

Fraud and misconduct in clinical research: a step to improve ethical practice in research

Adhra Al-Mawali,^a John Idikula,^a Avinash Daniel Pinto^a

^aCentre of Studies and Research, Ministry of Health, Oman

Correspondence to Adhra Al-Mawali (email: adhra.almawali@gmail.com).

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Strict compliance to ethical principles in conducting clinical research is mandatory to ensure safety and well-being of study participants and legal protection of researchers. Many instances of fraud and misconduct are reported in world literature that has harmed clients and also eroded the trust that society had on bioscience researchers. In the light of a review of international experience on ethical practice in clinical research, we prepared the 'Guideline for Responsible Conduct of Clinical Studies and Trials' which covers important aspects of clinical research including protection of the rights, safety, well-being, and autonomy of study participants; role and responsibilities of the researchers, supervisors, and sponsors including pharmaceutical agencies; documentation required; reporting of research findings and related issues. Clinical researchers must acquire and apply knowledge, attitude, and skill in conducting ethically sound high-quality clinical research as prescribed in this guideline. This review and our guideline will hopefully be useful resources to all researchers worldwide.

Keywords clinical research, bioethics, guideline, bias, scientific Misconduct

Introduction

In the domain of research, deceit, fraud, forgery, piracy, plagiarism, bias, fabrication, falsification, negligence, fudging, faking, forging, deceit, misconduct, cooking and trimming, *epistemological heteronomy* or whatever name one may attribute to such inappropriate acts, are not uncommon and the same holds true in Health Research as well. Although the commonly used terms are fraud and misconduct and these are often used interchangeably, the term fraud would be defined in legal terms as a crime of knowingly cheating or deceiving another person. "Fabrication" "Falsification", and "Plagiarism" are the common classification of fraud but these terms have to be distinguished from "error" which may be unavoidable in spite of sincere effort on the part of the researcher.

Does all fraudulent clinical research, when applied in clinical practice, always endanger the safety and well-being of patients? If it did not, should it still be considered as fraud? The question is not whether it had any adverse impact on patients but whether an act of fraud was committed at any stage of proposing, performing, reviewing or reporting of research. Committing a fraud is a crime just as attempting to rob a bank is a crime, whether or not the money in the bank was actually stolen or not. Clinical practitioners rely on research evidence to update their practice. If apparent evidence is from a fraudulent research, the patient may gain no benefit from that treatment at best, and at worst, suffer ill effects and even death or disability. If a fraudulent research is proven to have caused the death or serious injury to a participant, it would constitute a criminal offence in the justice system of the country than just a civil offence and the perpetrator would be held liable accordingly. Bias, however is distinct from fraud in that bias is inherent in clinical research and every researcher is obliged to identify potential bias and avoid them or at least reduce them as much as possible. If a researcher does not take the effort to reduce avoidable bias or does not disclose the potential bias in a research, it may tantamount to misconduct but not fraud. But if a misleading or incorrect declaration is made, for example, stating that study participants were randomly selected when actually it was not, that would amount to falsification which should be considered as a fraudulent act.

Good Clinical Research Practice (GCP) provides a "framework for the scientific and ethical integrity of research on human participants for generating valid observations and documentations."¹ It serves the interest of both those "actively involved in conducting clinical research, and the rights, safety and well-being of participants, which are compliant with the principles stated in the Declaration of Helsinki, and other international ethical guidelines."¹ For a developing country where innovative clinical research is still in its infancy, it would be reliant on international standards and guidelines. Hence, it is important that a clear set of locally specific guideline should be laid out which is clear, concise, and easily accessible for review by researchers and yet compliant on all matters of ethics and etiquette including maintaining the autonomy and sanctity of the individual study participant. The objective of this paper is to present an overview of fraud and misconduct as they have happened in clinical research internationally, to draw attention to that malady, which should be appreciated by all researchers and to point to the step that we have taken in the Ministry of Health in bringing out our guideline for the responsible conduct of clinical studies and trials. "Two cardinal rules of biomedical research are that scientists pursue absolute truthfulness and objectivity and that they report only honest data."² But these ethical rules are often forfeited for various reasons. Monetary consideration including job opportunities, desire for personal fame, professional, academic, and scientific ambition are the common reasons for committing fraud in research.³ In the scientific community, the concept of "publish or perish" has only made the situation worse,⁴ and this is equally evident in clinical research.

