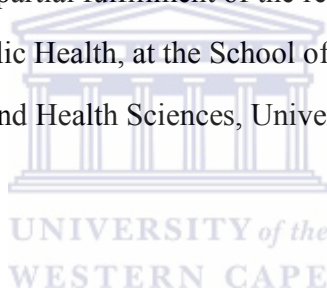


**THE UGANDAN PRIVATE STUDENTS SCHEME AT MAKERERE UNIVERSITY
SCHOOL OF MEDICINE AND ITS EFFECT ON INCREASING THE NUMBER OF
MEDICAL DOCTORS ENROLLED AND TRAINED FROM 1993 TO 2004**

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A mini-thesis submitted in partial fulfillment of the requirements for the degree of
Master in Public Health, at the School of Public Health,
Faculty of Community and Health Sciences, University of the Western Cape



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The Ugandan Private Students Scheme at Makerere University School of Medicine and its Effect on Increasing the Number of Medical Doctors Enrolled and Trained from 1993 to 2004

Suzanne Namusoke Kiwanuka

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Medical training.

Private Students Scheme (PSS).

Uganda.



DECLARATION

I declare that *The Ugandan Private Students Scheme at Makerere University School of Medicine and its Effect on Increasing the Number of Medical Doctors Enrolled and Trained from 1993 to 2004* is my own work, that it has not been submitted for any degree or examination in any other university, and that all sources I have used or quoted have been indicated and acknowledged by complete references.

Full name: Suzanne Namusoke Kiwanuka

Signed:



Date: 6th November 2010



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WESTERN CAPE

Dedication

I dedicate this thesis to my wonderful sons Matthew Austin and Micah Tendo. The joy of having the two of you in my life each day makes it all worthwhile.



Acknowledgements

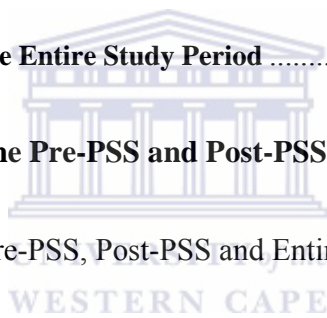
I am very grateful to my supervisors, Ms. Lucy Alexander and Dr. Ehimario Igumbor at the School of Public Health, University of the Western Cape for their tireless effort in supporting this work. Special thanks go to Dr. Stephen Kijjambu, Dean School of Medicine, Makerere University and Ms. Joan Basigira, Academic Registrar School of Medicine for facilitating the data collection process. I extend my heartfelt appreciation to Dr. Josephine Kayondo Sevume and Miss Maxencia Nassuna Kayondo for assisting with the data collection and entry. This work would not have been completed without you all. Thank You! And finally all Glory, Honour and Praise be to You my Father for enabling me to do this work.



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ACRONYMS AND ABBREVIATIONS

EAC	East African Community
HRH	Human Resources for Health
IMF	International Monetary Fund
IUCEA	Inter-University Council for East Africa
LMICs	Low and Middle-Income Countries
MBChB	Bachelor of Medicine and Bachelor of Surgery
MOH	Ministry of Health (Uganda)
MUSM	Makerere University School of Medicine
MUST	Mbarara University of Science and Technology
PSS	Private Students Scheme
UGX.	Uganda Shilling
UK	United Kingdom
USA	United States of America

DEFINITIONS OF KEY TERMS

The following definitions of terms were used in data collection, analysis and interpretation in this study.

Absconded - Students who dropped out of medical school for unknown reasons.

Attrition - The process or act of leaving medical school before completing their degree for whatever reason.

Cohort: A group of students described by their academic year of commencement, e.g. by the year of registration, i.e. 1988 for the 1988/89 cohort.

Cost-sharing - Partial privatisation of education.

Discontinued - This term refers to students required by the university to cease their studies on account of poor performance.

Dropped out - A colloquial term used to describe leaving one's studies before completion, a synonym for attrition for which there is no suitable verb.

Graduation rate - The number of students who graduated as a proportion of the number enrolled in each cohort. This excludes late graduates belonging to another cohort.

Dual track tuition policy - This refers to the policy whereby some students sponsored their own education while other students are fully sponsored by the government.

Private student - A student whose fees and study-related costs were fully sponsored by themselves or their family.

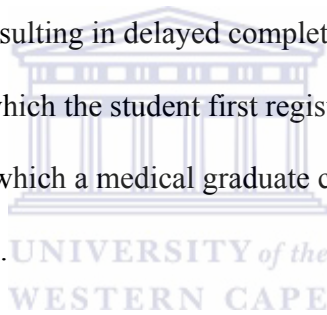
Private Students Scheme (PSS) - term used by the university and in this study, to refer to the dual track tuition policy implemented in Ugandan government institutions of higher learning to allow privately sponsored students to enrol for university education.

Standard duration/Period to complete/Length of study - Five years of study from enrolment to graduation is the standard period for medical students to complete their training.

Delayed completion - The process of taking more than five years to complete a study programme for whatever reason, resulting in delayed completion.

Year of enrolment - The year in which the student first registered for the degree at MUSM.

Year of graduation - The year in which a medical graduate completed his/her medical education as evidenced by graduation records.



ABSTRACT

Background: The global human resources for health crisis has affected Uganda deeply as is evidenced by grossly inadequate medical doctor to population ratios. Strategies to increase training and retention initiatives have been identified as the most promising ways to address the problem. In Uganda, the dual track tuition policy of higher education (called the Private Students Scheme or PSS) at the University of Makerere was initiated in the academic year 1993/94, to boost student intake and to supplement university revenue. However, the impact of this scheme on the enrolment and graduation of medical students at this University is unknown.

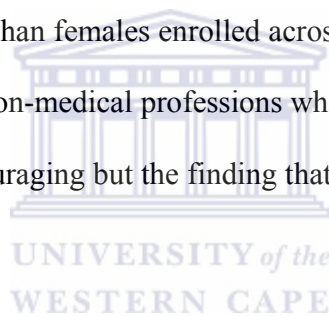
Aim: This study aimed to assess the effect of the PSS on enrolment, time to completion, attrition and number of graduated medical students at Makerere University Medical School after (post-) the Private Students Scheme (PSS).

Study design: A quantitative cross-sectional descriptive study based on a retrospective review of enrolment and graduation records of medical students was conducted comparing records of students enrolled five years before and after the privatisation scheme. Numbers enrolled, attrition rates, time to completion and graduation numbers were analysed.

Results: There were 895 students enrolled in the study period, 612 (72.2%) males and 236 (27.6%) females. Pre- and post-PSS periods had 401 and 494 enrolments respectively (a net increase of 93 students). During the post-PSS period, 447 (90.5%) government sponsored students were enrolled - 351 (71.1%) males and 143 (28.9% females); in the same period, 47 (9.5%) private students were enrolled, 30 (63.8%) male and 17 (36.2%) female. Graduation rates for the entire study period were 96% (859), which represented 44% (378) in the pre-PSS and 56% (481) in the post-PSS periods. Private students contributed 8.9% (43) of the graduates

in the post-PSS period. The majority of students (90.4%) graduated in five years. Thirty four students (3.8%) *dropped out* in the entire period, constituting significantly more in the pre-PSS - 22 (5.5%) than in the post PSS-period - 12 (2.4%). Males were more likely to *drop out*: 31 males did so (4.4%) compared with 3 (1.2%) females. In the post-PSS period, males made up 83.3% (10/12) of the attrition rate. Nine of them were government sponsored while three were private students.

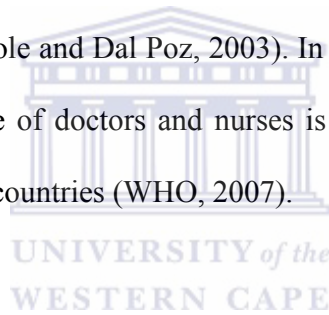
Conclusions: The PSS resulted in a 10% increase in enrolments when compared to the pre-PSS period. Furthermore the number of private medical student enrolments contributed 8.9% of the total graduations indicating that PSS succeeded in increasing the number of medical doctors graduated at MUSM. More males than females enrolled across all the years which might indicate a tendency for females to pursue non-medical professions which should be discouraged. Attrition of students was low which is encouraging but the finding that males were more likely to drop out than females deserves attention.



CHAPTER ONE: INTRODUCTION

1.0 Background

In 2006 the global human resources for health (HRH) shortage was estimated to be four million. This shortage was and still is particularly severe in sub-Saharan Africa, where it has been estimated that an additional one million health workers are needed to provide essential health services (Joint Learning Initiative, 2006; World Health Organisation, 2006). In several countries, achieving adequate expansion of health service delivery will not be possible unless there is a rapid scaling up of HRH (Beaglehole and Dal Poz, 2003). In fact, according to the World Health Organisation (WHO), the shortage of doctors and nurses is a major barrier to scaling-up anti-retroviral therapy in most African countries (WHO, 2007).



