Chapter

Medical Ethics

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> *"Without ethics, everything happens as if we were all five billion passengers on big machinery that nobody handles, and its going faster and faster but we don't know where".*
>
> *'Jacques Cousteau'*

Abstract

Medical ethics is very important at this time of medicine due to the covid-19 pandemic which has caused a lot of mortality and morbidity world wide. Medical is important in guiding clinicians and other healthcare workers not to cause harm while caring out their duties. There are various aspects of medical ethics such as negligence, do not cause harm, beneficent and others. Not practicing medical ethics has caused some physicians to face litigation by their patients and clients and also face medical disciplinary boards. Some have even been suspended from medical practice for a number of months or years or even have their names struck off from the register of the licensing board of their country.

Keywords: medicine, ethics, litigation

1. Introduction

Every profession has guidelines, rules and regulations guiding its practice, this is what ethics is all about. It has to do with the professional conduct of the practice of medicine including conducting research for the advancement of medicine and the making of new discoveries. One of the necessary aspects of human life is health [1] and it is the duty clinicians to care for the health needs of the populace [2]. Medical ethics has been from time immemorial. In medical education, medical ethics is taught at both the undergraduate and postgraduate levels to equip a new graduate in the dental and medical profession. Clinicians' face various challenges in the course of their work some of which may have ethical issues, worst are when there is poor clinical state and death is anticipated [3]. Decision making on patients care is a critical responsibility of every physician practicing medicine [4]. Physicians who err in their practice may be tried by the medical council. Each national medical council has guidelines for erring doctors who derail in their practice of medicine. Medical councils have a panel of enquiry and disciplinary boards for doctors who do not practice medicine without the application of the medical ethics. Various disciplinary measures include apology to the patient, suspension from practice for a period of time, or the extreme of which is the permanent seizure of the medical practicing license and striking off the doctors' name from the medical practicing register. Due to the importance of ethics the World Health Organization in 2002 established an ethics team known as the global health ethics unit, a unit dedicated to ethics [5].

Through this ethics team, the World Health Organization works in close collaboration with the United Nations interagency committee, non-governmental organizations and other international organizations [5].

2. Overview of ethics

Ethics is a concept in the field of philosophy. The word ethics is derived from the Greek word 'Ethnos' which means character, customs and habits. It is closely linked to the word 'moral' which is derived from the Latin word 'Mos' (mores) but they are different. Both ethics and morals generally mean the customs and socially accepted norms. Ethics is a branch of philosophy and includes the values, guidelines, rules and regulations and the justification for these values, and guidelines [6, 7]. Hence ethics is required in our daily lives in making choices from various available options and alternatives [8]. Ethics guides various professions in carrying out their duties while morals have to do with the way of life. Ethics is concerned in the concept of right and wrong. This was first conceptualized and structured by many Greek scholars and established by Aristotle by the third century BC. Various factors have affected the concept hence it has evolved over many centuries. It is the systematical philosophical study of morality. Ethics guides human beings where they are as it is the set of principles and values governing a group or even an individual. It also extends to the consequences of wrong misdoings. The application of values and moral to human activities also constitute ethics [9]. The conduct of right and wrong are both related to ethics and morals. The principles developed by an individual regarding what is perceived as right or wrong are morals. Morality can sometimes transform to cultural and regional norms while ethics is not affected by societal, cultural or religious norms. The standard of conduct which guides and governs an occupation or profession is knowns as professional ethics. Ethics is connected to the code of conduct, it guides how employees and employers to conduct themselves at the workplace. The understanding of moral values is related to ethics hence the relationship between ethics and morals [10]. Ethics is widespread in all areas of life as decision making is a part of life [11].

3. Overview of medical ethics

Medical ethics is a type of professional ethics. In modern medicine, ethics is believed to have started in the 18th century; a physician by name Thomas Percival authored a book on medical ethics which is believed to be the beginning and development of medical ethics code of conduct [7, 12, 13]. It is Dr. Thomas Percival who coined the term medical ethics after publishing his book in 1803. Medical ethics is the conduct required from any medical practitioner, it is necessary for the physician as it acts as a guide in making clinical decisions [14]. Medical ethics is the ethical, morals and values aspect that guides the medical profession and its allies and it consists of interdisciplinary knowledge [15, 16]. It guides decision making, medical practice, medical education and research in medicine [10, 12, 17]. There have been ethical guidelines which must be followed by healthcare workers in the history of the medical profession [6]. In 1949, the international code of medical ethics has been adopted by the World Medical Association in London [17]. Every national medical board has a code of conduct to guides the practice of medicine in that country. For instance, in Nigeria, medical ethics is governed by the Medical and Dental Council of Nigeria (MDCN) which published a booklet titled 'A Code of Conduct' which is handed over to every new medical and dental graduate at the

