My Africa

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> **Croat Med J. 2007;48:261-7**

What Drives Health Research in a Developing Country?

Research is certainly an integral part of academic medicine. For the individual medical school or university teacher, meaningful existence without demonstration of research expertise or experience is almost impossible. For a health system, it is inconceivable that reasonable services can be delivered without attention to research. So in a sense, research drives medicine.

While there is concern about the 10/90 gap, which implies that 90% of global research occurs in countries with 10% of population and also 90% of research dollars are spent on 10% of the diseases causing morbidity in the world, there is little debate as to who conducts research in the developing world (1-4). The ground rules of international research have been largely guided by biomedical ethics principles of respect for autonomy, beneficence, avoidance of harm, and justice. These are worthwhile principles. However, there do not seem to be any principles that I know of regarding where the research results following international research collaboration will be published. This can be understandable because health research journals are no longer subject to national boundaries. A journal published in one country has readership in several other countries, including developing nations. This article will explore issues related to international research incentives, research benefit sharing, the structural limitations that developing nations researchers face when conducting research, and ethics of research results dissemination.

Question of research incentives

Many researchers would agree that research incentives should not unduly induce potential research participants into accepting to participate in a study. The intent is that research participants should be free-willing to participate in a study and not be attracted by the reward or compensation. In a developing nation like Malawi, study participants are normally reimbursed minimally with payment of transport costs, meals, soap, and sugar. In social research with no physical examinations or collection of bodily specimens such as blood specimens, a suggestion to compensate research participants with any goods or cash equivalent to anything like US $10 and above is unlikely to get favorable review by the institutional review boards. The time compensation is usually a few dollars. It is, therefore, attractive to do research in resource-limited nations where the compensation for study participants is minimal.

In clinical research, potential study participants are told, as is required by the institutional review boards, that they are free to or not to participate in any study. If however, they choose not to participate, they will receive the standard of care. However, there are controversies as to what "standard of care" means in research implementation (5,6). The case study below illustrates that in countries with limited health services, participating in research as a research subject may be a matter of life and death:

Maliro is a 40-year old subsistence farmer living in a rural area in an African country. He has been feeling unwell lately, 4 years after the death of his wife who died from an AIDS-related illness. Highly active antiretroviral therapy (HAART) for the treatment of AIDS is not widely available. There are a few clinics in the city, but the cost of treatment is beyond the reach of the majority of the population. However, in a research clinic at the rural government hospital HAART is provided to patients who are enrolled in a research study. Maliro visited the hospital and was told that enrolment in the study was voluntary. However, should he choose to be in the study, he would receive medical care which included a battery of blood tests not available to other patients in the country, he would have monthly medical checks, and since he is in an advanced stage of the disease, he would also be provided with nutritional supplements and HAART. The study team has recruited medical doctors from the nearby government hospital and the study subject will receive all the care they need for free as a part of the study. Patients who do not accept to be in the study will receive the "usual standard of care," which is essentially not much.

The above-mentioned case study illustrates a situation where free choice not to participate in a study can result in adverse outcomes for the potential study participants. It is generally suggested that research participants should not expect direct benefits from the study but rather gain satisfaction by believing that they are contributing to the greater societal good. In many situations in the developing nations, there are immediate and significant medical benefits from participating in a study. If Maliro exercises his free will and decides not to participate in the study, he will be referred to the nearest government facility, which is under-resourced and where adequate standard care is not guaranteed.

Issues of benefit sharing

Muula and Mfutso-Bengo (7) questioned who has custody of bio-specimens collected in a developing nation which are eventually analyzed and stored in a developed nation. There should be a joint custody between the collaborating institutions, but this may be problematic. The following case study illustrates the dilemma:

A hypothetical Smith Joe College in the United States collaborated with a Malawian medical school, Gari Sinjani Medical School. Blood samples for malaria and HIV research were collected and shipped to the United States for analysis. At the time of study design, there was a lack of expertise and infrastructure in Malawi to conduct the genetic analyses. The original studies for which these samples were collected were concluded and the joint authorship included US and Malawian researchers. The samples are still stored at Smith Joe College. Graduate students at Smith Joe College (who could be Malawian students or anyone) have access to the data but this is not available to investigators not affiliated with Smith Joe College or not affiliated with Gari Sinjani Medical School.

The hypothetical illustration presented above shows one of the many situations that occur in international research. One option that could be pursued is to destroy all the specimens after a specified period. This will certainly insure that no one has access to the specimens beyond the index study. However, this also implies that researchers who may have benefited from an existing specimen bank will not be able to do so. If anyone wants to do another study, specimens may have to be collected from scratch, thus burdening developing nations' communities with the processes once again, when in actual fact the specimen data bank would have been the solution. New collection of specimens could also mean increased study costs. Some studies may never be carried out if specimens were to be collected specifically for each new study.

