Original Article

Do Students Eventually Get to Publish their Research Findings? The Case of Human Immunodeficiency Virus/Acquired Immunodeficiency Syndrome Research in Cameroon

Munung NS[1,#], Vidal L[2], Ouwe-Missi-Oukem-Boyer O[1,3,#]

[1]*Cameroon Bioethics Initiative (CAMBIN), Yaounde, Cameroon,* [2]*Institut de Recherche pour le Développement, Marseille, France,* [3]*Centre de Recherche Médicale et Sanitaire, Niamey, Niger*

[#]*This study was primarily carried out at the Centre International de Référence "Chantal BIYA" pour la Recherche sur la Prévention et la Prise en charge du VIH/SIDA (CIRCB), Yaoundé, Cameroon*

Address for correspondence:
Dr. Odile Ouwe Missi Oukem-Boyer, Centre de Recherche Médicale et Sanitaire, P. O. Box 10887, Niamey, Niger.
E-mail: ooukem@gmail.com

Abstract

Background: Scientific publication is commonly used to communicate research findings and in most academic/research settings, to evaluate the potential of a researcher and for recruitment and promotion. It has also been said that researchers have the duty to make public, the findings of their research. As a result, researchers are encouraged to share their research findings with the scientific world through peer review publications. In this study, we looked at the characteristics and publication rate of theses that documented studies on human immunodeficiency virus (HIV)/acquired immunodeficiency syndrome in Cameroon. **Materials and Methods:** To check if a thesis resulted in a publication, we searched: A database of publications on HIV in Cameroon, African Journals Online, PubMed and Google scholar. For each publication we recorded if the student was an author, the position of the student in the author listing, the journal and where the journal was indexed. We also looked at the impact factor of the journals. **Results:** One hundred and thirty theses/dissertations were included in the study, 74.6% (97/130) were written as part of a medical degree (MD), 23.8% (31/130) a postgraduate (PG) degree and 1.5% (2/130) for a Doctorate/PhD. On a whole, 13.9% (18/130) of the theses resulted in at least one publication in a scientific journal with a total of 22 journal articles, giving a mean publication rate of 0.17 article/thesis, 86.4% (11/22) were indexed on PubMed, 9.1% (2/22) on African Journals Online and 4.6% (1/22) on Google scholar. One PG thesis led to two book chapters. The student was the first author in 22.7% (5/22) of the articles and not an author in 9.1% (2/22) of the articles. Student supervisor was an author in all the articles. **Conclusion:** This study reveals that most students in Cameroon failed to transform their theses/dissertations to scientific publications. This indicates an urgent need to sensitize students on the importance of presenting their research findings in scientific meetings and peer reviewed journals. There is also a great necessity to build capacity in scientific writing among university students in Cameroon.

Keywords: Cameroon, Graduate and medical students, Human immunodeficiency virus/acquired immunodeficiency syndrome, Publication rates

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Introduction

Scientific publication is commonly used to communicate research findings to other scientist and to advance scientific discovery. Equally, scientific publication is fast becoming a tool used in most settings to evaluate the potential of a researcher. It is also a key factor for recruitment and promotion in most academic and research settings. The World Medical Association's Declaration of Helsinki, 2013, paragraph 36,[1]

states that authors have a duty to make publicly available the results of their research on human subjects and are accountable for the completeness and accuracy of their reports. This is usually through the form of publication in peer-reviewed journals, conference presentations and for most students, the writing of a thesis/dissertation.

With the advent of the human immunodeficiency virus/acquired immunodeficiency syndrome (HIV/AIDS) pandemic, some health researchers and funding agencies faced a shift in research interest with the desire to seek for and gain knowledge on the virus. As a consequence, Africa witnessed a sharp increase in the number of research studies on HIV as evidenced by the number of publications in the last decade when compared to other diseases like, but not limited to, Malaria and Filariasis.[2] In Cameroon, the first publication on HIV/AIDS was recorded in 1986 and by the year 2011, the country could boast of more than 2000 publications (journal articles, conference abstracts, books and book chapters) on HIV.[3] However, research productivity (based on published articles) in the area of virology has been shown to be quite low in developing countries.[4] This could be due to varied reasons amongst which is the likelihood that some of the research done in developing countries might still not be available to the wider scientific community.