"Are such events just the tip of the iceberg?" "Are they on the increase?" "Why do such errant practices happen?" "And what role should the biomedical establishment, including the editors of medical journals and of information retrieval systems, have in this?"² "What are the consequences of misconduct in research?" "How can research misconduct be curtailed?" These are the questions that not only the scientific community but also even the society wants to know.

There was a time when most societies respected health professionals as inerrant, dependable, and honest but that honorable reputation is withering because of bad publicity generated by news of unbecoming practices, although by a few “bad apples” in the professional basket.

International experience related to erosion of ethical and moral standards in research

In order to appreciate and understand the nature and magnitude of the problem, the questions posed above can be further explored.

Misconduct in research is just the tip of the iceberg

In a North American study on doctoral and post-doctoral students, 36% were aware of misconduct while a surprising 15% would consider committing fraud to obtain a research grant or get a paper published.³

A meta-analysis published in 2009 revealed that at least 2% of scientists admitted to having committed some form of scientific fraud at least once⁵ but as many as 72% were aware of their colleagues of having committed some questionable malpractice. In a nonsystematic survey of 80 professors of medical institutions in the UK, over 50% of the responders were aware of some instance of medical misconduct.⁶ In another study, as many as 18% even admitted that they may do possible misconduct in the future⁷—a worrying finding indeed.

From all the available evidence in such published studies, one has to conclude that fraud and misconduct in research are not a relatively minor and isolated practice but is quite widespread.³ What is even more surprising is that even the intension to commit fraud to achieve personal gain is rampant.

Fraud and misconduct in research are on the increase worldwide

Accurately estimating the number of cases of fraud can be difficult but once investigation of a case starts, it could have multiple ramifications as more such instances of malpractice may get uncovered as seen in the investigation of Dr. Darsee, at Harvard Medical School in 1981.² Between the years 2000 and 2010, 742 English language research papers were retracted from the PubMed database and of these, nearly 27% were retracted for fraud.⁸ The number of papers retracted per year have increased sharply and so has the retractions of published papers for fraud.⁸ This is not only due to improved detection rate by using sophisticated software programs and physical monitoring but an actual increase in the absolute number.⁵

How much and why would people who are generally held in high esteem by the society, stoop so low just to have a few more publications or add some glory to their name? When will it stop or will it? The answer we hope is not just blowing in the wind!

Role of the biomedical establishment on fraud in research

Many North American and European countries have Governmental agencies that are empowered to regulate, investigate, moderate, litigate, and convict persons committing scientific fraud, while most other countries rely on this role to be played by the universities, sponsors or professional institutions.⁹ Sadly, many countries do not have legislations that are specific to manage fraud in clinical research.⁹

Even though prescribed standards are not available, every institution and organization that facilitates research should have a research and ethics committee that not only prescribes the required standards of research but ensure compliance to it in all phases of the research.⁹ Unfortunately, most of these boards or committees do not have the mandate to investigate and suitably reprimand offenders.

Although there are guidelines on authorship,¹⁰ they are not strictly followed or enforced. Although most journals require all authors to acknowledge their contribution to the paper by submitting a signed document, their actual contribution or their role in the paper to justify the order in the listing of authors are often not ascertained by the publishers.

It is the responsibility of journal editors and their referees to be constantly aware of the possibility of bias and fraud and to take all possible steps to prevent publication of papers suspected of these offences.¹¹ When an incident of misconduct is discovered in a manuscript, editors have the responsibility to avoid publishing it.¹² But there is a limit to how much the editor of a journal or the reviewers can pick up as fraud. In response to the increasing incidence of fraud in research and the consequent demand on the publishers to be more vigilant, a small group of journal editors in the UK joined forces to establish the Committee on Publication Ethics (COPE) in 1997.¹³ Its membership is open to journal editors and others interested in publication ethics and now has a worldwide membership of over 10,000.¹³ COPE provides advice on publication ethics and the management of research and publication misconduct.¹³ Although COPE provides a forum for members to discuss individual cases of misconduct, it does not get involved in the actual investigation of such cases but encourages editors to ensure that suspected cases are investigated by the local authorities.¹³ A consensus statement on research misconduct in the UK was also put out by BMJ/COPE.¹⁴

Adverse consequences of misconduct in research

Many patients may be put to risk in fraudulent studies. In a 10-year period from 2000 to 2010, 9189 patients are known to have been treated in the 180 primary studies that were eventually retracted and 70,501 were treated in 851 secondary studies, which cited one of the retracted paper.¹⁵ This clearly indicates the magnitude of the problem; including receiving no therapeutic benefit or even an undue risk the patients may be put to if they are subjected to the recommendation of such fraudulent studies.