The imperative that developing nations' researchers should have the authority over specimens collected in their countries for good also implies that certain people would not have the access to specimens just because they are of different nationality. What this position neglects is the fact that before we were different nationalities, we were all human. The question is whether a United States researcher can therefore have custody of Malawian specimens just as well as a Malawian researcher can have custody of specimens collected from another country. Researchers should endeavor to continue to seek collaboration across nationalities for the good of human kind.

It would have also been possible to leave specimens collected in a developing nation within that nation. If the specimens stay idle and would not be assessed again due to structural limitations, then humankind as a group, has lost. This is also not desirable. We should, however, strive to ensure that benefits arising from research on a population find their way back to the studied population. This benefit may arise not from an index study but a study which was carried out on stored specimens.

Research capacity building

Conducting health research in the 21st century is rarely a single-person endeavor. Individuals and/or institutions often need to collaborate for a diversity of reasons. Sharing different skills within the research team is an important part of such collaboration. In case of research which involves data collection in developing nations, the involvement of developing nations' researchers may be motivated by a number of different reasons. First, it is possible to engage developing nations' scientists in the spirit of mutual partnership, networking, and connection (8). However, in some situations, developing nations' researchers may just be engaged in order to meet the funding agencies' requirements. Many funding agencies are increasingly requesting that if research is to be conducted in developing nations, it is mandatory that they include developing countries' researchers. In this case, collaborators are invited to participate as a means to an end.

Capacity to conduct research in developing nation is limited. Some developing nations are more constrained than others, in part due to the human resources migration (brain drain) being experienced. The limitations in research capacity and brain drain threat will be illustrated by a case study of Malawi. Between June and August 2001, I conducted a study to explore the career intentions of medical graduates from the University of Malawi, College of Medicine. At the time, a graduating class comprised a dozen to 25 students each year. In the study, I focused on medical graduates who had graduated in 1998 and 1999 and their career intentions. There were 36 medical graduates in total and 35 (97.2%) participated in the study. One female doctor was excluded as she could not be traced in the UK where she had accompanied spouse who had gone for graduate studies. Information was sought on the following variables; age, sex and marital status; current employer, job title, desire to specialize and the preferred specialty; plans to work in Malawi for a period of more than 10 years. I also wanted to know the reasons for the current job choice.

Of the 35 questionnaires sent, 27 (77.1%) were returned completed (4 study participants were female and 23 were male). Gender distribution of medical students at the time was typically in favor of men (85.2% men vs 14.8% women) (9). The age range was 25-35 years with a median age of 30 years. Twenty five expressed desire to specialize and 2 had no desire for specialist training although one went on to state desired field of specialty. Fourteen had no plans to work in Malawi for more than 10 years, 12 planned to work in the country for more than 10 years, and 1 abstained from responding the question.

Those who had expressed no desire to work in the country for longer than 10 years, gave the following reasons: 1) low remuneration for doctors: 2) lack of career structure in the public services; 3) work place not academically challenging; 4) lack of opportunities for postgraduate training in the country; 5) desire for work experience in another environment; 6) poor general working conditions.

Reasons for the migration of doctors from developing to wealthy countries have been described elsewhere (9-11). The reasons that doctors in Malawi report as influencing their decisions to migrate are similar to what have been reported elsewhere. The lack of specialization possibilities is diminishing as postgraduate programs are introduced in many countries of the southern African region (12).

The desire to leave the country was not universal as there were also few doctors who expressed the desire to work within the public health services system. The reasons were the following: 1) availability of opportunities to be sent abroad for post-graduate training; 2) job satisfaction; 3) job security; 4) professional freedom; 5) opportunity for rural district experience; 6) returning a debt through service to the government; 7) parent's advice; and 8) the lack of a better job.

Of course, intentions to migrate may not materialize due to several factors. But it is still of particular interest to note that many doctors did not believe they would still be in the country ten years after graduating.

The movement of doctors from a developing nation has a bearing on the capacity of that country to do research. International research teams may be the only solutions to supplement the local inadequacies.

Research for its own sake

Researchers are often reminded not to conduct research whose results are not likely to be of use to the studied population. In international research, just as in any other research, researchers are therefore expected to justify why they plan to conduct research in the countries and among the populations that they have suggested. If institutional review boards or funding agencies perceive that there are limited gains to be obtained, research grants protocols may not be funded.

While the requirement to demonstrate possible utility of the results is worth considering, there were many situations where the research may be perceived as being exploitative. The first HIV treatment studies in Africa are the case in point. When evidence started to accumulate that zidovudine (AZT) was effective in reversing immune decline in HIV infected persons in developed nations, researchers proposed to conduct AZT studies. The cost of treatment was unaffordable to the majority of people in developing nations. The question therefore arose as to what use were the AZT trials in Africa, when it was "known" that many of the people in Africa could not afford a month-supply of antiretrovirals, let alone a life time treatment. Such perceptions though did not get confirmed with the passage of time. As antiretroviral therapy becomes increasingly available, even in the poorest countries, one understands that the zidovudine research that was conducted in Africa and elsewhere cannot currently be described as exploitative.