The shortage of human resources for health has prompted governments and international organisations to actively seek ways of increasing health worker numbers. Strategies have included expanding training by opening new schools and /or increasing enrolment of students, increasing health worker recruitment and retention strategies as well as substituting higher level cadres with lower level cadres (task shifting) in areas most affected by numerical and skills shortages (Education for Health in Africa Initiative, 2007). The scale-up of health worker training requires careful planning because it demands additional resources, including space, teaching staff and coordination (Education for Health in Africa Initiative, 2007). Furthermore, most African countries do not have the economic capacity to increase student enrolments in

training institutions (McPake, 2007; Joint Learning Initiative, 2004). This makes it particularly vital that health professions students who are enrolled are able to complete their training and to do so within a reasonable time period.

Because African governments are increasingly unable to provide complete funding for their higher education students, some have introduced cost-sharing as a means of increasing enrolments for university education to supplement institutional revenue (Oketch, 2003). The cost-sharing policy was introduced by the Ugandan government to allow a proportion of students who qualified for enrolment into public higher learning institutions to sponsor themselves privately. Introduced in Uganda in the academic year 1993/4, the impact of this initiative on enrolments and graduations of medical students has not been systematically assessed up to this date. With the growing imperative to identify promising and sustainable approaches to increase the number of medical doctors, assessing the effect of cost-sharing could provide useful information for policy and decision making.

1.1.0 Study Setting

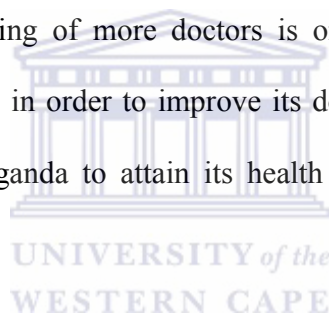
Uganda is amongst the countries most severely hit by the health worker shortage (WHO, 2007). Based on year 2003 estimates, the Ugandan population of 24 million people had an estimated 2 102 medical doctors registered with the Uganda Medical and Dental Practitioners Council and the doctor to population ratio was 1: 12 000. Of these professionals, 25% were foreign nationals, raising sustainability questions about the medical workforce in Uganda (Matsiko and Kiwanuka, 2003; Joint Learning Initiative, 2004). However, the numbers of doctors in Uganda may exceed

the number estimated based on currently registered doctors because although registration is required annually for doctors practicing clinical medicine, some doctors who are not in clinical practice fields may not register annually. When Uganda's population was estimated at 28 million in 2005, the doctor-population ratio was at 1:20 000 (based on 2003 estimates) at the national level (United Nations Development Program, 2008; WHO, 2007). According to Alwan and Diaz-Herrera (2006), this ratio was even worse for post conflict affected districts like Pader (Northern Uganda) which was at 1: 53 291. Unfortunately different studies and sources put the estimates of the numbers of doctors in Uganda at different levels, most times without including information on how these estimates were arrived at. This implies that without a well conducted census, the real numbers of doctors in Uganda are still estimates at best.

With one of the highest population growth rates in Africa (3.2% per annum), Uganda's population is projected to be 55 million by 2025 (Government of Uganda, 2008a). This however is only one of the reasons for the low doctor-population ratio. The shortage of doctors has also resulted from a range of factors including insufficient numbers being trained, emigration of doctors and internal loss of trained doctors to supposedly more lucrative employment like business, managerial and administrative positions (Dambisya, 2004).

Inequitable distribution of health workers between rural and urban areas aggravates this problem for populations living in rural parts of the country since most health professionals prefer to work in the central region, around major cities, towns and referral hospitals. Furthermore, the competition for the few doctors between the public sector and the burgeoning private sector

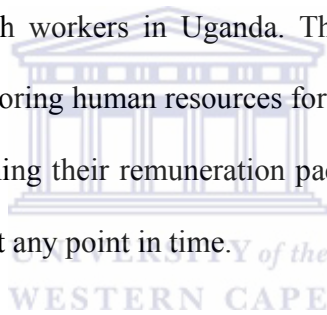
threatens the quality of services in the public sector. Indeed, according to one Ministry of Health report, 54% of health workers in public facilities also work in private facilities (Mandelli, Kyomuhanji and Scribner, 2005). Moreover poor motivation amongst doctors and other health workers is widespread: this is reportedly related to inadequate and irregular remuneration, poor leadership, support and supervision, lack of career path improvements, excessive workloads and poor working conditions (Government of Uganda, 2007). According to its Human Resources For Health Strategy 2005-2020, Uganda needs to produce 229 medical doctors per year to contribute to the total of all health workers in order to achieve its goal of achieving a health worker population ratio of 1.7 for 1 000 population by 2020 (Government of Uganda, 2007). With all these issues considered, the training of more doctors is only one step in the multi-pronged approach Uganda needs to engage in order to improve its doctor-population ratio. The role of training institutions in helping Uganda to attain its health training worker goals is therefore crucial.



1.1.1 Training Medical Doctors in Uganda

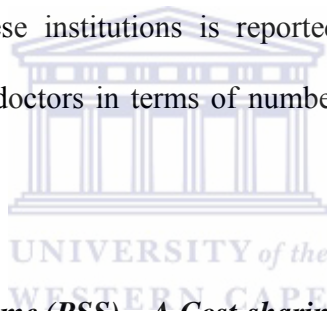
Over the past two decades training institutions have demonstrated a growing inability to meet the demand for trained health workers because of the high cost of training and lack of capacity of the training institutions, resulting in insufficient enrolments (Government of Uganda, 2007). Poor academic staff retention also contributes to the problem, with reports of highly skilled academics departing in pursuit of jobs in foreign countries (Government of Uganda, 2007). This has further limited the ability of institutions to train more health workers.

In Uganda, as in other low and middle-income countries (LMICs), the Ministry of Health (MOH) has no direct control over training institutions, which are administered by under the Ministry of Education (Government of Uganda, 2007; DoE, Republic of South Africa, 2006). The role of the MOH in Uganda is restricted to human resource planning, monitoring workforce numbers and health worker performance. On the other hand, the recruitment and distribution of health workers is managed by the Ministry of Public Service, while the Ministry of Finance and Economic Development determines their remuneration packages (Government of Uganda, 2007). The fact that the different components of training, recruitment and remuneration of health workers in Uganda are managed by different government departments continues to pose challenges in planning and distribution of health workers in Uganda. This implies that while the MOH is responsible for planning and monitoring human resources for health, it is not directly responsible for training them or even determining their remuneration packages and hence cannot determine the numbers that can be recruited at any point in time.



There are four universities in Uganda with faculties that train medical doctors. These include three public universities and one privately owned university. These universities all have Faculties of Medicine attached to major teaching hospitals. The three public universities are Mbarara University of Science and Technology (MUST) in Western Uganda, established in 1989, which has been graduating students since 1994 (Mbarara University, 2010), Gulu University Faculty of Medicine in Northern Uganda established in 2004, which recently hosted its first graduation in 2010 (Gulu University, 2010) and Makerere University School of Medicine (MUSM). The latter, which is the oldest and biggest medical training institution in Uganda, was established in 1942

and is located in the Central part of the country within the capital city, Kampala. The combined Bachelor of Medicine and Bachelor of Surgery (MBChB), a degree of five years duration taken by all medical students, is one of the four undergraduate degrees currently offered by the training institutions. Since the early 1990s, the MUSM has been enrolling approximately 100-130 medical students annually. In addition, Kampala International University, Ishaka Campus, a private institution accredited in 2007 hosts the newest medical doctor training school (Kampala International University, 2010) but has not yet hosted any medical student graduation. Across the three institutions which have hosted graduations, approximately 210 doctors graduate annually (about 100, 70 and 40 from MUSM, MUST and Gulu University respectively). The supply of trained medical doctors from these institutions is reportedly not meeting the health sector demand. The training of medical doctors in terms of numbers and duration forms the focus of this study.

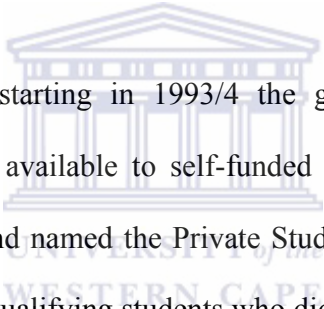


1.1.2 The Private Students Scheme (PSS) – A Cost-sharing Initiative

Prior to 1990, Makerere University was severely under-funded relying entirely on government funding for both tuition and living expenses of all its students. This funding has been declining since 1993 and in 1999, the university received only 47% of its required recurrent expenditures from the government. Under these circumstances, only a limited number of government-sponsorships for students were available, awarded on the basis of academic performance (Government of Uganda, 2007; Matsiko and Kiwanuka, 2003).

According to year 2007 documentation, the fee structure from the Academic Registrar's office indicated that the annual cost of training a doctor was Ugandan Shillings (UGX.)

8 000 000 which was by then equivalent to 4 650 US dollars (USD). This translates to approximately USD 2 325 000 or UGX. 3 999 000 000 over a period of five years, to train 100 medical doctors (Government of Uganda, 2007). These costs vary and may indeed be higher from one year to another over the five year duration of training, as a result of increasing costs of field work and practical modules. It is also significant that some students take longer than the required five years to complete, and need an extra year or more (referred to as delayed completion). This poses additional strain on the limited funds available.

