior researcher in NIMR who said that the "junior ones will have their names included on papers as co-authors just to help them move up the ladder".

Greediness and over ambition is another major cause of research misconduct that was identified in the focus group discussion and interview. A senior researcher in NIPRD corroborated this thus "I think it is intellectual laziness liked with over ambition one trying to go beyond what he or she is capable of doing". This was linked to the reward system in the academic that based promotion on papers published which gave rise to the popular saying 'publish or perish'. Lock (1994) affirmed the issue of greed and status symbol as cause of research misconduct reported that the motive for fraud among family doctors in the UK and some hospital physicians in the USA is to establish status or greed (for each patient entered into a study may attract several hundred of dollars in payment).

The issue of poor funding featured prominently as one the cause of research misconduct in the focus group discussion and interview. This financial constraint caused by poor funding made it difficult for the institutes to acquire modern research equipment hence the researcher sometime resulted into the use of improvised equipment to meet research deadline, which sometime lead to distorted scientific results. The junior researchers in NITR emphasized this as a cause of research misconduct. This confirm Tore et al (2010) saying that "Scientific dishonesty" implies actions or omissions in connection with research which leads to false or distorted scientific results or gives misleading information about an individual contribution to research.

Cases of research misconduct

Most focus group discussion participants were of the view that cases of research misconduct are usually not reported to the appropriate authorities. A participant in NIPRD pointed out that research misconduct is usually not reported and thus go un-investigated and unpunished. Information about the few cases reported was gotten through some of the key informants and these informants are senior staff of the institutes that research directly into human health (NIMR and NIPRD). For instance a key informant from NIPRD confirmed that "there was a work done on a medicinal plant and published data generated from the investigation was copied and published by another researcher in another journal listing the names of the investigators of the earlier published paper as co-authors. One of the investigators (Co-author) of the former investigation reported the case". Another instance of a reported case through a key informant interview was the case of a NIMR staff designated as support staff, who was custodian to the data gathered by a researcher and he went ahead to publish papers based on the data gathered by the researcher.

The few cases reported did not follow any known reporting process according to the informants. It started as rumour until the victim summoned courage to make official report. The junior researchers appear not to know much about reported cases of research misconduct or perhaps they were afraid of the reaction of the management of their institutions if they should confirm cases of research misconduct during the focus group discussion. This gave credence to Braxton and Bayer (1994) who reasoned why people do not report scientific misconducts. First, Braxton and Bayer (1994) argued that the definition of misconduct is confusing. If people cannot decide whether a certain action is misconduct or not, they would not report it. Second, people are worried about the negative consequences of reporting on their own life.

The study also established that the research staff are not formally tutored on what research misconduct are but that their knowledge of research misconduct were derived from residual

knowledge from school, experience on the job and guessing. This means that some of the participants are not well-knowledgeable and guided on issues of research misconduct. This could have led to unconscious involvement in research malpractices. It must be noted that ignorance is not an excuse, especially among the learned and academicians. Researchers therefore need to be educated using different information, education and communication/behavioural change communication strategies to adhere to ethical, legal and professional guidelines that structure how research is conducted. They also need to be informed about the consequences that research misconduct can have; which are considerable and potentially disastrous as research misconduct can erode trust in one among colleagues, it can erode trust between researchers and funding agencies, which may make it more difficult for the same institution to receive grants and more importantly, it can cause the public to lose confidence in the ability and integrity of researchers.

Policy

The findings in this study showed that these research institutes do not have institutional policies guiding scientific misconduct hence there is no formal procedure for reporting research misconduct in any of the research institutes. Issues bothering on research misconduct are treated spontaneously since there is no policy in place to address it. Few cases that came up emanated as rumour and were handled administratively within the purview of public service rules and regulations, whereas it is important that the issue of investigations of research misconduct must satisfy the highest level of integrity and accuracy. Fairness and credibility are critical since the reputations of scientists are easily damaged and difficult to restore. Lack of institutional policy could also hinder punitive measure and penalty when research misconduct is reported and identified. The implication of such malpractices might not be known to them especially the younger researchers.

Given that it is difficult and costly to detect and report scientific misconduct as opined by Fox and Braxton (1999), hence, the best way to reduce misconduct is to prevent it in advance rather than regulating it afterwards. According to Jungmin Lee (2011), institutional policy can be another mechanism of deterrence and detection: being well aware of institutional policy prevents researchers from involving themselves in misconduct and encourages them to report research misconducts. Wells (2008) corroborated this view by reporting that scientists who read their institutional policies are more likely to make allegations.

The study also showed that two of the research institutes (NIMR and NIPRD) whose research mandates deal more with human, seems to be more concerned with the issue of research misconduct and integrity and that is probably the reason why they have Research Ethics Committee in their institutions and these Ethics committee are registered with NHREC while the other two research institutes do not have such a body. It was however revealed that these other institutions are just making efforts to set up ethics committee in their institutes.