Cameroon, one of the two countries in the world having French and English as official languages, is a citadel of learning in Central Africa. In recent times, there has been a relatively great improvement in terms of investment in higher education and research on HIV/AIDS in Cameroon. Nowadays, Cameroon can boast of eight state universities and a number of private universities and higher institutions of learning when compared to the sole state owned university of Yaounde in the 1950s. French and/or English are the languages of instruction in all universities; therefore students have the privilege of writing their thesis/dissertation in any of the official languages. The only exceptions being the solely Anglo-Saxon universities of Buea and Bamenda were lectures are done in English only and theses/dissertations must be written in English.

As part of training for obtaining a postgraduate and medical degree (MD) in Cameroon, students are required to engage in a scientific research study and to document the findings in a thesis. This is closely followed by an academic defense. The thesis is later on deposited in the library of the student's institution. In most institutions of higher learning in Cameroon, publication of a scientific finding in a peer review journal article is not a pre-requisite for graduation/completion of program. It is therefore the choice of the student and/or his/her supervisor(s) to go a step further to publish their research findings.

As with all scientific research, graduate education extends to peer review scientific publication, otherwise, the time and talent of many scientists would have been wasted and the knowledge generated would remain largely unavailable to potential users.[5] Studies have described the publication frequency and patterns of student theses in different universities around the world.[6-11] In Africa, such a study has been described in Togo.[12] However, little is known of the aftermath of theses describing research activities, once they have been presented as part of a degree program. In this study, we attempted to look at the characteristics of theses defended in Cameroon universities and that document studies on HIV/AIDS in Cameroon, as well as the publication rate.

Materials and Methods

This study focused on university theses (from 1989 to 2010) that documented research findings on HIV/AIDS in Cameroon. These theses were written as a partial fulfillment for the award of either a MD, a Maitrise, Masters, DEA (PG) or a Doctorate/PhD degree in a Cameroon-based university. The theses had been collected as part of a previous study for constituting a bibliography on HIV/AIDS in Cameroon[3] and were publicly available in university libraries or institutions, therefore no ethical clearance was sought.

For each thesis, we recorded the type of degree, year of thesis presentation, language in which the thesis was written (French or English) and the primary research area (vaccine discovery, diagnosis, drug discovery, improvement of clinical care, behavioral studies and prevalence studies). We also checked if the thesis was written following the structure of most scientific articles (introduction/background, materials and methods, results, discussion and references).

To check if a thesis resulted in a corresponding scientific publication (journal article, conference presentation, book or book chapter) we searched: A database of publications on HIV/AIDS in Cameroon,[3] African Journals Online (www.ajol.info), PubMed (www.ncbi.nlm.nih.gov/pubmed) and Google scholar (scholar.google.com). The database has a listing of publications on HIV/AIDS in Cameroon (journal articles, conference proceedings/presentations, books, book chapters) listed on a number of bibliographic databases and had been created as previously described.[13] The search was carried out using the name of the student and or thesis supervisor as the search term. If an article/conference presentation was found having the name of the student or that of his supervisor, we verified if the title was same or similar to that of the thesis and if the content of the article was similar to that recorded in the thesis. For each corresponding publication, we checked if the student was an author, the position of the student in the author listing. For each journal article, we recorded the name of the journal, where the journal was listed (African Journals Online, PubMed, Google scholar). The year of publication of the article was recorded to check how long it could take students to publish an article after their thesis defense. We also looked at the impact factor of the journals in which the articles were published (using the Thomas Reuter [formerly ISI] Journal Citation Index, 2011).

This method had been described in similar studies in France,[10] Finland,[11] India[8] and Peru.[6] Data was analyzed using Microsoft Excel 2007.

Results

One hundred and thirty theses/dissertations were included in the study, of which 74.6% (97/130) were written as part of a MD, 23.84% (31/130) a postgraduate (PG) degree and 2 (1.54%, 2/130) for a Doctorate/PhD. The number of theses systematically increased across the years [Figure 1]. For further analysis, the two Doctorate/PhD theses were grouped under PG degree. Overall, 45.4% (59/130) of the theses were focused on improving clinical care and/or management of HIV/AIDS, 26.2% (34/130) were prevalence studies, 20.8% (27/130) consisted in behavioral studies and 0.8% (1/130) on vaccine discovery [Table 1a]. One hundred and sixteen (89.2%, 116/130) student theses were supervised by academics with the rank of a professor, whereas 10% (13/130) were supervised by non-professors but by academics having a PhD [Table 1c]. 75.4% (98/130) of the theses were written in French while 24.6% (32/130) were in English [Table 1d].

