

International Mentorship and Research Ethics and Integrity: Reducing Brain Drain in Africa

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Abstract

The loss of gifted academic scholars, especially in research, is a serious issue for any nation or community. This loss is known commonly as “brain drain.” The prevention of “brain drain” in health research is a particularly serious intellectual property issue for Cameroon. This is compounded with women’s issues worldwide and the challenge of international respect for Africa’s scientific infrastructure. This article explores the movement from “high diplomas” to the “brain drain” issue in Cameroon, encouragement for research funding in Cameroon, and mentoring African women in scientific research. A consortium was formed and named, “Higher Institute for Growth in Health Research for Women” (HIGHER Women). Annual workshops have brought mentors and mentees together for three to five days of intensive training in topics such as, responsible conduct of research, work-life balance, and strengthening professional integrity. In its first five years, the mentor-protégé structured program of the HIGHER Women Consortium has become a model of mentoring that extends beyond Cameroon’s borders.

Keywords: international mentoring, responsible conduct of research, research integrity, ethics, brain drain, intellectual property

Introduction

Integrity is essential throughout the processes, procedures, results, and conclusions of scientific research. Such integrity is central for the ethical and legal creation, as well as the use of intellectual property. A commitment to research integrity is a must for the appropriate use of intellectual property when mentors and mentees from different countries share samples, reagents, technology, and ideas. Misconduct in health research may arise due to vague understanding of legal and ethical standards. It is worse if there is lack of respect for researchers from developing countries, especially females. This prevents researchers from bringing home new intellectual resources to foster development and prosperity in their countries of origin.

In order to ensure that the research itself and every researcher’s intellectual property rights (IPR) are protected effectively, host researchers, visiting researchers, and trainees need to know in advance the principles of research integrity, and commit to apply them. IPR in the context of this article is extended to the IPR of developing countries struggling to build up their own citizens in every way. The responsible conduct of research (RCR) consists of awareness and application of established professional norms and ethical principles. RCR is more than simple compliance with regulations. RCR most deeply includes ethics and integrity in any and all activities related to research in any field or endeavour. Such knowledge in an ever-increasing global research collaborative environment, requires a foundation of scientific background, cultural awareness, international mentorship and collaboration, and trust—all of which are not evident in the world, especially in the context of developing countries (Li, et al., 2015).

Graduate Diplomas Lead to *Brain Drain* in Cameroon

The higher education system in Cameroon is represented by 238 universities including eight state-run universities named according to city (Bamenda, Buea, Douala, Dschang, Maroua, Ngaoundere, Yaoundé 1, and Yaoundé 2), and 230 private institutions of higher

education. There are approximately 2,000 study programs, about 1,055 baccalaureate programs, 650 master's degree programs at 92 universities and 240 doctoral degree (PhD) programs at 36 universities. The number of graduate degree (tertiary diplomas) holders gradually increases over years but in contrast, only a few of the graduates find employment. The number of medical degree (MD) holders has increased, from over 2,000 in 2012 (Nghah Nghah et al., 2013) to about 4,000 in 2019, mostly due to the fact that the number of state and private university institutions that run medical programs has increased. From the Ministry of Higher Education statistics in 2018, 500 MDs, 150 pharmacy doctors (PharmDs), 150 dentists and 5,000 biomedical professionals are trained each year throughout the country. The number of PhD holders has also increased over the past decade. In 2018, there were 520,000 students in the 238 universities all over the country (Cameroon Ministry of Higher Education, 2018). It is estimated that about 1.5 percent of students earn the PhD degree, giving an estimate of up to 7,500 PhD holders throughout the country since 2018. At the University of Yaoundé II, 1,800 PhDs have graduated since its opening in 1993, and 1,100 new candidates are pursuing the degree.

In Cameroon, MD holders are generally employed in public hospitals upon graduation. However, many PhD holders must undergo long postdoctoral fellowship programs, as well as applying for positions leading to tenure in universities. In 2018, Cameroon had 4,518 teacher-researchers (Professors, Associate Professors, Assistant Professors) compared with 4,081 in 2012; 92 teaching and research associates and postdoctoral fellows; 380 technologists qualified to deliver technological and professional courses. Consequently, the number of available positions was very limited.