time of induction into the medical and dental profession. Medical ethics is a type of applied ethics. The basis of the medical ethics is centred on the Hippocratic Oath [7] which is an oath is taken by every dental and medical graduate at the time of been inducted into the medical and dental profession. They are set of rules, regulations and guidelines that guides and governs physicians in carrying out their duties [18]. Medical ethics focuses on the relationship that exists between the doctor and their patient, which includes the legal and ethical implications. Hospitals also ensure that their employees practice medical ethics to prevent litigations which can cause loss of resources to the health facilities. Medical ethics guides decision making of medical practitioners as patient centred care is based on medical ethics. It is expected that medical practitioners are well equipped with medical skills and knowledge and also they are familiar with the medical ethics and its legal implications [9]. Medical ethics is a branch of applied ethics and bioethics. Medical ethics promotes the respect of patient and confidentiality. Medical ethics is important in the practice of medicine [10] therefore it is taught in most medical and dental schools both at the undergraduate and postgraduate levels. It is applied in all clinical settings as well as the medical workplace and in research; it encompasses other disciplines such as history, philosophy, theology, anthropology and sociology [18]. The different categories of professionals involved in providing healthcare practice medical ethics [19]. Therefore for a better understanding of the concept training in medical ethics should be incorporated into undergraduate and postgraduate education curriculum [10, 15, 20]. It is the duty of every physician to practice medical ethics in every consultation with the patient.

4. Importance of medical ethics

Medical ethics is important both in medical practice which involves the patient doctor relationship and in medical research.

Some of the roles of medical ethics are:

1. It provides standards in the professional relationship between the physician and their clients or patient hence provides guidelines in the prevention of litigation [17, 21, 22].

2. The social capital in the professional relationship is established with members of the community [21].

3. Medical ethics is implemented in decision making by both the physician and the patient [23].

4. Medical ethics provides moral values necessary in providing solutions to ethical dilemma [23].

5. It provides privacy, confidentiality and truthfulness in the doctor-patient relationship [19].

6. Medical ethics promotes health, wellbeing, respect decision making, dignity, justice and accountability in the medical profession [17, 19].

7. Medical ethics helps in promoting good and quality medical care by identifying, analyzing and attempting to resolve the ethical problems that arise in medical practice [10, 17, 24].

8. Medical ethics promotes diligence and proper training skills among healthcare professionals [7].

9. Medical ethics helps in the prevention of unethical practices such as negligence and malpractice.

5. Ethical dilemma

Controversies and conflict sometimes occur in the practice of medicine especially in the decision making process. Sometimes, these conflict occurs in the shared decision making as conflicts arise when the doctors and patient decisions contravenes medical ethical principles. Generally everyday there are ethical dilemma occurs daily in the practice of medicine [14, 25, 26]. Ethical dilemma has been described by the World Health Organization as a dilemma between different values which are seen as necessary particularly in cases and circumstances in conflict with each other [10]. It occurs when all the possible remedy for a clinical care will lead to moral violation [8, 23]. Sometimes, there are no answers to ethical dilemmas [27]. These ethical dilemmas arise when there are options for the decisions which may be compelling reasons and actions [19]. Ethical dilemma consists of a type of ethical problem. From several researchers, there is a relationship between ethical dilemma and ethical principles [28]. No ethical principle can explain adequately ethical dilemma [2]. There is a connection between facts, values and morals conflict, some of the problems associated with ethical dilemma have been there for centuries with medical ethics [29]. Ethical dilemma is a product of conflict arising from ethical principles and options [30, 31]. When ethical dilemma occurs, it can be resolved using individualistic approach as there are no general principles in tackling it [17, 23]. Ethical dilemma is not limited to medical practice only as it also occurs in medical research [14]. The establishment of a comprehensive ethical framework and legal framework will guide medical health care workers in resolving ethical dilemma.

Ethical dilemma can be found in telemedicine, artificial intelligence, COVID-19 testing, management of near end of life care, medical error, priority testing, biotechnology, medical ethics education, e-health and bioethics [10]. Some of the factors and barriers to ethical dilemmas are connected to medical facts, individual characteristics and unclassified factors [31].