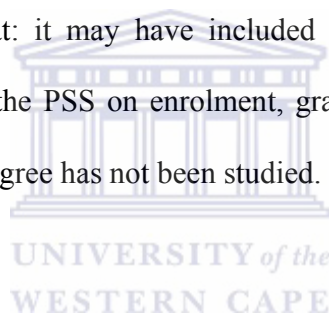


In order to increase enrolment, starting in 1993/4 the government recommended that an additional 5% of places be made available to self-funded fee paying students. This scheme, implemented across all faculties and named the Private Students Scheme (PSS) or cost-sharing scheme, enabled the enrolment of qualifying students who did not win government sponsorships. Under the PSS, it was anticipated that fees would be paid by the students and their parents, thus contributing to university revenue while increasing the spread of university education and the numbers of trained professionals (Ishengoma, 2004a).

Initially the PSS aimed only at providing an additional 5% of places for private students, while government-sponsored student numbers were intended to remain constant. However, in his analysis of trends in enrolment at the university after the initiation of the PSS, Mayanja (2006) found that by 1999/2000, the proportional intake of private students across faculties had

increased to between 60% and 80%. This means that while the Ugandan government provided fewer university sponsorships each successive year, the proportion of self-sponsoring students increased well beyond the initially agreed 5%. This decrease in government-sponsorships was particularly notable for courses not in the health field (Mayanja, 2006).

While the non-medical faculties were able to gradually increase their numbers of private students by as much as 80%, MUSM was reportedly only able to increase its private student intake by 43% by 2001, which however, according to Mayanja (2006), constituted an overall increase in numbers. This study by Mayanja (2006) does not give clear explanations as to how the number of private students was arrived at: it may have included foreign as well as inter-university exchange students. The effect of the PSS on enrolment, graduation and the five year standard completion time for the medical degree has not been studied.



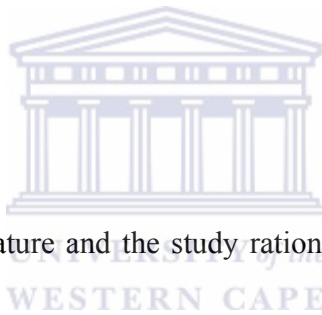
1.2.0 Problem Statement

The shortage of government resources to increase the number of medical doctors sponsored to train at public universities motivated the Ugandan government to introduce the PSS in 1993/4 to increase enrolment of students across faculties which train medical doctors in Uganda (Mayanja, 2006). The effect of the scheme at the MUSM on enrolment, attrition, time to graduation and medical doctor production has yet to be systematically evaluated.

1.3.0 Rationale for this Study

The Ugandan population of 24 million people had an estimated 2 102 medical doctors registered with the Uganda Medical and Dental Practitioners Council in 2003. With the population

currently estimated to be 31 million, Uganda's Vision 2025 aims to reduce the ratio of population per doctor from 12 000: 1 to 5 000: 1 (Government of Uganda, 2006). According to the *Ugandan Human Resources Strategic Plan 2005 – 2020* (Government of Uganda, 2007), the country needs to increase its numbers of doctors from 3 541 (2005) to 33 673 by 2020 in order to meet health sector staffing requirements. In the absence of a clear government policy to increase budgetary support for training health professionals and the high cost of medical education, a systematic evaluation of the effect of the PSS is needed. It is hoped that this study will inform policy makers of the effect of partial privatization of training on medical doctor production at the MUSM. This could contribute to future planning strategies for increasing medical doctor training capacity in Uganda.



1.4.0 Research Questions

Arising from a review of the literature and the study rationale, this study aimed to answer the following research questions:

1. Did the PSS result in increased enrolment and graduation of medical students at MUSM in the first five annual cohorts enrolled after its inception in 1993/4?
2. Did the duration of training (time to graduation) and attrition rate differ between government-sponsored and private students?

1.5.0 Aim and Objectives of the Study

The aim of this study is to describe the effect of the Private Students Scheme on medical doctor training at MUSM, Uganda in the cohorts enrolled in the first five years after its inception in 1993/4.

The study had the following objectives:

1. To describe the absolute change (increase or decrease) in enrolment of medical students during the five years pre-PSS (1988/89 - 1992/93) and the five years post-PSS (1993/94 - 1997/98).
2. To compare the graduation rate of medical students who enrolled during the five years pre-PSS (1988/89 - 1992/93) and the five years post-PSS (1993/94 - 1997/98).
3. To compare the enrolment of government-sponsored and private student cohorts post-PSS (between 1993/94 – 1997/98).
4. To compare graduation rates of government-sponsored and private students who enrolled post-PSS.
5. To compare time to graduation of government-sponsored and private medical students post-PSS.
6. To compare attrition rates between government-sponsored and private students post-PSS.



This study reviews the records of students enrolled five years pre-PSS and five years post-PSS in order to assess the effect of PSS on students enrolment, duration of training, attrition and graduation, with a focus on government and private students.

1.6.0 Structure of the Mini-thesis

In this chapter, the study setting has been discussed both in terms of human resources for health shortages and study context; the study problem and rationale for this study, as well as its aim and objectives have been introduced. The second chapter explores the literature relevant to the topic

of medical student training, cost-sharing in higher education and issues relating to completion of training. In Chapter Three the study methods are described in some detail including ethical considerations and the limitations of the study. Chapter Four is a presentation of the results, while in Chapter Five, the results are discussed and some conclusions are drawn accompanied by several recommendations.



CHAPTER TWO: LITERATURE REVIEW

This review of literature provides insights on the cost of medical education in Africa, and how cost-sharing has been engaged as a possible funding source and human resources development strategy. It also reviews the costs of training health workers in resource constrained settings and the potential for cost-sharing in the education sector, especially in Low and Middle-Income Countries (LMICs), as well as the challenges which arise from delayed completion of training.

2.0 The Cost of Training Medical Doctors

Globally the high cost of training a medical doctor is well documented. According to Thorne (1996), it takes a minimum of four years to complete an undergraduate training as a medical doctor and in 1999, the cost of tuition was estimated to range from USD 4 000 - 8 000 per year in Canada. In many sub-Saharan African countries, medical education costs are borne by the government (Ishengoma, 2004a; Oketch, 2003). Reports from Uganda in 2007 estimate that USD 4 650 is spent annually in training one medical student and this cost does not include training supplies such as books or accommodation (Government of Uganda, 2007). Initiatives to reduce the cost to government do exist in Africa, for example, in Nigeria where the World Bank financed a US\$ 120 million project in 1990 aimed at developing federal universities. This loan was channelled towards improving the effectiveness and relevance of teaching and research whilst making them more cost-effective and specifically encouraging universities to reduce the recurrent cost per student borne by government (Babalola, Sikwibele & Suleiman, 2000).

2.1 The Cost-sharing Strategy in Higher Education

Because governments in many LMICs fund the training of their health workers (Ishengoma, 2004a; Oketch, 2003), limited government budgets have often meant that insufficient numbers of health workers can be trained annually (Matsiko and Kiwanuka, 2003). In countries such as Uganda and Tanzania, where governments have been increasingly unable to provide sufficient or full funding to expand student numbers in higher education, the policy of cost-sharing was introduced in the 1990s (Johnstone, 2001; University of New York and University of Dar es Salaam, 2002). This policy was initiated as part of economic and social reforms under the International Monetary Fund (IMF)/World Bank sponsored structural adjustment programs (Ishengoma, 2004a).

Moreover, only a few countries among those which introduced cost-sharing (South Africa, Kenya and Tanzania) have loan programs which extend financial assistance to potential students (University of New York and University of Dar es Salaam, 2002; Oketch, 2003). Surveys among university students in Togo and Nigeria reveal that inability to enrol at university, and high attrition rates are attributable to lack of financial support (Saint, Hartnett & Strassner, 2003; African Development Fund, 2006).

In a landmark conference - Africa Higher Education - on financing of higher education in Eastern and Southern Africa held in New York in March 2002 and attended by high ranking officials and stakeholders from ten African countries, cost sharing was discussed as a strategy for promoting equity, requiring the recipient students and their parents (who stand to benefit in the

long term) to bear more of the costs of their higher education than the average taxpayer or citizen. Furthermore, in line with ensuring equity, proponents of cost-sharing emphasize that special attention must be shown to family willingness to support the higher education expenses of daughters as well as sons. They noted that while more studies are needed on the extent and nature of the problem, care should be taken not to encourage a tradition of lesser support for daughters. This is important in that in some African settings, the education of a male child is favored over that of a female child and can therefore result in further discrimination regarding opportunities for training within the family. In Uganda the tendency of many females in Uganda to pursue non-health related careers is reported (Government of Uganda, 2004). However this situation emerges early along the education path whereby girl child enrollment and completion of education reduces substantially with advancing age and years in school. Uganda's education strategic plan stipulates efforts to increase female education by reducing the socio-cultural barriers such as early marriages, teenage pregnancies, heavier family responsibilities, gender insensitive learning environment for young girls and parental preference for boys to access education among others that hinder girl child education. The Affirmative Action policy for females in higher education, awards more points to female students to facilitate their entry into institutions of higher learning but has not yielded much success because the progress in enrollment (from lower to higher levels of education) has not been accompanied by interventions to address the structural gender inequalities that continue to undermine females' education (Government of Uganda, 2004).. Similar challenges have been reported in the Nigerian state of Bauchi. In Bauchi, the 100% restriction on females attaining higher education led the government to sponsor a number of female medical students to study Gynecology in Egypt at

SHAMS University. This move is reported to have made Bauchi the only state that will have sufficient numbers of female doctors to attend to the needs of female patients in Nigeria (All Africa, 2008).