On December 13, 2019, the Cameroonian Prime Ministry (PM) and the Ministry of State/Ministry of Higher Education published a list of 1,237 of PhDs recruited in the first phase of a special operation to recruit 2,000 lecturers into the eight state-run universities in Cameroon. The list was immediately contested by non-recruited PhDs and social media activists who insisted that the recruitment process was characterized by irregularities such as duplications, age restrictions (45 years being the upper limit), and other issues. Over 500 were recruited for 2020 and candidates' files are undergoing processing. Though data have not been officially published, 90 percent of candidates are not usually recruited. At the University of Yaoundé I, 103 new lecturers out of 1,000 candidates were recruited to replace irregular, adjunct, visiting or part-time lecturers and teachers who resigned, retired, or died. At the University of Yaoundé II, 127 lecturers were hired in 2019, but only 56 for the year 2020.

Among Cameroonian PhD holders, a considerable number pursued their education abroad, or completed their PhD under joint institutional supervision. Many of them have been reluctant to face unemployment in their native country. Even those who have obtained their PhD in Cameroon have gone abroad either on postdoctoral fellowship or with research tenure contracts because they cannot secure recruitment locally. The loss of the best and brightest in a country is referred to as *brain drain* (Boger, 2018).

Scarce Research Funding in Cameroon

Since 2010, the government has made remarkable efforts to support the career growth of scientists in Cameroon, thereby encouraging them to persevere in research. These efforts have taken the form of an allowance of research modernization granted to university teachers by the

Ministry of Higher Education. Instituted by the President of the Republic of Cameroon, and applied by the Minister of State/Minister of Higher Education, this is called “special allowance for the modernization of university research.” This program benefits all teacher-researchers at state-run universities. Full professors receive an annual stipend of approximately \$7,500 (US) in four instalments. Associate professors receive about \$5,900 yearly; and assistant professors receive up to \$4,500. This is certainly not enough to cover research needs. Though this financial endowment is barely sufficient for research in the country, it has promoted a spike in Cameroonian research activities in the last decade, and consequently, set up a doorway for some scientists to make their mark in research in the country. It is important to persevere in fundraising for research, by adding new approaches to attract international funding.

In recent years, there has been an increase in health research in Cameroon thanks to investments from the international donors such as the Bill and Melinda Gates Foundation, the Global Fund for the Fight against HIV/AIDS, Tuberculosis and Malaria (GFATM), the European Commission, Wellcome Trust, and the European and Developing Countries Clinical Trials Partnership (EDCTP). Such funders have periodic calls for research proposals. However, only scientists with ample writing and research experience are prepared to develop the necessary strategies to secure funds. Again, research mentoring is the cornerstone to help develop and master these strategies.

Research Compliance, Ethics, Integrity, and the Dignity of Human Persons

Health research is more than a simple factor of progress; it is a necessity. It leads to an understanding of the many diseases and events that affect human beings, the improvement of access to health care, and to the improvement of health and well-being (individual and collective) of the entire nation.

To improve access to care for all, health research faces a number of challenges such as the following: a) institutional integrity in hospitals/trial centers and units, universities, and laboratories; b) career development of students, teachers, and researchers; and, c) economic challenges of too few quality control laboratories, drug companies, and income for researchers. All of these challenges could potentially impact the human rights, dignity, physical, and moral integrity of research participants. Research is never justified when ignoring human rights.

Egregious historical examples considered in hindsight have helped lay the foundations for research ethics and integrity in the form of guidelines, rules and laws indicating what is acceptable or not, both socially and legally. In some horrific cases the very definition of who was a “human being” was modified to avoid crises of conscience.

For research to involve human participants, there must be compliance depending on the designs of the studies. Compliance with the revised Common Rule effective January 2019 by the US Department of Health and Human Services, the Declaration of Helsinki 2013, the Council for International Organizations of Medical Sciences (CIOMS) ethical guidelines 2016, and the Good Clinical Practice (GCP) guidelines E6(R2) are all now compulsory throughout the world.

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A review of research protocols submitted to the Cameroon national ethics committee between 1997 and 2012 showed that:

Clinical trial protocols submitted for review did not adequately plan to assess adverse events in clinical trial protocols. In order to improve on the safety of participants and marketed drug, there was a need to develop national guidelines for clinical trials by the government, and to improve evaluation procedures and monitoring of ongoing trials by the ethics committee (Ebile et al., 2015).