Medical Factors: Some of the medical factors associated with ethical dilemmas are the patient's history, diagnostic results, risks, complications and previous intervention associated with the illness the patient is suffering from.

6. Individual characteristics

There are some characteristics that are peculiar to everyone that can lead to ethical dilemma. These factors affect the decision process of the patient. These include values, culture, religion, relationships and previous experiences [31]. The belief system affects medical care.

7. Unclassified factors

There are some factors not associated with individual characteristics and medical affects that affect decision making process. These include the logistics facility,

competing interests and Interprofessional perspectives [31]. In some countries, there have been Interprofessional rivalry between the different categories of health care workers and the clients and patients are the ones who suffer when such occur.

8. Some ethical dilemmas

Healthcare professionals regularly encounter ethical dilemmas while carrying out their duties [3, 17, 27]. Some situations in which ethical dilemma can occur are discussed below:

1. **Near End of Life**: End of life is a topic and phenomenon that has been debated for several decades. There is the ethical dilemma if end of life care should be provided or should such patients be abandoned? Is end of life care a waste of resources? Especially in low resource counties where health insurance is not available. Near end of life care is expensive as it may involve artificial nutrition hydration, telling the patient's care givers the truth and disagreement that may arise in the course of management. Such disagreements may include continuation of artificial ventilation or administration of oxygen, care in the intensive care unit. Moral distress sometimes is experienced by the physician, patient and their caregivers when there are unexpected clinical developments as death approaches [3].

2. **Telemedicine:** Telemedicine means "healing from a distance" and it is very beneficial [32]. Telemedicine is becoming popular due to the need for social and physical distancing especially in this time of the COVID-19 pandemic. During telemedicine proper history taking may not be gotten and a comprehensive physical examination may not be done. Physical examination is important in every medical consultant. Ethical dilemma occurs in telemedicine due to the conflict in productivity and patient confidentiality which cannot be obtained. Privacy cannot be attained in the patient-doctor relationship while using telemedicine [30]. This is worst if artificial intelligence is also used. During consultation using telemedicine, it must be done in a secure and safe way so that medical electronic information is not leaked out. Therefore passwords security should be maintained always [32].

3. **Coronavirus-2019 (COVID-19) Testing**: The ethical considerations in the management of epidemics are different [16]. This is not different for the Covid-19 pandemic as several ethical principles are affected by the pandemic. This includes autonomy, truthfulness, confidentiality and justice. In the Covid-19 pandemic, testing is done without consent of the patient. This is also to help in the control and to protect others. Also the ethical principle of autonomy is not respected during contact racing [33]. Confidentiality is not maintained in the Covid-19 testing in order to protect the public. This is why it is required before air travel especially international travel and also admission and entry into certain public places such as schools and camps. There is the ethical dilemma in the allocation of the scare resources and medical supplies, therefore question to be answered are who need what? Hence the ethical principle of justice has to be practiced. The physician decides which patient may likely die or lives, which patient should be connected to the ventilator, which is in short supply worldwide. Allocation of these scares medical resources must be done fairly and with justice [16, 34]. This has created a high ethical dilemma which intensivists have to deal with [35]. Rationing of medical equipment is a great dilemma ravaging

the world due to the covid019 pandemic [34]. Also coupled with the increase patient load in intensive care units [35]. In other to protect the public, there is the ethical dilemma when a patient with the signs and symptoms of the Severe Acute Respiratory Syndrome-2 refuses to get tested.

4. **Medical Error**: Errors can occur in any profession but it can lead to fatalities in some sectors. Some of such sectors are the aviation, architecture and medicine as any mistake can lead to disability and even death. Not all medical errors can lead to disability and death but it may increase hospital stay and loss of work days. This is a serious issue especially as there are increase cases of litigation. There is the ethical dilemma of weather the patient or client should be informed about medical errors when they occur.

Ethical dilemma is also encountered when dealing with "Do Not Resuscitate Order".