Historically, several surgical, medical, or other therapeutic interventions that were promoted by well-meaning researchers did not stand the test of time because of improper or flawed research design and poorly reviewed publications. Superficial Temporal Artery to Middle Cerebral Artery (EC-IC) anastomosis for cerebral ischemic symptoms and stroke prevention which was popularized in the 1960s and 1970s is one such example.^{16,17} When Vitamin E was commercially introduced into the market in the 1980s, drug companies began to promote it as the treatment for many chronic or nonspecific clinical conditions based on low-quality or biased studies¹⁸. Later, the therapeutic benefit for most of it was disproved.¹⁹⁻²² Although the participants in these studies may not have been harmed by taking Vitamin E, they would obviously have been denied the benefit of a better therapeutic intervention for their clinical condition for which they were enrolled in this study.

History is replete with many such examples: Gastric cooling for peptic ulcer, mental transposition for intractable lower limb edema, tonsillectomy for children with recurrent tonsillitis, antibiotics for childhood diarrhea are just a few such examples, none of which have withstood the test of time or rigorous scientific scrutiny.

There is equally a danger that beneficial interventions from the good quality research could be delayed or even gone unrecognized due to researcher bias or even publication bias

Curtailling research misconduct

Fraud in any form in any research is condemnable. It is important that individuals who are proven guilty should be suitably reprimanded which may require them to resign from the institution where the fraud took place, reimburse grants already issued and forfeit future research awards.²

Should health professionals who commit fraud in research be allowed to practice their profession without review by licensing officials? Although severity of punishment may serve as a deterrent to commit fraud, there is always a possibility that fraudsters will come up with more ingenious ways to avoid getting caught rather than improve their ways.

Plagiarism detecting software and other programs that can evaluate data using algorithms to suspect fraudulent data are helpful to suspect some frauds. "Central statistical monitoring" using statistical programs are becoming more efficient especially for evaluating data in multicenter studies for fraud or bias.²³ It is generally accepted that plagiarism and duplicate publication are among the most common research misconduct and the most pervasive in all areas of academic activities.¹² Whistle-blowing by colleagues involved in the same or similar research or in the same facility is a reliable and credible way to initiate an enquiry about the originality and truthfulness of a research. Of course, the integrity, honesty and sincerity of the whistle-blower also matters in this regard.

Every research facility has to have a clear set of guidelines on research ethics and etiquette. They may use a standard international or national guideline, which can be suitably adapted to its loco-regional specifics. Many countries have clearly defined national level regulations like the Federal Register in the USA that is updated regularly.²⁴ List of Individuals convicted of fraud and the action taken on them are even publicized which could act as a deterrent.²⁵ The Declaration of Helsinki, which was drafted in response to the atrocities committed on victims in the name of medical research that came to light after the Second World War and the Belmont Report are among the original guidelines of the 20th Century. Strict adherence to these principles must be ensured by the respective institutions and research supervisors.

Researchers should practice research ethics for their intrinsic goodness and also as an example to others and they should also have the courage to courteously report any suspected misconduct to the appropriate authority.²⁶ Whistle-blowers who raise any questions in good faith should not be penalized in any way.

Teaching research ethics to bioscience students in high schools and universities have not received the high priority it should have. Increasing incidence of reported misconduct reinforces the need for research students to be exposed to and be trained in the professional ethical standards of their specific discipline.²⁷ It should also include senior scientists and faculty members. Continuing education in research ethics should be

made compulsory and an integral part of the professional requisite of the practicing bio-scientist.²⁸ It is reasonable to recommend that accreditation of biomedical institutions should include verification of strict adherence to bioethical practices including periodic training in ethics of its personnel. So also, biomedical researchers should have sufficient knowledge, attitude, and skills in applying concepts of bioethics in their professional practice to obtain professional licensing and periodic renewal of such license to conduct clinical research.

