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Developing countries, including Egypt and North African countries, need to improve their quality of research by enhancing international cooperation and exchanges of scientific information, as well as competing for obtaining international funds to support research activities. Research must comply with laws and other requirements for research that involves human subjects. The purpose of this article is to overview the status of health research ethics in Egypt and North African countries, with reference to other Middle Eastern countries. The EU and North African Migrants: Health and Health Systems project (EUNAM) has supported the revision of the status of health research ethics in Egypt and North African countries, by holding meetings and discussions to collect information about research ethics committees in Egypt, and revising the structure and guidelines of the committees, as well as reviewing the literature concerning ethics activities in the concerned countries. This overview has revealed that noticeable efforts have been made to regulate research ethics in certain countries in the Middle East. This can be seen in the new regulations, which contain the majority of protections mentioned in the international guidelines related to research ethics. For most of the internationally registered research ethics committees in North African countries, the composition and functionality reflect the international guidelines. There is growing awareness of research ethics in these countries, which extends to teaching efforts to undergraduate and postgraduate medical students.

Introduction

Bioethics is related to the study of human conduct in the areas of the life sciences and health care.[1] It is the process of examining ethical issues in health care, health science and health policy, and discussing and reviewing its standards.[2] This conduct is examined in the light of moral values and principles. Arabic medical researchers should be more aware about health research ethics, in the context of bioethics, and are in need of continuous training on ethical guidelines and regulations to facilitate participation in international research projects, with the aim of improving health care and research in all Arab countries.[3] North African countries have their own cultural identity and traditions based on the unity of language, culture, traditions, religion, socio-economic criteria and demographic distribution.

Arab countries have recently been the focus of interest for clinical drug trials by pharmaceutical companies, which has led to the growth of clinical research in the Middle East, and the subsequent awareness of ethical considerations related to human subjects[4]. Vladimir, 2012,[5] reported that Egypt, Jordan and Lebanon are currently ready to undergo clinical trials, and they are considered emerging countries in the industry of clinical trials. Other North African countries such as Algeria and Morocco are next in line for these trials. During the period between 2006 and 2010, statistics showed a 4% rise in the global number of therapeutic trials conducted in the Middle East, which was the largest increase in any region of the world.[6] In a study conducted on members of research ethics committees (RECs) in Egypt, 92% of participants described the development of appropriate national guidelines as an enormous challenge.[7]

In 2000, the World Health Organization (WHO) stated, 'The purpose of a Research Ethics Committee (REC) in reviewing health research is to contribute to safeguarding the dignity, rights, safety, and well being of all actual or potential research participants. An important principle of research involving human participants is "respect for the dignity of persons"'.[8] RECs play important roles in protecting human participants. They review initial research protocols to ensure that the plans include provisions for informed consent of participants, and do not expose them to unreasonable risks. They also conduct continuing reviews and follow-up of approved research to guarantee that human subject protections are enforced. Bioethical thought is particularly expressed at a religious level, which was first demonstrated among Arab countries, at the first international conference of medicine held in Kuwait in 1981, which culminated in the publication of the 'Islamic Code of Medical Ethics', and was supported by the first Congress of Islamic Sciences, held in Cairo in 1985.[9] This was developed further by the Islamic Organization of Medical Sciences in 2004, in cooperation with the Council of International Organizations of Medical Sciences (CIOMS) and WHO.[9]

History and status of research ethics committees in North Africa

RECs were introduced in the Arab countries, Egypt and Algeria in the 1980s in some institutions, followed by Tunisia in 1993. The Egyptian National Committee for Bioethics was established in 1996, followed by the Jordanian Committee in 1999. The Egyptian Constitution in 1971 mentioned that no medical or scientific

Table 1 RECs in North Africa

REC / National Law	Egypt	Algeria	Tunisia	Morocco	Libya
National Ethics Committees	Egyptian National Commission for Bioethics	National Council for Ethics in Health Sciences in 1996, renewed in 2006	National Committee of Medical Ethics of Tunisia in 1994		National Committee for Bioethics, Biosafety and Biosecurity
Institutional RECs	More than 50 RECs			4 RECs	
National Law	Under development			Under development	
Registered RECs	45 RECs registered at the Office for Human Research Protections (OHRP)	7 RECs registered at the Office for Human Research Protections (OHRP)	3 RECs registered at the Office for Human Research Protections (OHRP)		
National Network of RECs	ENREC				

Source: References No.[11–14]

experiment might be performed on any person without his free consent.[10]

Although there are few health RECs in North African countries, many committees are registered at the Office for Human Research Protections and have Federal Wide Assurance (FWA) active numbers. Egypt has 45 registered RECs in 2011,[11] Algeria 7 RECs and Tunisia 3 RECs. Libya has a National Committee for Bioethics, Biosafety and Biosecurity; Tunisia has a National Committee of Medical Ethics; and Egypt has a National Ethical Committee and Institutional committees.