9. Ethical dilemma: case report

A 72 years old woman was brought to the emergency room in a developing country by her children with complaints of unconsciousness and difficulty in breathing of 24 hours duration. She is a known hypertensive not compliant with her medications. On examination, she was not pale, unconscious with a Glasgow Coma Scale of verbal response – 1, eye opening – 1, and motor response – 1 with a total of 3/15. She was not cyanosed, in respiratory distress evidenced by flaring alae nasi and subcostal and intercostal recession. Oxygen saturation was 76%, she was gasping for breathing, auscultation of the chest yielded vesicular breath sounds. Respiratory rate was 60 cycles per minute and pulse rate was 100 beats over minute, regular and full volume. Blood pressure was 150/100 mmhg. A diagnosis of cerebrovascular accident was made. She was placed on oxygen, 20% mannitol and normal saline. After admission, the patient was not improving and the patient's caregiver was paying out of pocket for the management of the patient. After twenty four hours of hospital admission, the patient's daughter requested that the patient was in a bad clinical state therefore she wants the oxygen to be discontinued, that she (the daughter) feels that the mother may not survive the illness. She was counseled on her mother's condition but she still insisted that the oxygen should be discontinued. After much argument, she was asked to write an undertaken that she is the one requesting for the discontinuation of oxygen therapy. At this point she refused to put it down in writing and started crying. The oxygen was never discontinued.

10. Discussion of the case report

This is a case of ethical dilemma on end of life care and care of a patient unable to make decisions. When patients are unable to make decisions for themselves such decisions are made by a legal caregiver who may be patient, child, guardian or legal representative. In some developing countries like Nigeria where the extended family system is practiced and the people live a communal life, the caregiver may be any relative or even a neighbor; the group of people who cannot make decisions for themselves are the unconscious patient, children and minors and the mentally impaired. Some of the decisions made by a caregiver may not always be in the best interest of the patient. For instance in this case, the patient is unconscious and the caregiver is her daughter. Even though the patient was in bad clinical state, oxygen

therapy was necessary for her management hence the dilemma of whether or not to discontinue the intranasal oxygen. There is conflict between the ethical principles of autonomy and maleficence. This can lead to litigation against the attending physician. If the physician decides to obey the wish of the caregiver, even though she takes an undertaken, the conflict of maleficence in which a doctor is required not to do harm may arise. The physician will have no justification to discontinue the administration of oxygen if taken to a court of law as he or she has received medical training.

11. Institutional review boards

In the practice of medicine, research is an important and essential tool [36–38]. Institutional review boards are ethical committees in institutions that analyze and review proposed research protocols, it serves as a deliberation forum in which ethical issues in medical researchers are analyzed (WHO). Some institutions have more than one institutional review board [39]. Institutional review board plays an important role in medical practice. Some of these roles of the institutional review boards are to protect human subjects in the course of any medical research [39]. This is because some researches may have detrimental effects on research participants, some of these effects may lead to morbidity and even mortality. Institutional review board act as risk benefit analysis intermediary between research participants and the researcher. They also determines if the research should be commenced or not [38]. They ensure that the research is conducted as specified by the researcher in the research protocol. Institutional review boards are important in the improvement of medical practice by working with researches to apply good ethical principles in their research [40]. Each institutional review board has its guidelines. Some have documents that must be used while applying for ethical approval for any study. The institutional review boards are made up of persons with expertise in medical ethics and medical specialties. There are different types of institutional review board namely national ethics committee, research ethics committee and clinical ethics committee (WHO). Globally, there are different local and medical national institutional review boards and communities [17]. An example of a national ethics committee is the National Health Research Ethics Committee of Nigeria (NHREC). In medical research, the human subjects are a very valuable resource hence there safety has to be protected [37]. Extra scrutiny is done on research that will be carried out among vulnerable populations [38]. This is to avoid coercion in the recruitment of research participants. The vulnerable populations are children and minors, older persons, the mentally retarded, pregnant women and people in conflict and war zones.

12. Principles of medical ethics

Since the olden days, it is believed that the doctor knows it all and also knows the best [41]. These have been challenging as there is an increase in litigation against doctors, practice and implementation of ethical principles helps as the preventive measure against such medical litigation and jurisprudence. Modern medicine is faced with several ethical problems [29]. Some of these problems can be abated by ethical principles. Clinicians try to do their best for their patients by providing the best medical care available. These ethical principles guide physicians in decision making in the course of their work especially where there are ethical dilemmas and helps in the resolution of ethical conflict [27]. Hence physicians generally act in the

best interest of their clients and patient though conflict may sometimes occur as they weigh the risks and benefits of all available choices but act in the best interest of the patient [2, 27]. The principles of medical ethics [3, 4, 10, 27] are:

1. Autonomy
2. Justice
3. Beneficence
4. Non maleficence
5. Confidentiality
6. Truth telling

12.1 Autonomy

The fundamental principle of medical ethics is autonomy [42] Autonomy is the freedom of patients and clients to make their decisions on their conditions without the interference, pressurization and duress. It means giving adequate information to the patient respectfully and disclosure of information about a patient after obtaining informed consent to do so [4, 43, 44]. Trust is always key in every doctor patient relationship as the patient rusts the doctor to the best for him or her therefore the patient is entitled to autonomy. It is the duty of the doctors to counsel and explain to the patient the diagnosis, proposed management and treatment options. The doctor is not expected to impose any decision on the patient. Hence, the freedom of thought, intention and decision making process especially in the new era of shared decision. For this to be complete, the patient should be counseled in simple language so that they understand the risks and benefits of the procedures. This is also the principle for not to do evil or inflict harm. Autonomy allows the freedom of choice and action by the patient. The principle of autonomy requires the physician should provide all available therapeutic options to the client [21]. This also shows that the patient even after all the counseling has the right to refuse and reject treatment [10]. Ethical principles are affected by cultural and traditional beliefs and practices. Some cultures frown against being told that the clinical condition is poor worst is if death is anticipated. Since time immemorial, doctors have been faced with the notion of to what extent and how much clinical information should be released to a patient especially when it is bad news [45]. This is in conflict with the ethical principle of autonomy for which people should be allowed to make their decisions without any influence or been coerced to do so. The other medical ethical principles of truth telling, and confidentiality including informed consent are all based on autonomy [4]. Autonomy allows the patient to choose from every available treatment options depending on their goals and values [41, 44, 46]. Although sometimes doctors are able to convince their patients to accept what they believe is the best for the patient [41]. Autonomy therefore makes patients to be responsible for their health needs and wishes [11].

12.2 Beneficence

The principle of beneficence is that everything done by the medical practitioner should be in the best interest of the patient [4, 10, 47]. Therefore this guides the decision making process of the physician. This means that all negative options

which will not be in the best interest of the patient should not be offered to the patient. An example is administering a medication to a patient because of the side effect of the drug. The summary of beneficence is to do good always. Though every physician has to practice the ethical principle of autonomy, options that shall be beneficial to the patient should only be offered to be patient [47]. This ethical principle is implemented in the choice of drugs as all medications have adverse effects some of which may be mild which can be tolerated while some others are severe which can worsen the clinical state and can even cause death.

12.3 Non-maleficence

The ethical principle of non-maleficence is related to beneficence but they are different [44]. The principle of non-maleficence states that no harm should be done to the patient or other people in the community [4, 9, 10, 17, 48]. Implementing the principle of non-maleficence means that any treatment option that will be harmful to the patient should not be offered to the patient [44] as the patient will also exhibit autonomy. Hence the patient's medical condition may worsen. Violation of non-maleficence can lead to litigation and malpractice. Negligence is a consequence of the violence of non-maleficence. Medical error can result in non-maleficence. This also applies to research in which the research protocol must be reviewed by an institutional review board so that none of the research participants suffer harm. All the benefits, risks and consequences of all treatment are weighed in the course of the medical consultation [49]. It is the duty of the physician to protect their patients [48]. Though all health practitioners encounter ethical challenges in the course of their work, the principle of not to do harm is always a priority [17].

12.4 Justice

Justice requires fairness in the management of patients and distribution of resources especially in the time of scarcity and when priority needs to be maintained such as during mass casualty and pandemics. Individuals at all time should be treated fairly when they visit a health facility [10]. The distribution of health resources requires justice for it to be done fairly and equitably [1, 4, 19, 47]. Justice is also necessary in respecting the rights of patients [19]. In times of scarcity, the ethical principle of justice is used to determine areas of priority in the distribution of health resources [10].

12.5 Confidentiality

Confidentiality and privacy generally is required in any human relationship [43]. A physician is expected to maintain confidentiality of all discussions made with the client or patient [50]. The physician requires permission and consent of the patient before divulging such information to any other person even among fellow physicians and health care professionals. The ethical principle of confidentiality is related to other ethical principles of autonomy and truthfulness. Patients trust their physicians hence that can open up their privacy to the doctor and trust that the doctor will keep secret all information confided in him or her to be private. Patients and their caregivers hold different preference in the disclosure of medical information about them or their loved one to third parties [44]. The ethical principle of confidentiality is based on trust hence patients trust the clinician therefore they tell them the truth and except the doctor to keep it private to themselves only without their authorization or informed consent [4, 43, 51]. Part of a patient's right dwells on the physician respecting patient confidentiality. Trust in the patient doctor relationship

is based on trust confidentiality and trustfulness. This issue of confidentiality is also maintained even after the death of the patient [32]. The doctor patient relationship is strengthened by confidentiality including communication between them [51]. It is ethical and legally binding on doctors to respect patient confidentiality always [50, 52]. Sometimes, the ethical principle of confidentiality is breached when the medical information is required by a court or law or when the illness is a threat or will be harmful to others and the public. Patients put their trust in their physician hence it is importance to maintain this trust to meet all legal requirements [32]. Confidentiality is breached when communicating with patients through an interpreter.