In a publication titled "repairing research integrity" from the Office of Research Integrity in the USA, Titus et al. have suggested a list of strategies to improve research integrity.²⁹ These are: adopt zero tolerance to suspected misconduct, protect and encourage whistle-blowers, have clearly defined fraud reporting process, training of mentors and supervisors to monitor research more effectively, improve auditing process of research, and encourage, promote and role model ethical behavior among researchers.²⁹

Health Research and Research Ethics in Developing Countries

Although there have been rapid advances in health care services and health delivery in most developing countries, health research was not a high priority endeavor till about the 1970s or 1980s. Before this, there was significant reliance on clinical research and innovation taking place in advanced countries. Since then, in most developing countries the quantity and quality of research have increased although it is still not at par with many developed countries. Attempts to catch up on innovation and research will undoubtedly create a competitive environment in which inadvertent compromise on research ethics and etiquette may take place. That makes it all the more imperative that young researchers become well-grounded on concepts of research ethics

The Centre of Studies & Research (CSR) in the Directorate General of Planning and Studies of the Ministry of Health (MoH) in Oman has the responsibility of co-ordinating, facilitating, monitoring, training, supervising, and encouraging research in the MoH.³⁰ The CSR has developed a website and one of its main activities is to register and process all research proposals arising in the MoH, which are then put up for approval by the Research and Ethical Review & Approval Committee (RERAC), the equivalent of the Institutional Review Board (IRB). The Guidelines for Responsible Conduct of Clinical Studies and Trials is available online at the website of CSR (<http://mohcsr.gov.om>) so that researchers have an opportunity to go over it and incorporate necessary ethical requisites in their research. This guideline provides concepts of ethics and etiquette necessary for conducting clinical research.³¹ The Ministry of Health in Oman has mandated that all research conducted in Ministry of Health facilities must strictly adhere to the Guidelines set out here and no research proposal can be approved if they do not meet all applicable criteria specified in it. This is the first of such guidelines originating among the Gulf Co-operation Countries (GCC) and has been considered as a model for preparing a standard guideline for GCC and probably even the Middle East.

This Guideline is adapted from well-documented and published information on the subject from reputed agencies. Among them are: (1) "The current revision of the Declaration of Helsinki"³² which is the accepted basis for clinical trial

ethics, and must be fully followed and respected by all parties involved in the conduct of such trials, (2) "The Belmont Report: Ethical Principles and Guidelines for the Protection of Human subjects of research by the National Commission for the Protection of Human Subjects of Biomedical and Behavioral research,"³³ (3) "Ethics of clinical research: An Islamic perspective,"³⁴ (4) Publications related to ethics by the World Health Organization (WHO) like the handbook for GCP¹, and (5) Several other Guidelines from countries known to have advanced and innovative research capacity are also used.

Guidelines for Responsible Conduct of Clinical Studies and Trials

We share here some of the ethical concepts brought out in our guideline in a sequential order through which the progression of a clinical research takes place. At every stage in conducting a research, there are issues pertaining to ethics and etiquette that becomes relevant. The researcher needs to be fully aware of these to appreciate and apply these concepts at every stage.³¹ The relevance of many of these concepts can be easily appreciated in the light of the examples and situations mentioned earlier.

Identifying a Clinical Problem

Becoming aware of a clinical problem or observing an unexpected or unusual event in clinical practice is what should initiate an enquiry to develop a greater understanding of the clinical event or situation.³¹ "Whether such an observation was an adverse event or a favorable event, it should not be ignored but further investigated through appropriate enquiry or research."³¹ Not acting on it is like walking away without doing anything from the scene of a road traffic accident which would be morally, socially and ethically inappropriate.

Information Retrieval and Critical Appraisal

"Prior to conducting clinical research, the researcher is obliged to carry out an exhaustive search to identify and critically evaluate all available and accessible information on the topic to be researched. If a critical review of available literature on the topic or situation clarifies the answer to the problem, there is no further need to address that issue unless there are some lacunae in the understanding of the problem or some new information has since become available that warrants a review of the problem. It would be unethical to spend time, effort and resources to repeat research that has already been done for the sake of doing a research."³¹

The researcher must review all available literature on the topic and not just the ones that he agrees with. A biased literature search has often led to biased conclusion, which is detrimental to the progress of science.³¹ It is also the responsibility of the researcher to critique the publications and to take up those that have a high quality as well to avoid inherent flaws in earlier studies.