Biomedical research targeted some important diseases that pose a great burden to Cameroonians, but vulnerable populations were almost always excluded from that research; Biomedical research rarely addressed components of the health system and emerging diseases of vital public health importance.

It was recommended that the government of Cameroon play a central role between researchers from academic institutions, sponsors, non-governmental organizations (NGOs) and research institutions to ensure that biomedical research addresses the health priorities of Cameroonians. Vulnerable populations should also be included, and other components of the health system must be addressed for balance (Ebile et al., 2017).

There have been initiatives to strengthen the capacities of investigators and members of Research Ethics Committees (RECs). Such initiatives include optimizing review procedures, monitoring clinical research, and harmonizing the standard operating procedures (SOPs), with ethics grants obtained by some ethics committees in the country. Such committees include: The National Ethics Committee, the Ethics Review Committee of the Cameroon Bioethics Initiative (CAMBIN), and the Institutional Review Board (IRB) of the University of Buea.

To date, about 20 RECs for human health have been established throughout the country widely. Administrative authorization for health research is also granted by the Minister of Public Health, through the Division of Health Research Operations (*Division de la Recherche Opérationnelle en Santé du Ministère de la Santé [DROS/MINSANTE]*) under the authority of the Ministry of Public Health. Additionally, there should be active and ongoing monitoring in the field ensuring that approved protocols are followed and participants are respected. There have been over the years an increasing number of online courses on research ethics and integrity, opportunities for obtaining recognized certification of members of ethics committees, for visiting IRBs abroad, for attendance at appropriate conferences, or training in established institutes. Access to the guidelines for compliance has been readily available. Regulations continue to evolve and staying up-to-date will always be required.

Beyond Compliance: Mentoring for Research Integrity and Reduction of *Brain Drain*

Intellectual property (McJohn, 2019) is the intangible property that results from creations of the mind and mental efforts in various academic and research areas of investigation. Its results arise in many diverse forms and for many diverse fields of inquiry. The most common example of intellectual property theft is plagiarism whereby a researcher copies another's work and then presents it as his/her own, without acknowledging the original author. Plagiarism has become

easily detected within a language, and progress has been made to readily detect plagiarism between languages. Beyond actual plagiarism, the theft of intellectual property (IP) may not be as readily detectable nor preventable. Intellectual property legal systems are highly procedural. Both internationally and nationally one goal of such systems is for intellectual property holders to be given full recognition and respect for their rights.

Egregious examples of IP theft have been reported regularly, especially when they also involved national security, confiscation by customs officials, and criminal charges in the countries involved. A less publicized but more serious aspect of IP loss is brain drain. Brain drain, as discussed earlier, begins with small, incremental, seemingly innocuous discouragements over time (Easterly and Ricard, 2011), until a researcher changes career interests, thinking that his/her original goal is unattainable in one's current institution or home country. The researcher then seeks greener pastures elsewhere.

Good international mentorship may be just the remedy, propelling the mentee back home, fostering brain retention, and promoting the future of excellent research in the mentee's home country, while giving him or her opportunities to work with funds and facilities from abroad.

Effective networking and mentoring would also detect and prevent misconduct. If research misconduct and cheating have been observed over time (Elsayed, 2020), from both the mentors' and trainees' side, it irreparably damages the reputation of the whole scientific community. The foreign researcher has all too often been blamed for misconduct that occurred in the host institution years earlier. A lack of trust has discouraged international organizations to invest time, personnel or funding in scientific research (Li, et al., 2015).

Professional integrity can be built with interpersonal relationships that incorporate guidance, coaching, tutoring, and mentoring. From a holistic point of view, mentoring is the single most important mechanism for building and sustaining the next generation of researchers around the world. Mentoring allows for the mentee's personal and professional development to flourish through networking, balancing work and life, especially nurturing emotional resilience wherever the mentee finds him or herself in the world. Mentoring is a life-long benefit and so important that several mentors may be recruited during the span of one's career, whether they are from home or abroad.

Mentoring for African Women in Science

Men are three times more likely than women to reach top-level positions (Sungjoo, 2018) in research. In Cameroon, only 7.25 percent of professors are women and 12.5 percent are associate professors (SIGIPES/MINESUP, 2013). The need for women scientists' role models was highlighted in a study that interviewed 10 women scientists in Cameroon. The women in that study noted the absence of female role models in sciences (Woodhouse & Ndongko, 1993). Academic education has standards, but true mentoring has so far been lagging among women in Cameroon and elsewhere in Africa. To support the next generation of women scientific leaders, an American consortium of women scientists "Committee for the Advancement of women Chemists (COACH)" (<https://coach.uoregon.edu/coach-international/>) is coaching women in the United States and in Africa, including Cameroon.