A total of 22 (16.9%, 22/130) journal articles were published from the 130 theses analyzed in this study [Table 1f]. Overall, the mean publication rate per thesis was 0.17 article with 18/130 (13.9%) of the theses resulting in at least one publication in a scientific journal. 14.4% (14/97) of the MD theses, led to at least one journal article and 12.1% (4/33) of the PG resulted in a publication in a scientific journal. The number of published articles per thesis ranged from 0 to 2. Nineteen (86.4%, 19/22) of the journal articles were indexed on PubMed while 9.1% (2/22) were on African Journals Online [Table 1g]. One PG thesis also resulted in two book chapters both of which were available online (via Google scholar, data not shown).

Out of the 22 articles published from student theses, the student was the first author in 22.7% (5/22) of the articles, second author in 27.3% (6/22) of the articles and not an author in 2 (9.1%, 2/22) articles. The student's supervisor appeared in all articles as an author. 4.6% (1/22) of the articles was published before the year of thesis presentation, while most were published in the year the thesis was presented (27.3%, 6/22) or 2 years (22.7%, 5/22) thereafter [Table 2]. Only one (4.6%, 1/22) article was published in French while the rest (95.5%, 21/22) were in English.

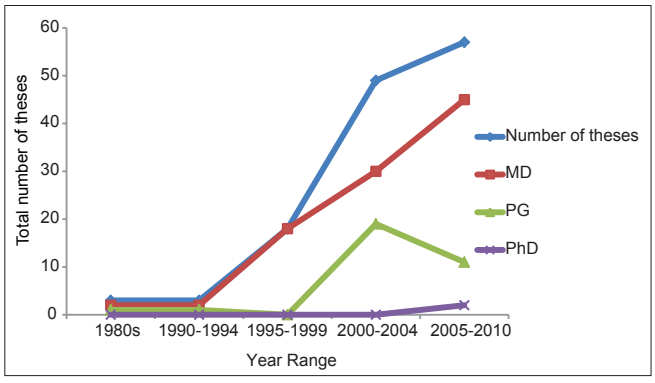

Figure 1: Distribution of theses/dissertations over the years (1980-2010)

Discussion

Publication of a research study in a peer review journal increases visibility of research findings and helps advance scientific knowledge. Research findings as documented in student theses describing research on HIV/AIDS in Cameroon is still largely unavailable to the international scientific community. In this study, we investigated and documented the characteristics and publication rate of HIV/AIDS research in Cameroon as carried out by students in medical schools and universities. The results show that many students are getting more and more involved in HIV/AIDS research in Cameroon in the last 10 years.

Much (45.4%) of the research undertaken by students was in the area of clinical care and management and this was mostly done by students studying for an MD [Table 1]. In Cameroon, students in medical school spend the last academic years of

Table 1: Characteristics of theses/dissertations on HIV/AIDS in Cameroon

Characteristic of theses	MD theses (*n*=97) (%)	PG theses (*n*=33) (%)	All theses
a. Primary research area			
Behavioral	1 (1)	26 (78.8)	27 (20.8)
Clinical care/management	57 (58.8)	2 (6.1)	59 (45.4)
Diagnosis	5 (5.2)	3 (9.1)	8 (6.2)
Drug discovery/ pharmacology	0	1 (3)	1 (0.8)
Epidemiology	33 (34)	1 (3)	34 (26.2)
Vaccine discovery	1 (1)	0	1 (0.8)
b. Research designs			
Cross-sectional	60 (61.9)	10 (30.3)	70 (53.9)
Longitudinal	3 (3.1)	0	3 (2.3)
Qualitative	1 (1)	23 (69.7)	24 (18.5)
Retrospective	17 (17.5)	0	17 (13.1)
Others	16 (16.5)	0	16 (12.3)
c. Theses supervision			
Professor	97 (100)	19 (57.6)	116 (89.2)
PhD	0	13 (39.4)	13 (10.0)
Others	0	1 (3)	1 (0.8)
d. Language			
English	25 (25.8)	7 (21.2)	32 (24.6)
French	72 (72.2)	26 (78.8)	98 (75.4)
e. Theses written following format of a scientific journal article	97 (100)	12 (37.5)	109 (83.9)
f. Journal article	15	7	22 (16.9)
g. Indexing of published articles*			
PubMed	12 (80)	7 (100)	19 (86.4)
African Journals Online (only)	2 (13.3)	0	2 (9.1)
Google scholar (only)	1 (6.7)	0	1 (4.6)
h. Conference presentation	11 (11.3)	3 (9.1)	14 (10.8)