Means testing, defined as the official process of measuring how much income a person has in order to decide whether they should receive money from the government” (Cambridge Online Dictionaries, 2010), enables the determination of family economic status and hence, in this case, the ability to afford university tuition costs. Means testing enables educational, health or other social benefits grants to be “targeted” towards disadvantaged populations deemed to be in most need of them, based on the assessment of their wealth status as per a set of predetermined criteria. In many African countries, means testing to determine which students are eligible for educational grants or government-paid fees, has proved to be a challenge because of unverifiable measures of family income and assets.

Moreover, in some instances cost-sharing has been associated with perpetuating inequity, in that students who qualify and are able to pay, are therefore more likely to be enrolled into medical school while those who qualify equally but cannot pay, are rejected. Similarly, a review of medical schools enrolment records between 1992 and 2002 in Canada revealed that as a result of the high cost of medical school education, the pool of applicants to medical schools had reduced over the years, and that this was especially so for minority groups (Elam, Scott, Gilbert & Hartmann, 2003). Elam *et al.* argue that the high cost of medical training had tilted the composition of Canadian medical schools towards accepting more students from high income families who *can* pay, while students who qualify for selection from low income families who

are unable to pay, and who are not willing to incur educational loans, forfeit their places. This situation is mitigated in many higher income countries like Canada, USA, and some European countries, where university students are able to access government loans in order to pursue their education. Even so, the increasingly high education costs which subsequently result in educational debt to families and students have threatened enrolment and completion of medical school education especially among lower income families (Kwong, Dhalla, Streiner, Baddour, Waddell & Johnson, 2002).

In countries where loan facilities were introduced to reduce inequitable exclusion, they amounted simply to another form of cost-sharing. For instance when Tanzania introduced cost-sharing in 1993/94, the Tanzanian government subsidized educational costs substantially through provision of loans (Ishengoma, 2004a). Students received these loans which enabled them to pay for accommodation and stationery but they would ultimately be required to pay back the government during their future employment. Moreover, according to Ishengoma (2004a) citing the World Bank Report of 2003, participation in tertiary education for eligible age groups was 1% in Tanzania in the year 2000, compared to 3% for Uganda and Kenya respectively. This indicates that to some extent the goal of increasing equitable participation in higher education through the provision of student loans had not been achieved, resulting in the proportion of the population engaged in higher education remaining low. The Ugandan Education Strategy 2007-2015 proposes a strategy to move from an input-based financing system to a capitation based system whereby instead of government providing funds directly to the training institutions, students will

get loans to pay for tuition, accommodation and other amenities (Government of Uganda, 2008b). The government plans to achieve this by completely eliminating full government scholarships in order to introduce this student loan system targeting “needy” (from lower economic strata and unable to afford to pay) students (Government of Uganda, 2008b). Considering the challenges of means testing to determine the eligibility for these loans, the lessons learned from the Tanzanian higher education loan system might be of great value.

2.2 Regional Health Worker Training Initiative: Inter University Collaborations

Long before efforts to boost intakes of university students within their own countries, East African countries utilized the East African Community (EAC), the umbrella body that brings together the Republics of Burundi, Kenya, Rwanda, Uganda and the United Republic of Tanzania, to support education among their students through the exchange of students across universities. The Inter-University Council for East Africa (IUCEA) is a regional inter-governmental organization whose mission is to encourage and develop mutually beneficial collaboration between universities in East Africa, and between their governments and other organizations, both public and private. In existence since 1970, the current membership of IUCEA is 74 universities from five Partner States. The Council has established an Inter-University Exchange Program to facilitate the admission of students through formalized established links, exchange programs or individual applications. Most of these students receive their bursaries from their respective governments or other home institutions. In each of the member countries, students from other countries are considered for admission to both

undergraduate and postgraduate studies, subject to the availability of vacancies. It is unclear however, how many scholars from Uganda have attended medical schools in neighboring partner countries and determining this is beyond the scope of this study. This implies that additional Ugandan doctors are being trained in universities beyond its borders who may potentially contribute to the numbers of Ugandan doctors, but exact figures are not available. The presence of students from other countries amongst the student cohorts addressed in this study has, however, been noted.

2.3 Health Worker Training: Duration and Completion

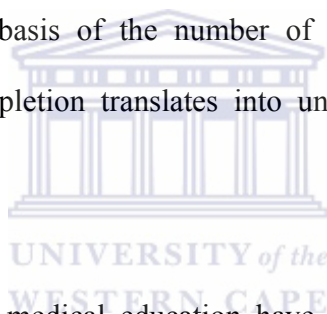
Increasing student numbers should ideally be accompanied by infrastructural investments such as expanded facilities, educational resources and increased academic staff numbers. As noted by Matsiko and Kiwanuka (2003) in a review of the human resources for health training needs in Uganda, the absence of these inputs can pose a threat to health worker education. He noted that despite the shortage of health workers countrywide, the output of trained health professionals is not based on the market demand but rather on the capacity of health training institutions, and recommended that in order to meet the challenge of training more health workers, the Ugandan government would need to invest more in these training institutions.

Other factors have also been identified in the literature as contributing to completion rates, as is evident in a study by Arulampalam, Naylor and Smith (2007) which attempted to identify ‘predictors’ of medical student *drop out*, a measure which could serve to reduce wastage of training resources. The study used individual-level longitudinal data for two entire cohorts of

medical students in United Kingdom (UK) universities to analyze the probability of individual students *dropping out* of medical school prior to the completion of their studies. In this study they examined the cohorts of students enrolling for a medical degree at the start of the academic years 1985 and 1986 and found that completion was influenced by measures of academic preparedness, sex, and age as well as by the characteristics of the medical school itself. Another study by Simpson and Budd (1996), who retrospectively assessed the records and demographic data of all medical school enrolment cohorts who left the medical training course prematurely between 1983 and 1992 at the University of Leeds, reported an attrition rate of 14% (283 students) over the 10 years, with more males than females *dropping out*. According to their findings, those that *dropped out* were academically less able than the students who did not *drop out*; furthermore about 53% of those who *dropped out* were asked to withdraw from the course for academic reasons while the rest left of their own volition. Amongst the factors that influenced attrition were personal problems (30%), while 9% had a combination of academic and personal problems and 8% had health problems; psychological difficulties were the commonest. They also found that as the entry cohort increased in size, student attrition increased.

In the literature, completion rate describes the percentage of students who complete their training in the minimum required time, for instance five to six years for medical students in some South African Universities (Department of Education, 2006). The same report notes that some students may take longer to complete their training owing to academic weakness, medical, financial or personal problems, suggesting that increasing student numbers might not necessarily improve completion rates.

The inadequate capacity of training institutions to offer additional academic support for delayed completion may also contribute to longer periods of training, which has financial implications. For instance in South Africa, medical schools aiming to increase graduate numbers of students from previously disadvantaged communities have enrolled student numbers as high as 8 536 in total annually; however six-year completion rates as low as 15.7% (1 340) have been recorded (DoE, Republic of South Africa, 2006). This translates into higher costs to the universities for additional delayed completion years (Ministry of Education, Republic of South Africa, 2001). This is because although all medical schools are government funded, partial subsidies are awarded to each school on the basis of the number of students enrolled, coupled with a throughput subsidy; delayed completion translates into universities providing tuition over a longer period for the same subsidy.



Completion and attrition rates in medical education have therefore been argued to relate to institutional capacity and individual academic and personal factors (Ishengoma, 2004b). Research on the effect of cost-sharing on completion rates is an equally relevant topic and will be explored further, as this will be relevant to understanding factors influencing a policy like PSS.