Framing an Answerable Research Question

"In order to conduct research, a potentially answerable question has to be framed. Answers that are sought should attempt to resolve the identified clinical problem or provide more knowledge and information on it."³¹

Formulating a Research Hypothesis

Every clinical research is intrinsically testing a hypothesis, whether such hypothesis is overtly stated or inherently implicit. Every scientific hypothesis should be testable and preferably, even refutable but should not contain any moral, spiritual or other unprovable or emotively sensitive component.³¹

Utilizing an Appropriate Study Design

"Every researcher must employ the best possible research design to answer the identified research problem as there are many instances where inferior study design has provided the wrong answer."³¹ "Historically, there are many instances of useless or even harmful treatment that has been promoted and propagated by well-meaning clinicians on patients because published research that recommended such treatment was the result of poor study design."³¹ Hence, every researcher is ethically obliged to employ the most appropriate study design so that the findings of the research can provide the basis for evidence-based practice.³¹

Informed Consent

Obtaining a properly informed consent from each of the study participants (or participant's legal representative) is of critical importance in all clinical studies. The researcher should comply with the local rules and guidelines in addition to ensuring that all aspects of Good Clinical Research Practice are adhered to.¹ Except under special circumstances, consent should be taken in writing and preferably in the presence of a neutral witness. All rights, duties, and privileges of the participants, as well as that of the researchers, should be clearly explained. Consent should be freely given without fear or favor, including the right to withdraw from the study at any time without discrimination, forfeit of any rights or privileges, or bear any penalty. Participant's rights and privileges must be honored including the right to privacy, confidentiality, and anonymity. Also, the participant's willingness to consent must not forfeit the right to seeking any future legal recourse.

Observational Studies

It is a common malady in observational studies that a lot of data is collected from the participants. One should avoid collecting data that are not directly relevant to the study or as part of the hypothesis being tested. The common excuse is that some interesting associations may emerge. Such "fishing expeditions" should be avoided.³¹

Interventional Studies

All interventional studies are fraught with serious ethical issues. The researcher is directed to thoroughly consider all aspects of such experimental clinical studies to ensure that no ethical issues are overlooked.³¹ "The ethical concepts of beneficence, nonmaleficence, justice, and equity are most applicable in this situation and of equal importance ethically is the control group, especially on matters of the use of placebo."³¹ In a surgical trial, can a placebo surgery ever be justified? Even in the use of a placebo surgery, ethical analysis and guidelines are available.³⁵ The system and process of reporting adverse events including management of participants who have any adverse event should be specified in the study protocol. Also, clinical management such as management of any associated

conditions should be clearly specified. The indications for breaking an allocation code to clinically manage a study participant or to perform an interim analysis have to be specified in the protocol. These safety measures are critical to ensure safety of the participants in the trial and also to avoid potential legal implications. Patient safety and well-being are of paramount concern and must not be sacrificed for any gains in the study. The researcher must be thorough with local rules and regulations and also international guidelines on ethics.

Selecting the Study Population

The choice of the study population depends on the prevalence, nature, and manifestation of the clinical problem; and based on the nature of the study and the level of existing knowledge, the study population would vary.³¹ It is well documented historically that vulnerable population groups have been sometimes subjected to therapeutic trials in an unethical manner. Such instances, although much less likely because of strict control and monitoring, could still happen even in developed countries.³⁶ There is incriminating evidence that, loopholes in the rules and regulations of some developing countries have been exploited to run therapeutic trials in populations of those countries while the same research would not have been possible in developed countries.³⁷⁻³⁹ Such practice is certainly unethical and researchers should be aware of such situations and avoid them.⁴⁰

Proper Sampling

Most clinical studies deal with a sample drawn from the population and hence it is important to make a proper choice of the study sample such that it truly represents the study population, failing which the outcome of the study cannot be generalized to the reference population.³¹ Many published articles do not clearly mention the sampling process. There are also many instances of wrongly reporting the sampling process (such as stating that the sample was random when in fact, it was not truly so) which are well known and such declarations amount to fraud in research and not just a breach of research ethics.³¹ Incorrect sampling technique is a common malady and it leads to selection bias which affects the external validity of the study.

Maintaining and Following up After Intervention

“Inadequate follow-up after intervention, use of an unproven or inappropriate “proxy” outcome measure, incomplete follow-up, loss to follow-up, etc. are common problems that happen in longitudinal and interventional studies.”³⁰ Truthfully documenting all such problems and analyzing and interpreting them appropriately are important requirements in every study. Methods such as “intention to treat analysis” “per protocol” or any other should be clearly indicated. Eliminating inconvenient results and pretending they never existed is a fraud—whether or not such an action had an influence on the interpretation of the study.