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There has been a significant need for well-organized and viable mentorship programs within African institutions. A consortium of women scientists in Cameroon has, as its cornerstone, mentoring early career women in biomedical research: The “Higher Institute for Growth in Health Research for Women (HIGHER Women)” consortium. The HIGHER Women consortium, founded by Professor Rose Gana Fomban Leke, holds that attracting and maintaining young Africans in research is vital to the development of African communities (Essama et al., 2019). Professor Rose Leke is an Emeritus Professor of Medicine. Among other distinctions, she is Doctor Honoris Causa, University of Ghana 2014, holder of the African Union 2011 Kwame Nkrumah Scientific Award for Women, and 2018 World Health Organization Heroine in Medicine. She has developed her visionary idea of propelling promising Cameroonian women scientists in research for health using a holistic approach strategy.

Holistic mentoring equips early career women with both personal and professional skills to perform well in their career, achieve success and stay in the professional research track (Boer and Moonnesinghe, 2020). Mentoring has met with some challenges such as sustainability, expansion, retention of mentees in Africa, motivation of mentors, and institutional support. To be successful and achieve excellent results, mentoring must circumvent these challenges with more human and financial resources in addition to institutional support.

The Mentor-Protégée Structured Program of the HIGHER Women Consortium as a Model of Local Mentoring

The HIGHER Women consortium has been led by Professor Rose Gana Fomban Leke, who retired as head of the Laboratory of Immunology at the Biotechnology Centre of the University of Yaoundé I. The Consortium was delighted by the emphasis placed on the inclusion and promotion of the career of emerging women scientists (protégées) by committing to facilitate professional growth and to foster diverse relationships that add value to the research community in Cameroon. The mission of the HIGHER Women mentor-protégée program (MPP) is to be the center of expertise, information, and ideas to promote the careers and competitiveness of women in biomedical research in Cameroon. The following are the central aspects of the HIGHER Women MPP. The material that follows is found in and has been summarized from the references cited at the end of this section.

The overall objective of the HIGHER Women MPP is to provide professional guidance to the protégée to facilitate growth and emergence in their careers. Specifically, the HIGHER Women MPP aims to:

1. Advance the growth and development of women in order to attain long-term sustainability and responsible conduct of research in the women’s careers;
2. Contribute to the development of quality practices above and beyond mere compliance in the field of health research;
3. Increase the women’s ability to mobilize sizeable funding for the execution of quality research projects;
4. Increase national and international visibility of Cameroonian women researchers through sustained and superb research productivity;
5. Enable successful transition from being a protégée to becoming a mentor after successful completion of five years in the MPP.

The HIGHER Women MPP shall be comprised of three key components: the Mentor, the Protégée, and the Consortium. Each component plays a major role in the program and each bears responsibility for the success of the program. Each Mentor-Protégée relationship should be unique--based on needs, type of specialty and research climate in the research institutions of origin. Each of the three components is summarized as follows:

The Mentor: A mentor is a well-established, successful woman in health research who is willing to voluntarily commit time, resources, and expertise to teach, develop, and grow the career of an emerging woman in the field. The Mentor is usually a woman who has extensive work experience either nationally or internationally and/or who is currently working on a research project or has worked extensively in the field in the past. The Mentor serves as an advisor to the protégé and receives no monetary compensation from HIGHER Women consortium. Mentors are equipped with the knowledge and experience to help emerging women health researchers to pursue the objectives of the HIGHER Women MPP. A mentor may voluntarily withdraw from the MPP by notifying the HIGHER Women consortium in writing at least 30 days in advance of the mentor's intent to voluntarily withdraw her participation in the MPP.

The Protégée: A protégée is an emerging women health researcher, who has voluntarily signed a HIGHER Women MPP engagement form, working in a research institution in any of the 10 regions of Cameroon in the field of health research with 0 to 5 years of experience. The protégée needs to have a vision for growth and long-term stability and sustainability in her research area of specialty but needs guidance to attain higher levels of performance that will increase her potential for sustainable growth in her career. A protégée may voluntarily withdraw from the MPP by notifying the HIGHER Women consortium in writing at least 30 days in advance of the protégée's intent to voluntarily withdraw her participation in the MPP.