2.4 Evaluating the Effect of Cost-Sharing on Medical Student Training

A number of studies have evaluated the effect of diverse interventions on higher education in the United Kingdom, United States of America and Canada. Most of these studies have used an approach known as “cohort analysis”. A cohort is defined as a group of students who are

admitted to a program in a given year and then followed up to determine whether they graduated and how long it took them (Lussier, 1995). A few studies exist evaluating the effect of cost-sharing in higher education. In Kenya, the Parallel Degree Program (a cost-sharing scheme), which initially allowed only a handful of private students to enroll in public universities in 1998, is said by 2008 to have increased private student numbers to 32 010 out of a total of 44 914 (71% in University of Nairobi), 11 568 out of 20 426 (57%, in Kenyatta University) and 8 068 out of 16 000 (50% in Moi University) (Kipchumba, 2008). Tanzania, however, has not been as successful at enrolling private students at public universities reportedly owing to the high cost of tuition fees (Ishengoma, 2004b). Enrolment of private students at University of Dar es Salaam ranged between 0.9 and 4.7% of the total enrolments between academic years 1992/93 and 2001/02. This low increase was attributed to high tuition fees and inadequate institutional resources to accommodate additional students (Ishengoma, 2004b). Unfortunately the report by Ishengoma (2004b) does not go into detail about whether the fees were relatively higher in Tanzania or whether the economic status of citizens in that country was relatively lower than in other East African countries. However, significantly one report from Tanzania notes that higher education institutions were forced to lower their tuition fees for private students in order to improve their enrolments (Ishengoma, 2004b). In both Kenya and Tanzania, studies assessing the effect of cost-sharing have focused on absolute numbers of students enrolled before and after the introduction of cost-sharing but have not documented the time to completion, graduation and attrition rates (Ishengoma, 2004b; Kipchumba, 2008).

The high cost of training and the challenge of increasing the numbers of doctors trained is particularly important for Uganda where cost-sharing has been introduced without well established methods of means testing and without financial institutions to extend educational loans to private students who cannot afford to pay. These issues may require further consideration while the effect of policies such as PSS and their potential contribution to increasing the number of medical doctors trained need to be assessed, by analysing changes in enrolment, completion and attrition (*dropout*) rates of medical students at MUSM using retrospective cohort student data as is described in the next chapter.



CHAPTER THREE: METHODS

This chapter is a presentation of the methods employed in this study which aimed to evaluate the effect of PSS on medical doctor training at MUSM in Uganda.

3.0 Study Design

Since the aim of this study was to describe the effect of the Private Students Scheme on medical doctor training at MUSM, a study design was selected which compares a range of variables in cohorts of medical students enrolled in the first five years of the PSS (inception 1993/4) with the five years before its inception, as well as between government and privately funded students during the first five years after the inception of PSS. This involved a retrospective records review and analysis. For ease of reference, the study objectives are included here:

1. To describe the absolute change (increase or decrease) in enrolment of medical students during the five years pre-PSS (1988/89 - 1992/93) and the five years post-PSS (1993/94 - 1997/98).
2. To compare the graduation rate of medical students who enrolled during the five years pre-PSS (1988/89 - 1992/93) and the five years post-PSS (1993/94 - 1997/98).
3. To compare the enrolment of government-sponsored and private student cohorts post-PSS (between 1993/94 – 1997/98).
4. To compare graduation rates of government-sponsored and private students who enrolled post-PSS.

5. To compare time to graduation of government-sponsored and private medical students post-PSS.
6. To compare attrition rates between government-sponsored and private students post-PSS.

To achieve study objectives 1 and 2, an observational, non-experimental quantitative analysis of enrolment and graduation data of cohorts pre- and post-PSS was conducted, to quantify and describe the effect of PSS on enrolment and graduation. By comparing pre-PSS enrolment, graduation numbers and proportions with post-PSS data, the investigator was able to analyse potential graduate increases resulting from the PSS.

To address objectives 3-6, post-PSS data from cohorts of government-sponsored and private students were compared to describe trends for the period post-PSS. Through this analysis, the effect of the PSS on enrolment and graduation as well as other effects such as time to completion and attrition were described. By comparing the progress of government-sponsored and private students post-PSS, the investigator was able to evaluate the effect of the PSS.

The study was conceptualised as a quantitative cross-sectional descriptive study based on a retrospective review of student records so as to enable the researcher to quantify the effect of the PSS on the production of medical doctors, as well as to quantify the effects of some (though not all) of the problems that could potentially arise from self-sponsorship, such as attrition due to lack of funds and longer time to completion.

3.1 Study Setting

The study setting was the Makerere University School of Medicine (MUSM) in Kampala, Uganda with a focus on the cohorts who embarked on their studies in each academic year between 1988/9 and 1997/8. The focus was on the academic years 1988/9 to 2004/5 during which students who registered five years before and five years after PSS were active - that is from the time they enrolled to the time they completed their studies, including three possible delayed completion years for each cohort.

3.2 Study Population

Records of all medical students who *enrolled* at MUSM in the years between 1988/9 and 1997/8 with each academic year starting from August and ending in August the following year (e.g. August 2002-August 2003) were included in this study. Cohorts were named by the academic year of commencement, e.g. by the year of registration, i.e. 1988 for the 1988/89 cohort. This convention will be used from here on in the study. Figure 1 shows the years for which enrolment and graduation data were collected.

Enrolment Year	Pre-PSS cohorts					Enrolment Year	Post-PSS cohorts				
	1	2	3	4	5		1	2	3	4	5
1988/89	■										
1989/90	■	■									
1990/91	■	■	■								
1991/92	■	■	■	■							
1992/93	■	■	■	■	■						
1993/94	■	■	■	■	■	PSS COMMENCES	■				
1994/95	■	■	■	■	■	1994/95	■	■			
1995/96	■	■	■	■	■	1995/96	■	■	■		
1996/97		■	■	■	■	1996/97	■	■	■	■	
1997/98			■	■	■	1997/98	■	■	■	■	■
1998/99				■	■	1998/99	■	■	■	■	■
1999/00					■	1999/00	■	■	■	■	■
						2000/01	■	■	■	■	■
						2001/02	■	■	■	■	■
						2002/03	■	■	■	■	■
						2003/04	■	■	■	■	■
						2004/05	■	■	■	■	■
Prescribed duration of medical education – 5 years											
Permitted period for delayed completion – 3 additional years											

Figure 1: The years in which enrolment and graduation data were collected pre- and post-PSS

For the five year period pre-PSS, the study population included all medical students enrolled between and including 1988 and 1992. For the post-PSS period, the study population included all those enrolled between 1993 and 1997.

The study took account of those who took additional years to complete the programme since MUSM's academic rules allow up to three additional years for delayed completion. This is with the exception of those who get severely ill at any time during the course of their training. For any

group, e.g. those that enrolled in 1992, data was collected for an additional three years after the standard five years of education (i.e. until 1999), to include those who needed more years to complete. The five years study population post-PSS included those medical students enrolled from and including 1993 to 1997; for those that enrolled in 1997, data was included for three additional years after the standard five years of education (i.e. until 2004), to include those who delayed completion. Time to completion data was obtained by cohort for all MUSM students who embarked on their programme between 1993 - 1997 so as to determine attrition and time to graduation.

3.3 Sample Size

The sample included the entire study population of medical students who embarked on their studies at MUSM between 1988 and 1997. This was because in order to determine absolute changes in enrolment and graduation, it was important for the study to include all records of students who enrolled five years pre-PSS and five years post-PSS. The MUSM enrolls approximately 100 new students each year. Prior to commencing the study, the study population was estimated to be approximately 1 000, about 500 students enrolled five years pre-PSS and 500 enrolled five years post-PSS. Since all data was available in the Medical School Registrar's office, this study population size was deemed manageable.

3.4 Exclusion Criteria

As was previously explained in Chapter One, a number of students from other East African countries were enrolled during pre-PSS and post-PSS periods. They were either inter-university

exchange students or privately sponsored students from other countries. These students are mentioned in the demographic description of the study population, but were excluded from the analysis as they are not likely to form potential human resources capacity for Uganda's health services.

In addition, data for pre-PSS cohorts excluded students who were part of the cohort because they were repeating a year of study in 1988: they represented a previous cohort of enrolment. Students who were repeating a year of study in 1993 were categorised as part of the pre-PSS cohorts. Students who delayed completion were categorised within their year of enrolment cohort.

3.5 Data Collection and Management

Data was obtained from the Medical School Registrar's office using a data extraction form (see Appendix 1). The relevant enrolment and completion data for all cohorts pre- and post-PSS was gathered in this way. Demographic characteristics such as age at enrolment, sex, region of origin in Uganda were also collected. Data was cleaned, coded to maintain confidentiality and entered into SPSS 15 for analysis (SPSS, 2006).

3.6 Measures for Validity and Reliability

According to Cook and Campbell (1979: 37) as cited by Colosi (1997), validity is the

"... best available approximation to the truth or falsity of a given inference, proposition or conclusion".

Internal validity seeks to determine whether there is a relationship between a given program or intervention and the outcome identified, and whether it is a causal relationship. Selection bias and measurement bias are often a threat to internal validity. The possibility of selection bias was eliminated in the study design by including all relevant student records. Measurement bias was minimized by clearly defining indicators of enrolment, attrition rates and time to graduation. The potentially large sample size reduced the possibility of the results of this study being arrived at by chance.