Avoiding/Reducing Bias

“Bias is defined as a systematic deviation from truth and hence, the researcher must take every effort to avoid or at least reduce all potential bias in the study.”³¹ “Bias may occur at various stages in the study process from selective review of literature all the way to interpretation of results.”³⁰ Selection bias, intervention bias, confounding bias, recall bias, measurement bias, etc. are among the most common in clinical studies.

Analyzing and Managing Data

Ensuring integrity of data from its collection all the way through to data maintenance, analysis, and interpretation are important in making the correct conclusion in any study while any form of fabrication and falsification of research results are serious forms of misconduct.³¹ So also are failing to report data that contradicts conclusions or excluding information without justification. All raw and analyzed data should be preserved for a period of at least 3 years after publication for any verification if required.³¹ It is also important to know that the ownership of the data lies with the organization or the institution in which the research was conducted and not with the research team.

Powerful statistical software that are available enable researchers to manage, analyze, and interpret research data with relative ease.³¹ However, appropriate use of statistical tests is important to make reasonable and justifiable conclusions. Data “dredging,” data “tweaking,” data “trimming,” data “torturing” and such manipulations on the data are often resorted to by researchers to “prove a point.” Such manipulation on the data, as long as it is not “falsified” or “fabricated,” may not amount to fraud, but still is an act of misconduct.

Conclusion and Interpretation of a clinical trial

“The conclusion section of the research presentation should confine to what has been achieved by the study and not extrapolate it to what could be achieved by making unproven recommendations or state speculative opinions that are not substantiated by the study results.”³¹ The stated conclusion in many research publications often exceeds the research objectives or the interpretation of the actual results obtained. Such inflated claims may mislead the eventual user, the clinician, to overestimate the applicability of the study outcome in routine clinical practice.³¹

Research Output

It is an ethical obligation for a researcher to publish research results in a timely manner through an appropriate forum to the scientific community. The researcher must disclose sufficient information to replicate such studies by other researchers. It is ethically and socially wrong to leak research findings to the public through any medium before it has been peer-reviewed and published in a scientific journal. All persons who contributed to the study should be duly credited as authors if there is scientific contribution or acknowledged if contribution is nonscientific or nonprofessional. The role and responsibility of each of the researchers and the order of listing the authors in the forthcoming publication should be decided at the planning stage of the study.

Our Guideline titled Guidelines for Responsible Conduct of Clinical Studies and Trials³¹ gives more details on issues pertaining to Informed Consent of Trial Participants including special reference to vulnerable groups, Privacy and Confidentiality, Plagiarism, Misuse of Privileged Information, Data Management, Authorship, Publication Issues like Self Citation, Duplicate Publication, Early Release of Information, Reporting of Suspected Misconduct, Obligation to report, Conflict of Interest, Qualification and practice privilege, Medical Care of Trial Participants, Record Keeping, Safety Reporting including notification of adverse events, Premature Termination or Suspension of Trial, Role and responsibility of Sponsor, International collaborative research and several such related issues, all of which can have ethical overtones.³¹

All potential researchers are encouraged to read these guidelines and most of all, practice ethical principles in all facets of clinical research, for the good of all and the glory of clinical research.⁴⁰

Conclusion

The scientific community all over the world has to accept the reality that various academic, professional, and personal pressures have led to compromises on applying ethical principles and hence led to increasing fraud and misconduct in clinical research. A review of the literature indicates that the situation is only getting worse. Unfortunately, such incidents of professional or research misconduct get bad publicity in the social media and that further erodes the trust and respect that the clinical professionals and researchers expect from the society. Hence, a good system of imparting knowledge in all aspects of ethics and etiquette in clinical research and ensuring its diligent practice by all researchers is important,

particularly among young researchers in developing countries. This does not imply that senior researchers and faculty are above board. In fact, they should not only continue to be updated themselves but even be competent to teach, supervise, and guide their apprentices on bioethics as well as explicitly practice the same in their own practice of research. The Guidelines for Responsible Conduct of Clinical Studies and Trials is available online at the CSR website and is designed to be a reference for researchers. It gives details on various aspects related to research ethics and etiquette that needs to be applied by every researcher at every stage in the planning and conduct of clinical research. It is hoped that this guideline will help researchers to conduct their research with full consideration to ethical issues and avoid any form of research misconduct.

Conflict of Interest Disclosure

The authors declare no competing or conflict of interest. ■

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