In Egypt, ethical committees are well-distributed over the country. The Egyptian national Ethical Committee collaborates with the United Nations Educational, Scientific and Cultural Organization (UNESCO). The Ministry of Health and Population (MOHP) has its own Ethical Committee as shown in Table 1. The Egyptian Network of Research Ethics Committees (ENREC) was created in 2008 to encourage the harmonization between RECs in reviewing research proposals and to increase exchange of information and intellectual resources, policies and review strategies. The eventual aim is to create improved processes for protecting research subjects. ENREC operates under the auspices of the Egyptian Society for Healthcare Development.[12] ENREC has 30 Egyptian REC members from different Universities and Institutes. Egypt is currently working on developing a national bioethics law for the regulation of clinical trials and human research ethics.

Although young researchers are aware of the need to respect the privacy of human beings and the protection of their rights and freedom, they still want to conduct research in specialized areas without measures that create obstacles. Some of the unfavourable factors for establishing ethics committees in North African countries include the absence of specific legislation in the bioethics field; the lack of interest in bioethical issues; and the lack of training in ethical (and legal) review in life and health sciences.

With reference to Morocco, there is no national ethical committee. However, a law on biomedical research and the protection of persons involved in research is under preparation at the Ministry of Health. Although it is very similar to the French law, it is still under discussion and not yet effective. The draft states, 'Medical doctors can participate in biomedical research involving human beings according to the national law. They have to check and confirm the relevance and objectivity of research to the hypothesis'.[9] A large component of this law is to specifically protect vulnerable groups. In Morocco, there are currently four independent ethics committees in the faculty of medicine, located in Casablanca, Rabat, Fes and Marrakech.[13] Their composition and functionality reflect and follow the International Conference of Harmonization guidelines. Rabat and Casablanca ethical committees are registered with in the US National Institute of Health. Laws on clinical research in Morocco are being composed.

In Algeria, there has been a National Council for Ethics in Health Sciences since 1996 (founded in 1990) and was renewed on 19 December 2006.[14] This council is composed of 20 members representing various ministries, namely Health, Defense, Justice, Higher Education and Work. Health professionals are represented by 12 members, and the top Islamic council has a seat. Its function is to guide the researchers, provide advice on organ transplantation, care methods imposed by the development of medical technology and scientific research and finally to set guidelines on human body experimentation for scientific research. Algeria was represented at the intergovernmental Committee of Bioethics from 2001 to 2003.

In Tunisia, a National Medical Ethics Committee was established in 1991; its tasks, composition and modes of function were laid down in 1994. Its missions include information, training and documentation.[13] It is responsible for organizing an annual conference, during which important medical ethics issues are publicly discussed. It also holds open sessions on the awareness of ethical issues and information, including participation of the following specialists: doctors, philosophers, religious representatives, media representatives and ordinary citizens, to consider the different perspectives that may emerge. It regularly publishes the activities undertaken as part of its missions, such as notices, annual conferences and the International Meeting on Bioethics.

The Pasteur Institute in Tunisia has had its own institutional review board (IRB) since 1992, which is registered at the Office for Human Research Protection in the USA and is committed to follow the Declaration of Helsinki. The IRB follows the guidelines established by the CIOMS and several National Tunisian laws dealing with Deontological practices and Ethics, the National Register of Clinical Assays (2001) and different administrative texts setting the regulations that should be followed for biological sample handling.

Composition and challenges of the Egyptian RECs

The composition and functionality of most of the internationally registered RECs in North African countries reflect the international guidelines set by The International Conference on Harmonisation of Technical Requirements for Registration of Pharmaceuticals for Human Use, and follow standard operating procedures (SOPs) described by WHO in 2000[8] and 2011[15] along with the guidelines for SOPs published by Silverman *et al.*[16] These SOPs describe policies and procedures for REC work implementation, and serve to enhance the consistency and efficiency of the ethical review of

RECS of biomedical research. Once these RECs are registered at the Office for Human Research Protections and obtain their FWA active numbers, they are eligible for inspection by this office to ensure correct adherence to the international guidelines. These SOPs were developed by a working group that consisted of persons who participated in the two-month Health Research Ethics Training Initiative in Egypt (HRETIE) and research ethics certificate course held at the University of Maryland, School of Medicine in Baltimore, MD, in June 2005. Successive training courses had been held by the HRETIE project from 2005 until 2008, followed by a follow-up MRETIE project, as part of a collaboration between various countries in the Middle East and the University of Maryland.[17] This training initiative aimed to improve research ethics functioning in the Middle East by offering educational programs. These ongoing courses have produced many certified trainers who graduated from the University of Maryland with the skills to initiate RECs in their own institutes of their countries and to register these RECs internationally and obtain an active FWA number.