External validity refers to the ability to generalize the results of the study to other settings (Colosi, 1997). The results of this study may not be generalisable to other medical schools in Uganda given that MUSM is the oldest medical school in the country, that teaching staff's experience may vary and that pedagogical approaches may differ. Nonetheless, it is anticipated that the findings of this study will have broad relevance in documenting the effect of PSS across medical schools in Uganda.

Reliability is the consistency of a measurement, or the degree to which an instrument measures the same way for each time it is used under the same conditions with the same subjects. In other words it is a measure of repeatability. If a person's score on the same test, given twice, is similar then it is said to be reliable (Colosi, 1997). The test-retest approach was used to determine the reliability of data from 36 student records which is 4% of all records which were extracted twice from the records, coded and entered as test-retest data in SPSS 15 (SPSS, 2006). Test-retest

agreement between the sample and the test-retest data was determined using Cohen's Kappa coefficient (Landis and Koch, 1997).

3.7 Missing Data

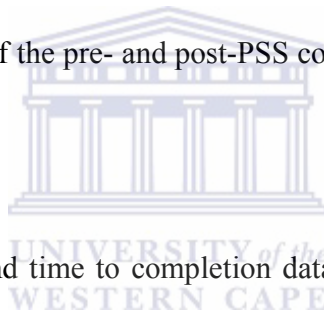
For incomplete student's records, a concerted effort was undertaken to fill in missing details using additional sources of data such as official graduation books, annual examination records and consultation with the MUSM Registrar. Complete data was obtained for all students from most records with the exception of 12.1% (n=115) missing data for student's year of birth, 5.8% (n=55) for student's region of origin and 0.5% (n=4) for student's year of completion. The majority of missing values for the student's year of birth (77%) were for the academic year 1996. On closer inspection the researcher noted that the student registration forms used during this year omitted the section requiring the student to record their year of birth. Other missing values for this particular variable were the result of students inadvertently not recording the year of birth on their forms.

3.8 Data Analysis

Data was analysed using SPSS version 15 for Windows (SPSS, 2006). Descriptive statistics including means and standard deviations (if normally distributed), median and inter-quartile ranges (if not normally distributed), and proportions of the gender and age of the students were computed. This was undertaken for the pre- and post-PSS cohorts, and for both government-sponsored and private students after the introduction of PSS. Foreign students who were either

inter-university exchange students or privately sponsored were excluded from the analyses. Only Ugandan government- and privately sponsored students were included.

To describe the absolute change in enrolment, the difference in the number of students enrolled in the pre-PSS and post-PSS stage was determined. A change in enrolment numbers (increase or decrease) of 5% or more annually, as intended by the Ugandan Government, was considered significant. A total graduation rate was calculated for each annual cohort, as well as a time to completion rate, i.e. the proportion of the study population who graduated over the five, six or seven year period divided by the number of students who enrolled within the same pre- or post-PSS period. The graduation rates of the pre- and post-PSS cohorts were compared using the Chi-square test.

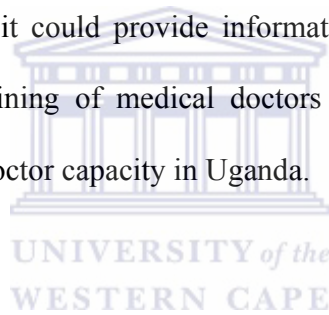


Enrolment, graduation, attrition and time to completion data were determined for government-sponsored and private students post-PSS. Bar graphs or histograms were used to depict the trends in enrolment and completion across the two time-periods, and between the two cohorts post-PSS. Chi-square tests were also used to investigate the differences in enrolment and graduation between government-sponsored and private students using the first year of PSS (1993) as the baseline year. For all comparative analyses, p-values ≤ 0.05 were considered statistically significant.

3.9 Ethics

Ethical approval for this study was obtained from the Ethics Committee of the University of Western Cape. Written permission to access student registration and graduation data was obtained from the office of the Registrar (Makerere University School of Medicine). Given the nature of the study, it was deemed unlikely that the data collected would infringe the rights of the study population. To ensure that the anonymity of the study population is maintained, an identification code was assigned to each student during data entry.

Any concern regarding the intrusiveness of the study is balanced by its institutional and human resources planning value, in that it could provide information to guide policy makers on the effect of cost sharing on the training of medical doctors and contribute to future planning strategies for increasing medical doctor capacity in Uganda.



CHAPTER FOUR: RESULTS

4.0 Introduction

The description of the study population is presented in this chapter followed by the study findings structured in terms of the objectives. Test retest results are presented and their reliability implications. Results are presented for government sponsored and private students. Analyses include only privately sponsored *Ugandan* students who studied under the PSS and not foreign nationals.

4.1 Data Reliability

A total of 4% (n=36) of student records were extracted twice during the process of data collection. This was done by re-selecting student files randomly across the pre-PSS and the post-PSS periods. Data was re-entered into forms and then made into a separate test-retest data file linked to the main data set. Test-retest agreement between the study population and the test-retest data was determined using Cohen's Kappa coefficient (Landis and Koch, 1997). The Kappa value was 0.95 for year of completion depicting almost perfect agreement. For the rest of the variables, Cohen's Kappa coefficient was 1.00 representing perfect agreement between the sample and the test-retest data.

4.2 Description of Overall Study Population

Across the academic years 1988 to 1997, a total of 895 Ugandan medical students were enrolled. Government sponsored students comprised of 612 (72.2%) males and 236 (27.6%) females, while private student numbers included 30 males (63.8%) and 17 females (36.3%). The majority

of students (63.2%) were in the 20-23 year age group at enrolment. The mean ages were 21.9 (SD 3.27) for males and 20.4 (SD 2.71) for females. These descriptive characteristics are presented in Table 1 below.

Table 1: Descriptive characteristics of the study population for pre-PSS and post-PSS periods

Characteristics	Frequency (%)	Pre-PSS	Post-PSS
Sex	N= 895	n= 401	n=494
Male	642 (71.7)	291 (72.6)	351 (71.0)
Female	253 (28.3)	110 (27.4)	143 (28.9)
Age group at enrolment (years)	N = 786*	n=388	n=398
≤19	177 (22.5)	84 (21.6)	93 (23.4)
20-23	497 (63.2)	251 (64.7)	246 (61.8)
24-27	59 (7.5)	32 (8.2)	27 (6.8)
>27	53 (6.7)	21 (5.4)	32 (8.0)
Sponsoring body	N = 895	n=401	n=494
Government	848 (94.7)	401 (100)	447 (90.5)
Private	47 (5.3)	0	47 (9.5)
Region	N = 882*	n=395	n=487
Central Uganda	246 (27.9)	110 (27.8)	136 (27.9)
Northern Uganda	179 (20.2)	83 (21.0)	96 (19.7)
Eastern Uganda	201 (22.8)	92 (23.2)	109 (22.3)
Western Uganda	256 (29.0)	110 (27.8)	146 (29.9)

*Totals do not add up to 895 owing to missing values.

Of the total Ugandan medical student study population of 895, a total of 401 (44.8%) were enrolled in the pre-PSS period (1988-1992), and 494 (55.2%) in the post-PSS (1993-1997) period. In the pre-PSS period 291 (72.6%) and 110 (27.4%) were male and female respectively, while in the post-PSS period, 351 males (71.1%) and 143 females (28.9%) enrolled. Twenty

nine percent and nearly twenty eight (27.9%) of all students recruited were from the Western and Central Regions respectively.

4.3 Trends in Enrolment of Medical Students from 1988 to 1997 (both Pre- and Post-PSS)

Overall, the trend in intake of medical students shows a gradual increase from 67 in 1988 to 104 in 1997, with the highest intake in 1996 numbering 111. Figure 2 shows the trend in enrolment.