Status of women and clash of cultures

It is well recognized that the status of women globally is worse than men. However, in terms of developing nations' research, women have been studied more than men. Women are easily accessible in studies with households as sampling units. Results from several demographic and health surveys have clearly showed this (13-15). Whereas women can be recruited from family planning clinics and maternity clinics, men are hard to enroll in studies.

Angela is a 17-year old married woman with 2 children. She is pregnant with her third child. While at the antenatal clinic, she is invited to participate in a study which compares the use of iron tablet alone with iron and folate tablets combined in the prevention of anemia. The standard of care in that country includes just iron tablets but medications are rarely available at the health center. Angela says she does not have a problem with participating in the study but she needs to ask her maternal uncle for permission. In this matrilineal society, individuals' maternal relatives are the responsible authorities.

What should researchers do when cultures clash? According to some authors, in such situations, opinions of the host nation should rank higher (16).

Dissemination of research results

Results of research can be categorized as those of direct benefit and those of indirect benefit to the populations from which data were collected. What happens to the research results after the data have been analyzed? They have to be published. But in which journal or journals? Should they be published in international high impact journals which are possibly less visible in the developing nation or low impact journals visible in the developing nation? The following case illustrates an all too common situation:

Dr J. is a clinician in Malawi who collaborated in a research project with researchers from the USA, funded by the National Institutes of Health (NIH). The team had studied the immunology of African sleeping sickness (*Trypanosoma brucei brucei*). They wrote a manuscript and submitted it to a high impact journal from a developed nation. The manuscript was rejected with the comment that the findings would be more suitable to the general medical readers who are conversant with the disease at hand. Dr J. suggests to the research team that the manuscript be submitted to his country's medical journal. Incidentally, the journal is published two times a year, has a circulation of 500 copies, and does not receive many manuscripts. Although it would depend on the editor's decision, chances of publication are high. Certainly the disease is of more immediate relevance to clinicians in a southern African country than in the West. If you were Dr J.'s collaborator, how would you respond?

Siegfried et al (17) studied African medical journals in 2005. In total, there were 158 journals and only 18 were indexed in MEDLINE and 10 in EMBASE. Fifty-nine were studied further, 41 had circulation below 1000 per issue, and 52 were published in 4 or fewer issues each year. Only 6 countries had more than 5 journals. A developed nation researcher who collaborates with developing nation researchers has in many cases obvious difficulties if they have to consider publishing in a small journal from the developing nation. Often, however, there is no consideration for the small journal.

The situation regarding medical journalism in Africa is not static. There have been improvements, eg, the initiative started by the Special Programme for Research and Training in Tropical Diseases (TDR), a joint UNICEF-UNDP-World Bank-WHO program, which resulted in the formation of the Forum for African Medical Editors (FAME). There is also the African Journals Partnership, jointly sponsored by the National Institute of Environmental Health Sciences (NIEHS), the National Library of Medicine, and the Fogarty International Centre, and implemented by the Council of Science Editors. The journal partnership has established partnerships between four African medical journals (*Malawi Medical Journal*, *Ghana Medical Journal*, *Mali Medicale,* and *African Health Sciences*) and 5 established journals in the developed world (*JAMA*, *BMJ*, *Environmental Health Perspectives*, *Lancet,* and *American Journal of Public Health*).

The African journals aim to improve sustainability and publishing regularity, improving the peer-review process by identifying experienced reviewers and offering local researchers and potential authors' guidance in preparing research papers for publication in peer reviewed journals (18-20).

What type of research should be conducted in developing countries?

Most of the global attention on health and disease in Africa has been directed toward malaria, tuberculosis, HIV and AIDS, and maternal mortality. These are certainly important public health considerations. A country like Malawi has a maternal mortality ratio or about 950 to 1120 deaths per 100 000 births, while many developed nations have single digit figures. Of the 40 million people estimated to be infected with HIV globally, 70% are in Africa, while malaria continues to be a menace in tropical countries. However, it is even of greater concern that in most of the developing world there is little research in hypertensive disorders and heart conditions. Needless to say, these diseases are growing causes of morbidity and mortality in developing nations. If any disease in the developing nations is to attract international attention, then its association with HIV or malaria has to be recognized. For most countries, the leading causes of deaths are not known. It is generally assumed that malaria, tuberculosis, AIDS, and maternal deaths are the main causes of high mortality when they may not be.

Conclusions

Research from developing nations is under-represented globally (21). Major journals reject manuscripts with authors from developing nations while journals from developing nations may suffer from a circle of inadequacy (22,23). There is a need to share the lessons on how a country's research capacity and output can be transformed from a "developing nation" to the "developed nation" category.

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