12.6 Truthfulness

Generally, most people say that it is hurtful to be told the truth but it has to be told whether it is palatable or not [45]. The physician is expected at all times to tell the patient the truth about their clinical condition. Truthfulness is also known as truth telling is one of the principles of medical ethics. Truth telling is guided by trust and confidentiality. Every patient expects the physician to tell them the truth about their illness always. It is very important in the advancement of patient autonomy [42]. Trust telling is an important ingredient in the physician doctor relationship as lack of it leads to distrust [4]. It is expected that all healthcare professionals including doctors should always tell their patients the truth always even if it will become bad news [45]. This is why medical ethics and breaking of bad news is incorporated in medical training. Some cultures and religions forbid been told the truth when it is bad news. Sometimes there is a contradiction between respect for the person as an individual and with the patient's right not to know due to patient autonomy [44, 45]. Therefore the issue of truth telling has been debated in biomedical ethics [2]. This is because truth telling has been a challenge in medical ethics as there is no guideline on the limit to how much information should be given to the patient which sometimes leads to ethical controversies [2, 44]. How the information is relayed to the patient is also very important [2]. Even with all these controversies, challenges and ethical issues associated with truth telling, it is always the right of the patient to be told the truth always [53].

13. Ethical considerations in conducting medical research

The Nuremberg Code is a code which was a part of the wins of the famous 'Nuremberg Trial' (1945–1946) and the "Doctors' Trial" (1946–1947) which indicted and tried major World War II (WWII) criminals and lesser WWII criminals, respectively, on war crimes, crimes against peace and other crimes committed against humanity. This trial began shortly after the end of WWII [54, 55]. If not for the Nuremberg Code, the whole world might not have been safer due to abuses against humanity. The Nuremberg Code is a set of 10 ethical principles that guides research involving human experimentation (**Table 1**) [56–58]. The Code emphasized four basic ethical principles of research which are 'informed consent', 'beneficence', 'non-maleficence', and 'non-coercion' [56, 58]; it was drafted in 1947 during the trial of some German physicians who were indicted of conducting heinous, unethical and invasive experiments on people incarcerated in concentration camps during the WWII [56, 57].

Through the creation of the Nuremberg Code, the whole world became awakened to the urgent need for the creation of policies and laws that guide the ethical conduct of research involving human subjects [57, 59]. However, over the years, many scientists had criticized the Nuremberg Code on issues pertaining to plagiarism and

Article	Code
1	The voluntary consent of the human subject is absolutely essential.
2	The experiment should be such as to yield fruitful results for the good of society, unprocurable by other methods or means of study, and not random and unnecessary in nature.
3	The experiment should be so designed and based on the results of animal experimentation and knowledge of the natural history of the disease or other problem under study that the anticipated results will justify the performance of the experiment.
4	The experiment should be so conducted as to avoid all unnecessary physical and mental suffering and injury.
5	No experiment should be conducted where there is an *a priori* reason to believe that death or disabling injury will occur; except, perhaps, in those experiments where the experimental physicians also serve as subjects.
6	The degree of risk to be taken should never exceed that determined by the humanitarian importance of the problem to be solved by the experiment.
7	Proper preparations should be made and adequate facilities provided to protect the experimental subject against even remote possibilities of injury, disability, or death.
8	The experiment should be conducted only by scientifically qualified persons. The highest degree of skill and care should be required through all stages of the experiment of those who conduct or engage in the experiment.
9	During the course of the experiment the human subject should be at liberty to bring the experiment to an end if he has reached the physical or mental state where continuation of the experiment seems to him to be impossible.
10	During the course of the experiment the scientist in charge must be prepared to terminate the experiment at any stage, if he has probable cause to believe, in the exercise of the good faith, superior skill and careful judgment required of him that a continuation of the experiment is likely to result in injury, disability, or death to the experimental subject.

Table 1.
Articles in the Nuremberg code [56, 57].

embedded loopholes in the Articles 4, 5, 9 and 10 of the Code (**Table 1**) [56–60]. Nonetheless, the Code is still widely regarded as the most important document in the history of medical research ethics [57–59].