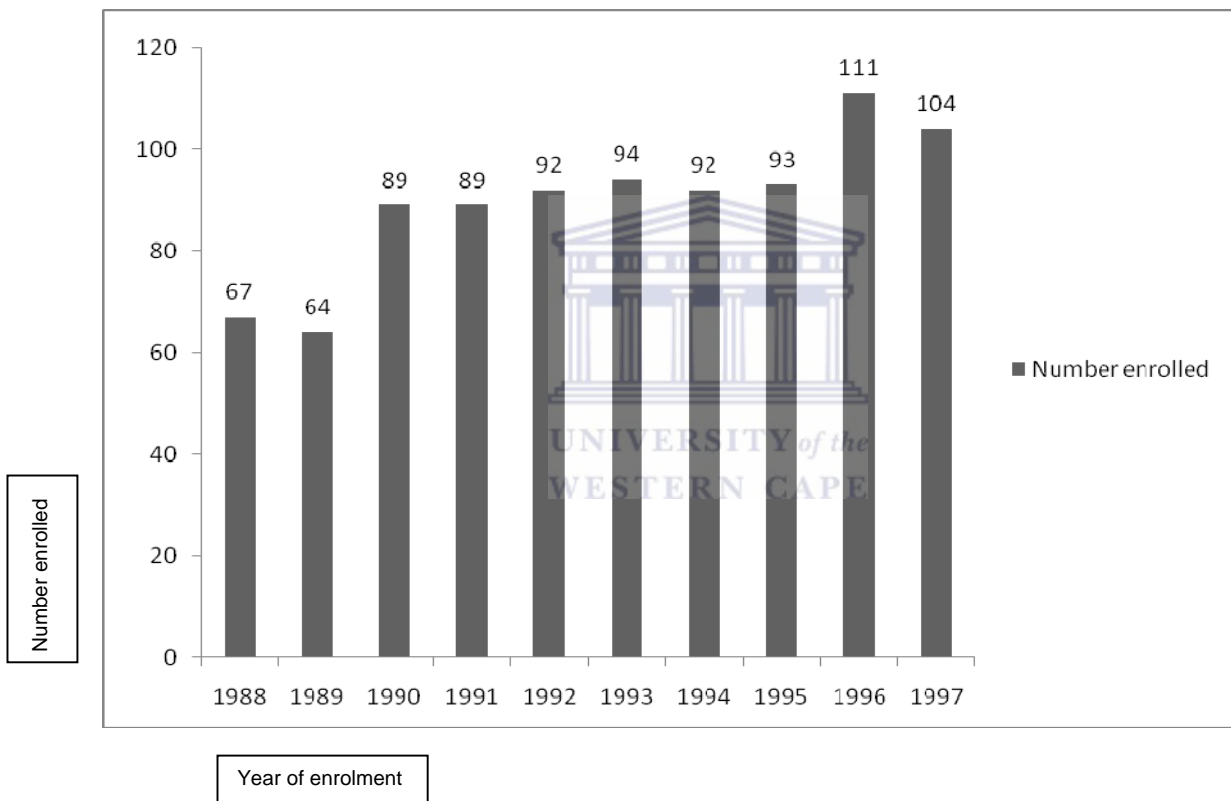


Figure 2: Overall trend in the number of medical students enrolled between 1988 and 1997

Note: 1993 marks the commencement of the PSS

In the post-PSS period, a total of 494 students enrolled: of them, 351 were males (71.0%) and 143 (29.0%) females. Of the 494 students, 447 (90.5%) were government-sponsored - 321

(71.8%) and 126 (28.2%) males and females respectively and 47 (9.5%) were private students - 30 (63.8% male) and 17 (36.2% female). Using the total of students enrolled each year as the denominator, the absolute and percentage changes in numbers of students enrolled across the five years post-PSS (1993-1997) were: 93 (98.9%), 88 (95.7%), 87 (93.5%), 90 (81.1%) and 89 (85.6%) government sponsored and 1 (1.1%), 4 (4.3%), 6 (6.5%), 21 (18.9%) and 15 (14.4%) private students respectively. The peak enrolment for private students was in 1996 with 21 (18.9%) students but the numbers reduced in the subsequent year to 15 (14.4%). Figure 3 below shows the changes in numbers of students enrolled across the years for both government-sponsored and private Ugandan students during the post-PSS period.

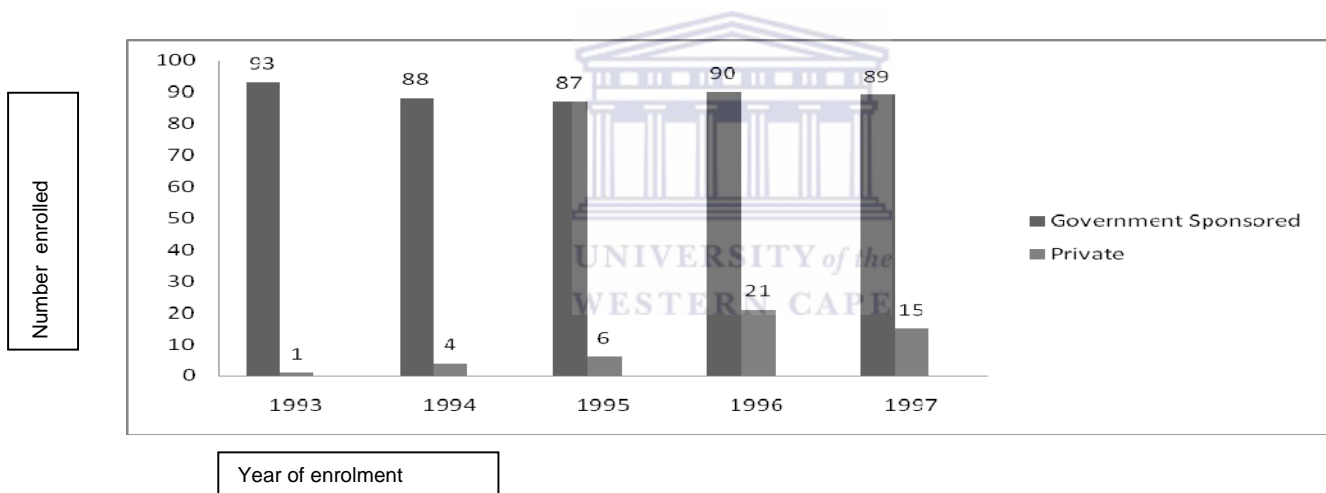


Figure 3: Number of students enrolled post-PSS for both government-sponsored and Ugandan private students

From the last year of enrolment pre-PSS to the last year post-PSS, the number of government-sponsored students changed gradually from 92 (100%) in 1992 to 89 (85.6%) in 1997 (an absolute decrease of nine students) as private student enrolments rose from 0 to 15 (14.4%).

Figure 4 compares government sponsored and private student enrolments during the post-PSS Periods. Government-sponsored enrolments peak during the pre-PSS period reaching 92 in 1992 from 67 and 64 in 1988 and 1989 respectively, while a peak in private students enrolled (21) occurs in 1996. The biggest drop in government-sponsored enrolments occurred in 1995 in which year the lowest proportion of students during the whole period were sponsored by the government. On the other hand, the proportion of private students increased from 0 to the highest proportion of 18.9% in 1996. Based on the pre-PSS total number of Ugandan students enrolled (385) all of whom were government sponsored, and the post-PSS total with both government (447) and private sponsored students (47), the government sponsored 100% of students in 1992, but only 90% (447/494) post-PSS.

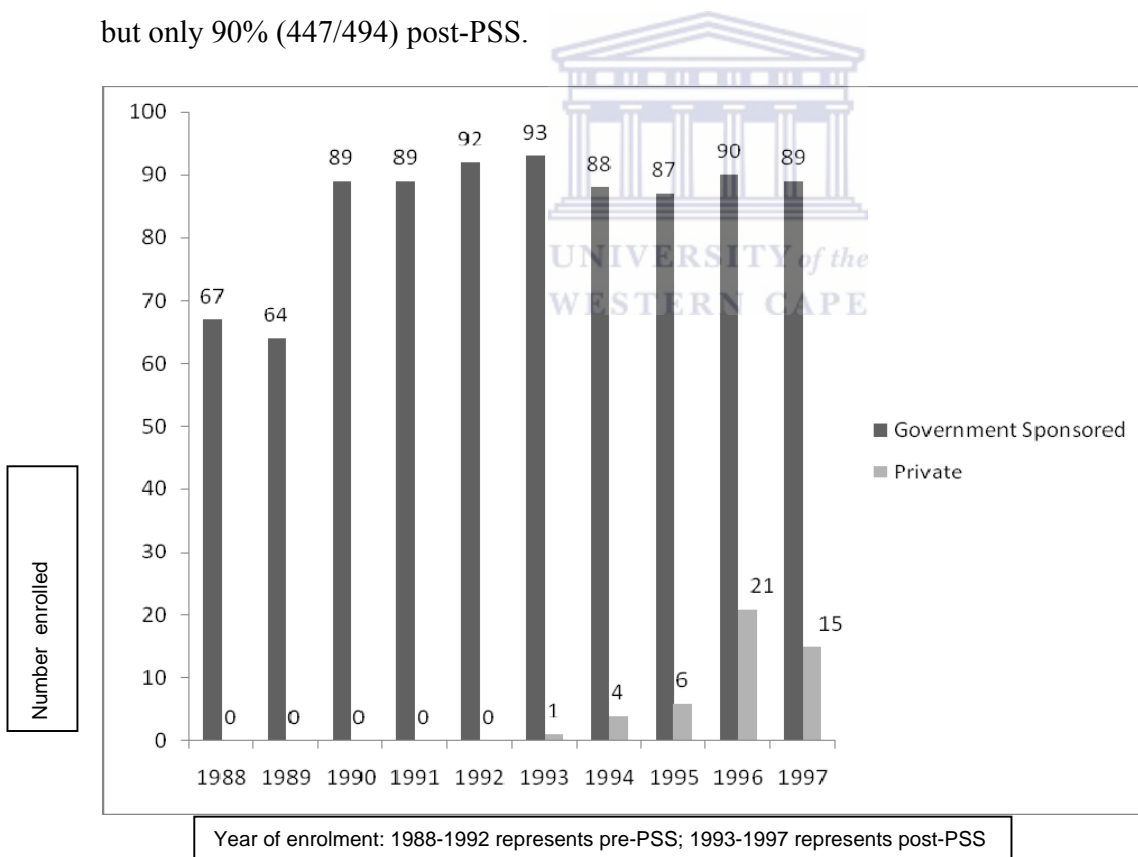


Figure 4: Trends in enrolment of medical students in the pre-PSS and post-PSS periods

4.4 Socio-Demographic Characteristics of Medical Students Enrolled Post-PSS

The total number of males enrolled pre- and post-PSS was 291(72.3%) and 351(27.7%) respectively while the corresponding values for females were 110 (71.1%) and 143 (28.9%). Based on the Chi-square test there were no statistically significant differences ($p > 0.01$) between the numbers of male or female students enrolled during the pre-PSS and the post-PSS periods.