This article presents three Egyptian RECs from Egypt that has the majority of active RECs, and is one of the North African countries participating in the EU and North African Migrants: Health and Health Systems (EUNAM) project.[18] These three committees are the National Research Center, the National Hepatology and Tropical Medicine Research Institute and the Faculty of Medicine at Ain Shams University (FMASU REC), the constitution and operating procedures of which are compared in Table 2. The FMASU REC, composed of 15 members, was established in 2007 for acquiring FWA numbers. Members are both male and female, medically affiliated to the faculty, medically non-affiliated, non-medically non-affiliated and of both religions, Moslems and Christians. The National Research Center Research Ethics Committee, composed of 11 members, was established in 2005 for acquiring FWA numbers. The National Hepatology and Tropical Medicine Research Institute Research Ethics Committee was established in 2007 and composed of 15 members.

The composition of national committees in North African countries matches closely with the international criteria, including physicians, lawyers, philosophers, journalists and communication scientists, religious personnel and anthropologists, historians, sociologists and political scientists.

On studying the strengths and weaknesses in the operation of 12 Egyptian RECs, Sleem et al. documented several strengths, namely, that many of the existing RECs meet frequently on a monthly basis; the majority of their members have been previously trained in research ethics; and the committees have written policies. The following weaknesses were listed: many committees should create a more diverse membership, hire administrative support personnel and demand more financial resources.[7] This is in accordance with Kerrison and Pollock, 2005, who described a lack of recourses as one of the weaknesses of RECs in the UK, which is essential for monitoring adherence and enforcing good practices.[19] Lack of training of the members is one of the weaknesses revealed by a study carried out by National Ethics Committees (NECs) in the Mediterranean region, including Morocco and Tunisia, which showed that only 21% of the members from all of the NECs indicated they had received formal training in ethics, while 53% of committee members had no formal training in ethics.[20]

Sleem et al. recommended that RECs should include more individuals from the community, and develop a continuing educational and training program for its members. In addition, institutional officials should be aware of the requirements of capacity building of their RECs.[7]

Discussion of the problems encountered by different RECs was carried by one of the EUNAM project meetings, by research ethics experts and the ENREC in Egypt.[12] The main problems, as reported by investigators, was the common belief that ethical reviewing hinders research and, on reviewing the methodology, it is often revealed that the proposed sample size does not comply with the calculated sample size. Delays in reviewing times were due to a lack of necessary data supplied by investigators or non-compliance of reviewers. This could be due to the investigators' unawareness of the ethics committee's functions, the main ethical requirement as scientific validity and ego constraints in the reviewing of one's work by colleagues. A common misunderstanding is that ethical issues can be distinguishable from scientific issues.

Problems regarding committee reviewers include non-compliance to training course attendance, lack of knowledge, contact with the funding drug companies without committee permission and some filling the protocol review checklist without adequate consideration. Another problem is the delay in reviewing time beyond that mentioned in the SOPs (two weeks), as the entire procedure takes, on an average, one to three months.

Table 2 Comparison of three Egyptian RECs regarding Constitution and Operating Procedures

REC Constitution and Operating Procedures	FMASU REC y	National Research Center	National Hepatology and Tropical Medicine Research Institute
Year of establishment	2007	2003	2005
Number of members	15	17	11
Gender	9 m/6f	7 m/ 10 f	8 m/3f
Number of training courses	10	22	5
Number of trainees	250	760	120
Number of reviewers	170	17	98
Number of served departments	32	33	6
SOPs	Yes	Yes	Yes
FWA No.	Yes	Yes	Yes
REC meetings	Monthly	Monthly	Monthly

Notes. Data are obtained from contact with ethical committees.

REC awareness dissemination

Since 2005, many workshops and training courses on health research ethics have been held in different universities and institutions in Egypt, such as Cairo, Ain Shams, El-Azhar, Alexandria, Mansoura, Benha, Suez Canal universities and the National Research Centre, all including certified trainers from the University of Maryland. This training has aimed to disseminate awareness of regulations and guidelines of health research ethics. The outcome of these courses was the establishment of RECs in many of these universities and institutes.