HIV/AIDS: Human immunodeficiency virus/acquired immunodeficiency syndrome, MD: Medical degree, PG: Post-graduate degree

Table 2: Publication rates of student theses on HIV/AIDS in Cameroon

Time taken from year of thesis defence to publication	Number of published articles (%)
Before defence of thesis presentation	1 (4.6)
Year of defense	6 (27.3)
1	1 (4.6)
2	5 (22.7)
3	3 (13.6)
4	2 (9.1)
≥5	4 (18.2)
Total	22 (100)

HIV/AIDS: Human immunodeficiency virus/acquired immunodeficiency syndrome

their training in hospitals or clinic for on-the-field training. During this period, students might therefore be able to collect data for their thesis as contact with patients is relatively easy compared with field or laboratory-based research. Prevalence studies (26.2%) were also dominant. This pattern is similar to that of another African university, where most of the theses from its medical school were concentrated on clinical (35.8%) and epidemiological (47%) themes.[12] Such patterns have also been shown in other medical schools around the world.[10,11] Our study demonstrates that very few students engage in wet-lab studies and this could be attributed to the expensive nature of such studies, limited funding for research in universities in Cameroon or the very fact that most of the laboratories in Cameroon universities are not well equipped. This shows a need for universities to source for funding (local or international) to equip laboratories and facilitate laboratory-based research on HIV/AIDS in Cameroon especially for students in the biomedical sciences who may be interested in vaccine/drug discovery studies. Furthermore, important is the need for Cameroon universities to partner with research institutes existing in the country, as this might facilitate the training of medical and postgraduate students. There is also the need for universities in Cameroon to partner with other universities in the north as well as the south, in order to facilitate student exchange in cases where local research laboratories cannot provide both the infrastructure and expertise. There is the necessity for the Government of Cameroon, through its Ministries in charge of Higher Education and Scientific research to provide small research grants for postgraduate and medical students.

Most (78.8%) of the PG students tend to be involved in research that addresses behavioural patterns towards HIV and 69.7% of the theses used qualitative methods to answer their research questions or achieve the objectives of the study [Table 1a and b]. This may imply that very few students in the biological sciences get engaged in HIV-related research. Again, this could be due to the very few well-equipped bio-laboratories found in the country and that are willing to host students interested in HIV research.

A majority (89.23%) of the students were supervised by faculty with the rank of a professor. This percentage appears to be higher than that recorded in a review of student theses in Finland.[11] All MD theses were supervised by professors while 39.4% of the PG theses were supervised by faculty with a PhD and 3% by a faculty without a PhD. Considering that many of the students were supervised by faculty with the rank of professorship, one would expect that students should have at least one publication arising from their theses. This is simply because professors are familiar with the publication process (from writing to responding to reviewers) and would be in a good position to guide novice researchers on the publication process.

More than 70% of the theses were in French. This is probably due to the fact that Cameroon is predominantly French speaking and therefore most students in universities will be more proficient in French than in English. This may also account for the low publication rates as many scientific journals accept articles only in English.

Most of the theses (83.9%) were written in the format of a scientific article, a situation that is similar to that documented in Finland.[11] Publishing part or all of the research findings documented in student theses in Cameroon appears not to be a common practice as just 13.9% of the theses had eventually given rise to a journal article. This is below that documented in a review of student theses in France,[10] Finland,[11] India and Peru[6] which had publication rates of 17.0%, 23.8%, 30% and 17.6% respectively. This again is worrying as the publication rate falls far below that (41%) reported in another African university, the University of Lome, Togo.[12] Many graduate students do not understand the process of scientific writing, nor the importance of peer review[14] and in Cameroon, there is little or no training in scientific communication/writing. Some authors have noted that teaching students to write effectively is a major cause for concern in education[14,15] and that intentional instruction in critical analysis and writing of scientific literature should accompany the training in the designing and execution of original research.[16] Such training must be incorporated as part of university education in Cameroon if there is any need to encourage budding scientist to publish their research findings. When compared with theses written by students in medical schools, PG theses had a higher publication rate (0.21) than MD theses (0.15). Despite the fact that most theses (83.9%) were in the structure of a scientific article, yet students often failed to transform their theses to scientific articles. This could simply be due to the fact that theses could be quite voluminous and narrowing it down to an article could be problematic to a young researcher with no experience in publishing scientific articles.