Over the years, many countries had formulated and enacted policies and laws guiding the ethical conduct of medical research within their borders [61–63]. In fact, multilateral and globally recognized health organizations like 'World Medical Association', 'World Health Organization', and 'Council for International Organizations on Medical Research' also have their own guidelines on the ethical conduct of biomedical research involving human subjects [57, 64, 65]. This shows the huge gravity of global concerns regarding the ethical conduct of research involving human subjects.

Ethical considerations are issues that are widely considered as a keystone part of medical research [66, 67]. In medical research, all stakeholders involved must consider the ethical implications of their conduct. The thoughts on these implications are, in order words, known as ethical considerations. There are so many issues of ethical consideration in the field of Medicine. Ethical considerations regarding the conduct of medical research centre on the basic ethical principles discussed in one of the preceding paragraphs. Pertinently, these considerations apply to all forms of medical research irrespective of where, when, how, and why it was conducted.

It is noteworthy to discuss extensively on some peculiar issues of ethical concerns that needs to be considered in medical research carried out at/on some peculiar (or special) periods or population groups. These discussions are below:

a. **Ethical considerations in conducting research in public health emergencies (PHEs):** Disease pandemics, flooding, earthquake, tsunamis, etc. are PHEs [6]. The periods of PHEs are tragic periods. They are characterized by chaos, panics, untold economic hardship, movement restrictions, stigmatizations, and other unforeseen irregularities [68]. Public health emergencies have been a public health problem that had been bedeviling humanity for thousands of years; unfortunately, the rate of occurrence of such emergencies has increased in its frequency due to many factors [68]. During PHEs, medical research are being conducted either to solve the problems that are associated with the PHE or other problems that are not related to the PHE. However, irrespective of the aims of the medical research endeavors conducted during PHEs, the point still boils down to the fact that such medical research endeavor is being carried out when a PHE is on.

In 2020, the whole world is battling with the COVD-19 pandemic [69]. In a situation like this, many medical researchers are facing enormous difficulties when it comes to the conduct of medical research [70]. Despite these enormous problems, yet a medical researcher still needs to be very mindful about the ethical implications of his/her conduct in all research endeavors carried out during the period. This issue will take us to have a look at a publication of the World Health Organization (WHO) on the ethical standards to be followed during PHEs [71]. Research is part of the key response to public health emergencies; hence, the conduct of medical research during disease pandemic is an ethical imperative as some research hypotheses can only be best answered during the period of a pandemic [71]. This implies that it becomes necessary, from an ethical point for view, for medical researchers to conduct research that will manage a pandemic.

However, it was further mentioned that:

i. Medical research should be conducted only if it does not impede emergency response efforts.

ii. When doing collaborative medical research, be it an international or a local collaboration, medical researchers should work as a team to jointly prioritize the challenges faced in the outbreak, determine the best fit research project that will provide answers to those challenges, conduct the research, and ensure that the research ultimately benefits the affected communities.

iii. The affected communities must be meaningfully and fairly engaged in the research process, and they should be involved in inclusive decision making efforts.

iv. Independent research ethics review committee should be strengthened and the ethical review process of research protocols should be expedited.

v. Appropriate research methodologies should be adopted for all medical research conducted during public health emergencies.

vi. Research participants' selection and treatment must be done safely, fairly, justifiably, and with respect.

vii. The research participants must be fully aware of the implications of their participation in such research, their participation must be voluntary, and their identity must be treated with strict confidentiality.

viii. Individuals and communities that participated in a research must have access to the benefits accrued from such research.

b. **Ethical Considerations in Conducting Research on Clinical Emergencies:** Medical and surgical emergencies are clinical emergencies that often occur in the hospital setting. Some of these conditions include asthma, trauma, cerebrovascular accidents, sepsis, and myocardial infarction [72]. These emergency conditions constitute a large proportion of global disease burden [72]. Through medical research, many clinical emergency problems had been solved. A very good example is the 1922 discovery of insulin by Frederick Banting which has helped in improving the clinical outcomes of diabetic emergencies [73]. There are also many other examples of great discoveries in medical research.