The EUNAM project reviews the health effects of migration from the country of origin to the host country and has assisted in revising the status of health research ethics in Egypt, by holding meetings and discussions, organized for collecting information about RECs in Egypt, and revising the structure and guidelines of the committees. This was carried out by collaboration between different parties working in this field, such as Faculties of Medicine, Medical Institutes, MOHP, WHO and Academy of Science.

Bioethics teaching in North Africa

Education of Health Research Ethics in Algeria, Lebanon, Morocco, Syria and Tunisia was described in a meeting in Morocco by the UNESCO in 2008, which revealed that many of the existing ethics teaching programs are still undertaken by certain dedicated pioneers, in the absence of any institutional support, which makes ethics teaching very weak.[21] This meeting highlighted there is an urgent

need to assist in the building of a new generation of ethics educators in the region. There is a conflict between health professionals regarding research ethics and medical ethics, or medical practice, which thus requires greater effort in disseminating awareness.

In Algeria, as reported in the UNESCO meeting in Marrakesh, 2008, there is currently no institutionalized or organized nationally accredited teaching for medical ethics/bioethics. All activities concerning ethics teaching are still undertaken by pioneers in the field,[21] in place since the academic year 2001–2002. Ethics is taught in one semester in the first and sixth year, including topics such as introduction to bioethics, ethics at the university, the Nuremberg code, human experimentation, organ donation, euthanasia, medically assisted reproduction, abortion and cloning. In Morocco, a teaching program in ethics foundations, ethics committees and research ethics have been held in the faculties of Medicine and Pharmacy in Casablanca since 2008. Another course in the faculty of science in Casablanca began in 2007. In Rabat, Morocco, a course entitled 'Medical Ethics and Pharmacy' is taught to the students of the faculties of Medicine and Pharmacy.[21] In Egypt, teaching Health Research Ethics Curricula have been set for the undergraduates since 2007, and postgraduates since 2009, in the FMASU , and in other universities, such as Suez Canal and Alexandria, as well as for Researchers in the National Research Center, in Cairo Egypt. These courses aim to improve research conduction and prevent research misconduct.

Research ethics and migration

Research related to health and health systems in countries and between countries and among immigrants, will need ethical approvals for collection of data and or samples to study different diseases and related risk factors or therapeutic trials. Before expanding in research activities, it was a necessity to revise the situation of ethical research committees in NA countries and to have an idea about the qualification of members and guidelines they are following for approvals. There are three broad categories of immigrants: voluntary migrants who come to join relatives already settled in the host country or to work, refugees and asylum seekers who enter the country to avoid persecution, and undocumented immigrants.[22] Research on immigrants being a vulnerable group carries a lot of risks on them and may imply a sort of coercion as they do not have autonomy to agree on participating in researches and clinical trials. Refugees who are settled in camps, being undocumented, may want to avoid participation in research projects but may feel that they are not free to decline participation.

Conclusion

This article has demonstrated that efforts have been made to regulate research ethics in five North African countries, namely Egypt, Algeria, Tunisia, Morocco and Libya. NECs are established in each of these countries except for Morocco. Most of the countries lack laws governing health research ethics.

Endeavours have also been made to regulate research ethics in the Middle East. National laws to regulate clinical research and research ethics are under development in North African countries such as Egypt and Morocco. These efforts can be seen in the new regulations that contain the majority of the protections mentioned in the International Conference on Harmonization—Good Clinical Practice guidelines, the CIOMS guidelines and the Declaration of Helsinki. However, the North African countries were at different levels with regard to the development of and adherence to research ethics guidelines. This was reported by Abdur Rab *et al.* in 2008, who carried out a descriptive analysis of 143 proposals from the Eastern Mediterranean Region (EM) involving Public Health, Biotechnology and Genomics submitted to a grant funded by the Eastern Mediterranean Regional Office of the WHO. Ethical clearance was not obtained by 29% of investigators; another 29% considered that informed consent was not needed. Adherence to ethical safeguards is deficient, optimal among investigators in the Eastern Mediterranean Region.[23]

Efforts regarding health research ethics in North African countries need to be enhanced, in the form of establishment of more institutional ethics committees, National Research Ethics laws and increased collaborative activities between these countries are crucial requirements. National guidelines for strengthening ethical review systems, as well as enhanced educational training of research ethics for investigators, are needed in this region.[24]

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