In this study, we realized that out of the one hundred and thirty theses analyzed only 18 (13.9%) eventually, led to a publication. On a whole there is a low publication rate by students in Cameroon Universities. It has been said that generally, medical students have a positive attitude towards science and scientific research in medicine.[17] This perhaps

could explain why medical students doing HIV research in Cameroon tend to publish in scientific journals more than their counterparts studying for a non-medical PG degree. Of the total number of published articles, 86.4% were indeed in PubMed while 9.1% were indexed in African journals Online. Interestingly, most of the theses were published in the year the theses were defended while one article was published before the thesis was defended. These findings appear to be better than that documented in France[10] and India.[8] Students also published in no impact journals to journals with impact factor > 5 [Table 3]. In general, PG students tend to publish in higher impact factor journals.

Scientific conferences usually serve as a medium for colleagues and peers to comment on a research study, for professional networking and in some cases, an opportunity for a submitted abstract to go through the process of peer review. In this study, 10.8% of the theses had been presented in scientific meetings either as oral presentations or conference abstracts. However, the percentage of theses presented at scientific meetings as documented in this study is less than that documented in Togo.[12] It is therefore necessary that students in Cameroon be encouraged to present their research findings in local and international scientific conferences, as this may spur up the students to consider eventual publication of their studies in peer reviewed journals. There is also the need for school authorities to advertise local and international conferences in their different universities.

Authorship of a scientific paper emanating from a student dissertation could in some cases be problematic, especially as it usually involves the student, one or more theses supervisor and in some cases a practicum supervisor. Usually many tensions arise in determining authorship order for a publication that is comprised of (or extends from) a student's dissertation research.[18] In this study, we looked at the authorship order of articles arising from student theses and if the student and supervisor were listed as authors in a corresponding article. In many schools of public health for example, dissertation supervisors and committee members are usually listed as authors on students' dissertation publications.[19] This was actually the case in this study as at least one of the students' supervisors was an author in an article published from a student thesis. The student was the first author in 5 (22.7%) articles and second author in six articles (27.3%). This trend is similar to that reported in France[10] and Finland[11] though the position of student as first author is lower than that recorded in Peru,[6] a developing country. In two cases, the student was not an author. This is likely to have happened in cases where the student had no time to write or contribute to the writing of the manuscript or where the student is not interested in following up a research career or had simply been excluded as an author by his/her supervisor. The International Committee of Medical Journal Editors requires that for one to be one listed as an author such a person must have been involved in all the following: (1) Substantial contributions to conception and design, acquisition of data, or analysis and interpretation of data; (2) drafting the article or revising it critically for important intellectual content; and (3) final approval of the version to be published (http://www.icmje.org/ethical_1author.html, accessed on 20 June 2012). If these guidelines are anything to go by, then one could perhaps understand why a student will not be an author of an article emanating from his/her thesis.

Table 3: Impact factor of journals in which students published their research findings

Impact factor of journal	Articles from MD theses	Articles from PG theses/dissertations	Number of articles
≤1 or no impact factor	8	0	8
>1≤2	5	1	6
>2≤3	1	2	3
>3≤4	0	2	2
>4≤5	0	1	1
≥5	1	1	2
Total	15	7	22

MD: Medical degree, PG: Post-graduate

Besides being a compulsory requirement for obtaining a MD or PG degree, a student thesis is a piece of scientific work. In a recent study,[7] the lack of time, staff support (35%) and confidence in the ability to write (29%) had been cited as some of the factors hindering students from publishing their findings after it has been reported in a thesis. The study further shows that, sustained commitment from supervisors, practical support (seminars, workshops and co supervision), effective supervisor-student engagement, funding and setting an expectation of publication could be help improve on the publication rates of student theses as journal articles. It can be recommended that studies hampering scientific publication and other issues of authorship be carried out in Cameroon. This may identify factors hindering publication and advice policy on the necessary actions to be taken to improve on publication rates of student theses in Cameroon.

The study findings reveals that PG and MD students in Cameroon often fail to transform their theses/dissertations to scientific publications. There is therefore an urgent need to sensitize students on the importance of presenting their research findings in scientific meetings and publishing these findings in scientific journals. This could be done through organizing workshops on scientific writing, providing language support in academic settings and introducing courses in scientific writing in the university curriculum especially for graduate students.

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