The ethical conduct of medical research more especially in the area of clinical emergencies is a very crucial one. There are many factors that pose as problems to the proper conduct of medical research in clinical emergencies. These factors are diverse and they range from governmental regulations to time of decision making/intervention [72]. To start with, many nations do not have a specific regulation regarding clinical emergency research [72]; this is a fundamental problem that needs to be solved. Also, the issue of informed consent taking is an issue central to the ethical conduct of research in clinical emergencies, more especially clinical trials. For instance, in unconscious patients, the decision on what clinical intervention (a trial intervention or an approved intervention) to do on such patient must be made in few minutes; unfortunately, such patients are unable to give their consent [74]. Also, the legally authorized representative (LAR) of such patients are often unavailable or in a state of emotional imbalance [74, 75]. In such kind of situation, some authorities recommended the use of 'deferred consent' taking from the LAR (e.g. next of kin) of such patient while some recommended that the medical researchers involved in such kind of clinical research (such as trials) can proceed with the study must be able to prove that:

i. Such patient is in a life-threatening situation.

ii. Available treatment options are unsatisfactory or untested.

iii. Such patient is unable to give his/her informed consent due to his/her current clinical condition.

iv. Such patient might have direct benefits from participating in the clinical study.

v. The time to seek an informed consent from the LAR prior to the clinical intervention is not available [74–76]. All the recommendations in this paragraph operate at the clinical level.

At the community level, it is recommended that medical researchers should engage the communities in inclusive decision making on how best to handle informed consent taking in clinical emergency research, make relevant public disclosures about the scope of their study, work closely with the Institutional Review Board (IRB) to guide the study protocol [74, 77]. This approach at the community level is plausible, since one of the ultimate goals of medical research is to improve the health and wellbeing of our communities.

c. **Ethical Considerations In Conducting Research On The Vulnerable Population Group:** The vulnerable population groups are the disadvantaged sub-segment of the community; they include minors (people below 18 years), the mentally impaired, children, prisoners, pregnant women, fetuses, older persons, displaced persons, and other categories of disadvantaged people [65, 78–80]. Due to the inherent characteristics of this population group, they are not capable to protect their own interests [80, 81]. Among all medical research types, trials are one of the most crucial types due to its complexity and the inclusion of an intervention in its scope. A study by Welch et al. extensively described the peculiarities and limitations of each particular sub-group in the vulnerable population group, when it comes to the ethical issues surrounding their participation in a clinical trial [80]. Based on these peculiarities and limitations, it was concluded that:

i. Vulnerable population group should not be unnecessarily excluded from a trial because their participation in a trial will also provide informative outcomes that might benefit their group.

ii. When designing a trial, the issues concerning the inclusion of vulnerable people and how the ethical and regulatory requirements of such people will be evaluated and managed must be addressed in the protocol of such study

iii. Activities that could result into the stigmatization of vulnerable groups, such as unnecessary exclusion, should be avoided as it could result into the violation of confidentiality and even loss of vital research data about vulnerable groups.

iv. The risks associated with the participation of vulnerable people in a trial should be properly evaluated and the protections of such group of people should be properly addressed.

v. There should be regular revisits of the laid down regulations of the appropriate authorities governing the ethical conduct of research on vulnerable groups during the course of the trial so as to ensure that the conduct of the study does not violate ethical standards.

vi. There should be regular review of the incremental risk of the study design with respect to the participating vulnerable persons so as to determine if there is a need for the provision of further protections to this peculiar group [80].

14. Informed consent taking in medical research

In medical research involving human subjects, taking consent from the subjects is very necessary. In fact, it is not just about consent taking; rather, it is about taking a consent that is informed. Informed consent refers to the voluntary agreement of a human subject regarding his/her participation in a medical research as a subject. Informed consent taking constitutes a major aspect in the ethical conduct of medical research. As non-coercion is one of the standing pillars in the principles governing medical ethics, all persons participating in a medical research must not be coerced to participate in any way; rather, their participation should be completely voluntary. In the course of recruiting humans into a medical research, they should

be given prior information that is of relevance to the protocol and safety profile of the study. However, informed consent taking applies only to adults, i.e. people aged 18 years or above. It is believed that only people in this category are mentally and psychologically capable to make decisions regarding consent. As for children, due to their age and level of psychological development, they can only give assent.

Informed consent can be taken in two ways: written or verbal. In written informed consent, the human subject gives a written documentation of him/her agreeing to participate in a study while in verbal informed consent, the human subject gave his/her agreement verbally. Between the two forms of informed consent, the written type is more reliable.

15. Conclusion

Medical ethics is a branch of ethics is a branch of philosophy that guides all human endeavors. Medical ethics are sets of regulations that guide physicians in their work and protect them against litigation. Ethical principles that guide the medical profession are autonomy, beneficence, non-maleficence, justice, confidentiality and truth telling. Sometimes these ethical principles have to be breached to protect the public and when required by a court of law. These ethical principles also help in there resolution of ethical dilemmas and conflict.

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