The Consortium: The major function of the HIGHER Women consortium is to facilitate interaction between the mentor and the protégé and to provide a platform for their exchanges. The consortium fosters an environment conducive to the proper functioning of the MPP. Through the organization of yearly forums, monitoring and evaluation of MPP activities, the consortium interfaces between funders and the program, as well as consistently raise funds for program's sustainability.

In the following, the roles and responsibilities of each of the three components are summarized.

Roles and responsibilities of the mentor

1. Sign a mentor engagement form;
2. Respond to protégée's meeting requests;
3. Attend at least one meeting per quarter (every 3 months) with each protégée. The meetings may be held "face to face", through the social media/virtual platforms (Skype, Google Meet, Zoom etc.) or by phone. During these meeting, the mentors should be prepared to review progress made in achieving the desired outcome outlined in the protégé professional development plan;

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4. Critically examine and revise the protégée's professional development plan so as to encourage the use of tools, skills, and opportunities that will further the protégée's career;
5. Inform the protégées of various professional opportunities (call for funding, workshops, seminars etc.);
6. Provide advice as indicated or requested by the protégée;
7. Review and revise annual MPP report form completed by the protégée to be submitted to the consortium.

Roles and responsibilities of the protégée

1. Sign a protégée engagement form;
2. Initiate the contact with the mentor and send meeting requests to the mentor at least once per quarter
3. Attend at least one meeting per quarter (every 3 months) with the mentor. The meetings may be held "face to face," through the internet or by phone;
4. Provide the mentor with a personal professional development plan and revise it as advised by the mentor so as to strive to achieve professional development goals outlined in the plan;
5. Solicit and listen to counsel and advice on the full spectrum of experiences of the mentor;
6. Prepare an annual MPP report form, review the form with the mentor, and submit it to the consortium. Each report is due 30 days after the end of each 12-month period commencing with the start of the MPP relationship.

Roles and responsibilities of the consortium

1. Recruit and match the mentors and the protégées according to their area of specialty;
2. Ensure that the mentor and protégée meet the eligibility requirements for the MPP.

Overall, the MPP has been accomplishing the goals of incentivizing the mentees to stay in Cameroon, expanding the female research community, enabling persistence in pursuing research careers, promoting research in Cameroon, and creating national and international opportunities to work with other researchers. Thirty (30) mentors and 115 protégées have participated since the program began in 2015. Further, the MPP has been facilitating the learning and adoption of legal and ethical research standards, thereby increasing professional integrity (Leke & Kwedi Nolna, 2016; Kwedi Nolna et al., 2017; Kwedi Nolna et al., 2018; Essama et al., 2019).

Conclusions and Relevance to Humanity

Knowledge and awareness of RCR for health has been limited among researchers worldwide, especially in Africa and sub-Saharan Africa, mainly because opportunities for leadership in health research have been limited. Until a better understanding of the connection of research and integrity develops, research and economic growth will not develop and increase.

This is true for all institutions and locations globally. The importance of African researchers with impeccable integrity and their application of those ethics in the development of African science is crucial. This article, hopefully, will ignite thinking about ways to incentivise African talent to return home after training abroad, or even to stay at home due to an effective and ethical international mentorship program.

Research integrity (Resnik, 2013; National Academies of Science, 2017) ensures respect for all while prohibiting misconduct of any form. Following rules and regulations may give rise to compliance, but mere compliance does not rise to what is meant by “integrity.”

If a well-trained and ethical African scientist collaborates with scientists from the North (Europe) or West (United States) to build his or her career, ready access to technology, resources, and incentives must exist in the home country. Initiatives from Africans to promote South-South collaboration in order to promote African scholars to continue their scholarship in their home countries should prove promising.

Evidence-based research that informs policy, responses to pandemics, and collaborative partnership is one of the gold standards. Mentoring allows fledgling scientists to receive additional training abroad, exchange with other scientists, meet with senior investigators and transfer knowledge and technologies. When research is conducted with integrity, conclusions will be trustworthy. Accordingly, trustworthy research findings will benefit all of humankind. The greatest benefits will be international diplomacy, mutual understanding, trust, and, in a word, integrity.

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