It is evident that all the research institutes where the study was conducted had no reporting mechanism and no punitive measures are put in place to serve as deterrent to offenders. It is important to state that the need for structured reporting system and punitive measures in these institutions are very necessary. The non-existent of such structured mechanisms could perhaps be responsible for the incidences of research misconducts reported in some of the institutions. They probably have a sense of impunity because there is no restraint in this respect.

Many of the participants noted that there is no formal system or structure in place to ameliorate and if possible solve cases of research misconduct. Meanwhile, few of them pointed out the existence of machinery such as Institutional Review Boards, Monitoring and Evaluation Unit, Research Development Committee to check against the act of research misconduct.

Research institutions and their parent Federal Ministries are partners who should share responsibility for the research process. Federal Ministries have ultimate oversight authority for research, but research institutions bear the primary responsibility for prevention and detection of research misconducts and for the inquiry, investigation, and adjudication of research misconduct alleged to have been perpetrated by any of their researcher(s).

It is important that the research institutions and their parent Federal Ministries develop guidelines on fair and timely procedures for responding to allegations of research misconduct(s). Such guidelines need be designed to provide safeguards for subjects of allegations as well as for the informants.

A mechanism that may also help is through "whistle-blowing". Whistle-blowing typically is the act of notifying someone outside the normal reporting structure about a practice that is believed to violate ethical, legal or professional norms. There is however need for caution because an allegation of research misconduct is a serious matter that should only be reserved for genuine situations where evidence actually indicates that there is actually a deviation from ethical, legal or professional norms. This caution is necessary in order to guard against abuse of the system by those who may want to let a personal conflict or a professional difference of opinion drive them to file a misconduct complaint against a colleague.

Limitations of the study

The limitation of this study is that, it focuses on biomedical researchers in just four research institutes in Nigeria. The results may therefore not be representative and generalisable to all categories of biomedical researchers in the country at large. The data are based on focus group discussions and key informant interviews with selected researchers. Further studies can introduce quantitative method to gather information. Nevertheless, the limitations do not

undermine the validity of the findings of the study. The data provide important insights into issues of research misconduct and integrity among researchers working in health and allied research institutes in Nigeria.

CHAPTER SIX

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

This study has established that there are issues of research misconduct among biomedical researchers in Nigeria that need attention. Thus, the information provided here will serve as a guide to the development of interventions to address the issues starting with preventive measures to enforcement. Health research institutions should develop robust policies backed up by national policy that will ensure adequate training on research ethics and enforcement, the training programmes which should start from school should continue at work. Employed researchers should have opportunities for training and retraining on research ethics both in-house and in-service training while adequate sanction should be melted out to defaulters to discourage perpetrator of research misconduct.

It is expected that the findings from this work would contribute positively to the knowledge on research misconduct in Nigeria. Hopefully, the information herein will inform the decisions and conducts of researchers, institutional officials, funders and other stakeholders in research integrity. This achieved, this modest effort would have contributed to the growing body of literature on research misconduct globally.

Recommendations

In view of the findings of this study coupled with findings from literature reviewed the following recommendations are proffered to ameliorate cases of research misconduct in Nigeria. The approach ranges from preventive to enforcement measures and it involves the

participation of all stakeholders, the national government, individual institutions, researchers and the societies at large.

1. All research institutes in the country should have formal system or structure including institutional policies and procedures to resolve cases of research misconduct. There should be written guidelines for reporting, investigating and dealing with cases of research misconduct. Report of cases treated should be made available to the research community.

2. Research institutions should adopt standards, rules and codes of conduct covering good scientific practice e.g., experimental design, laboratory safety, etc and ethics issues e.g., rights of human subjects, handling of experimental animals etc.

3. All research staff must be thoroughly trained in research integrity principles. Incorporating instruction about responsible conduct of research in the training of researchers, and their assistants. The training should be a continuous exercise both in-house and external. Online ethics training should be made mandatory in all the research institutes for their research staff.
4. Young researchers in the various research institutes should be educated on standards of conduct in health research as they assume duty. The institution should organise forum for discussion on research misconduct at the institutional level.
5. Each institution should devise a credible and transparent system for dealing with allegations of research misconducts; publicising the results of completed investigations; streamlining and rationalising the process of hiring, promotion and grant review. In hiring and promotion, rewarding quality of work rather than quantity of publications.
6. Editors of biomedical journals in Nigeria should be adequately trained on ethics of publication. The journals must contain well defined instructions to author among which

must include evidence of ethical clearance for the study. Efforts must be made in using computer software for detecting plagiarism in publications, proposals and reports.

7. All the institutions engaged in biomedical research must have research ethics committee, scientific committee and monitoring and evaluation committee. These bodies must be well funded and adequately staff to carry out their responsibilities efficiently and effectively.
8. Awareness creation. All the participants in both the focus group discussion and key informants interview attest to the need for awareness creation about research misconduct. This could be done in various ways, through advocacy, seminars, conferences and workshops.

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