The mean age of male students was statistically significantly higher than that of female students, (21.9 years SD 3.1 and 20.0 years SD 1.7, respectively $p < 0.05$) across the pre-PSS period; this was similar across the post-PSS period (21.8 years SD 3.5 and 20.7 years SD 3.4, $p < 0.05$). The mean age of government-sponsored students was not statistically significantly different from private students (21.5 years SD 3.5 and 21.4 years SD 3.6 respectively). Statistically significant differences ($p < 0.001$) were found between numbers of males and females enrolled and the region from which the students originated. Table 2 depicts the characteristics of the medical student population enrolled post-PSS.

Table 2: Descriptive characteristics of medical student population enrolled post-PSS

	n (%)	Total*
Sex	n=494	
Male	351 (71.0)**	494
Female	143 (28.9)	
Age group at enrolment	n= 398	
≤19	93 (23.4)	398
20-23	246 (61.8)	
24-27	27 (6.8)	
>27	32 (8.0)	
Sponsoring body		
Government	447 (90.5)	494
Private	47 (9.5)	
Region		
Central Uganda	136 (26.1)	487
Northern Uganda	96 (18.4)	
Eastern Uganda	109 (20.9)	
Western Uganda	146 (29.9)**	

*Totals may not add up to 494 owing to missing values.

** p<0.001

4.5 Graduation Rates

4.5.1 Graduation Rates over the Entire Study Period

Overall, 859 (94.8%) of all medical students who enrolled between 1988 and 1997 graduated or completed their education. The Chi-square test revealed no statistically significant differences in

completion rate between males and females (Chi square = 10.6, p value = 0.4). Table 3 depicts graduation rates across the study period.

Table 3: Percentage of medical students graduated of each cohort enrolled between 1988 and 1997

Year Enrolled	n (%) of government sponsored students who graduated	n (%) of private students who graduated
1988	61 (91.0)	
1989	61 (95.3)	
1990	84 (94.4)	
1991	83 (93.3)	
1992	89 (97.8)	
Pre- PSS total (378)	378 (94.2)	--
1993	89 (95.7)	0 (0)
1994	87 (98.8)	4 (100.0)
1995	85 (97.7)	6 (100.0)
1996	88 (97.8)	19 (90.0)
1997	89 (100.0)	14 (100.0)
Post PSS total (481)	438 (98.0)	43 (91.5)

4.5.2 Graduation Rates in the Pre-PSS and Post-PSS Periods

Of the 895 students enrolled across the study period, 859 (96%) graduated. Of these graduates, 378 (44%) had enrolled in the pre-PSS period, while 481 (56%) enrolled in the post-PSS period. According to the Chi-square test, this difference was statistically significant across the two periods.

Of the 447 government sponsored students enrolled in the post-PSS period, 438 (98%) students graduated while 43 out of 47 (91.5%) of private students graduated. This difference was statistically significant (Chi-square 7.27 p value = 0.006). Table 3 depicts the proportion of medical students who graduated for each cohort enrolled over the entire study period.

4.5.3. Time-to-graduation in the Pre-PSS, Post-PSS and Entire Study Periods

Of the total 859 medical students who graduated, 764 (88.9%) completed and graduated within five years, while 73 (8.4%) and 17 (1.9%) graduated in six and seven years respectively. Among the 378 students enrolled in the pre-PSS period and graduated, the proportion who graduated in five, six and seven years respectively was 80.7% (305), 15.3% (58) and 3.4% (13) respectively. The corresponding figures for the 481 students enrolled and graduated in the post-PSS period were 97.5% (459) in five years, 2.3% (15) in six years and 0.2% (4) in seven years. Figure 4 shows the time to graduation across the pre-PSS and post-PSS.

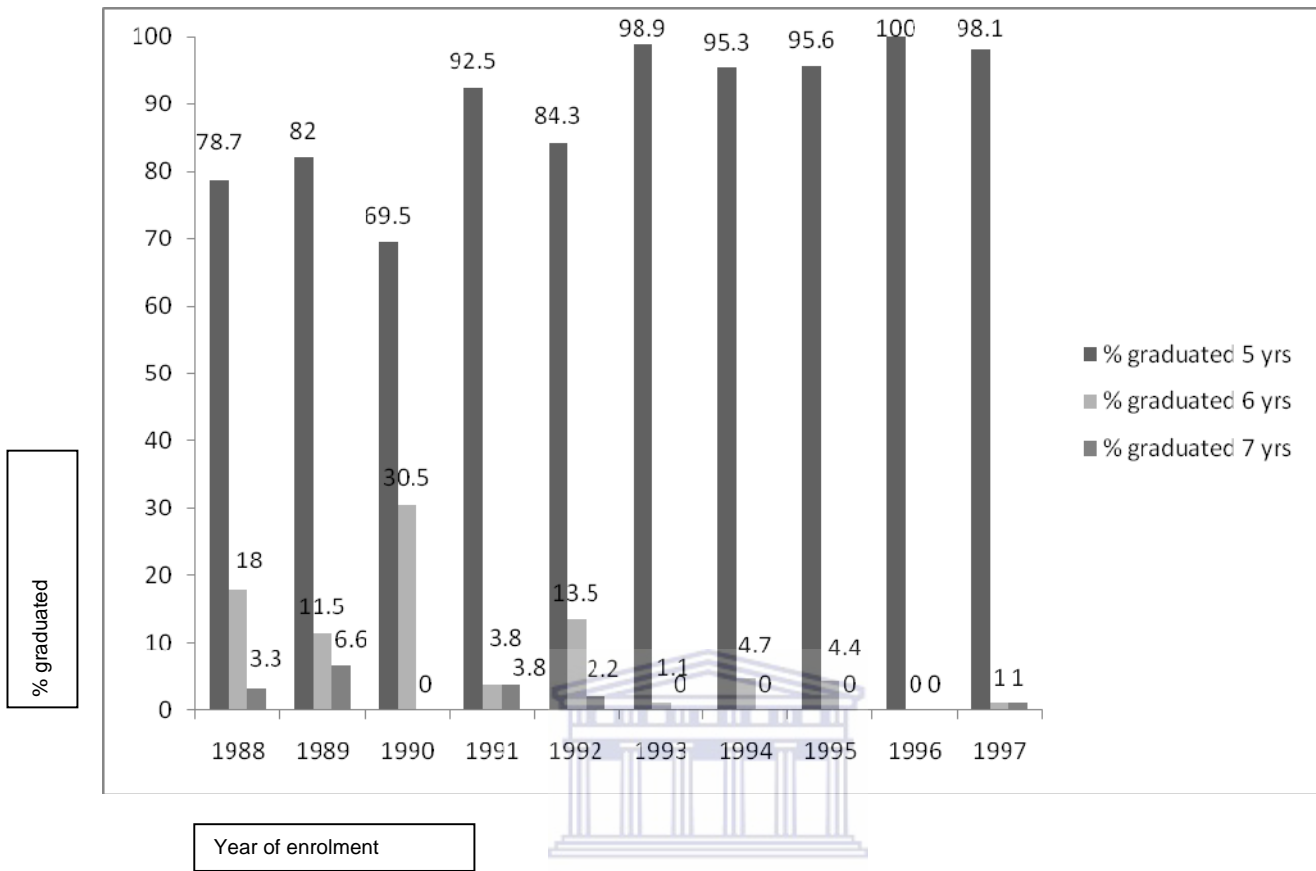


Figure 5: Time to graduation across the pre-PSS and post-PSS

4.5.4 Time to Graduation for Government Sponsored and Private Students

The mean time to graduation for all those students who graduated was 5.11 years (median 5, inter-quartile range 5-7 years). The difference in graduation rates of males (median 5.11, inter-quartile range 5-7) and females (median 5.07, inter-quartile range 5-6) was not statistically significant $p=0.05$. Females graduated slightly earlier than males.

In the post-PSS period there was a statistically significant difference ($p<0.01$) in the time taken to graduate between government sponsored with private students taking slightly longer to

graduate (median 5.02, inter quartile range 5-7) and private students (median 5.10, inter quartile range 5-6). Male private students took slightly longer to graduate (median 5.04 years inter-quartile range 5-7) than government-sponsored male students (median 5 years inter-quartile range 5-7) but this difference was not statistically significant (p value = 0.16). Figure 4 shows the time to graduation for government sponsored and private students post-PSS

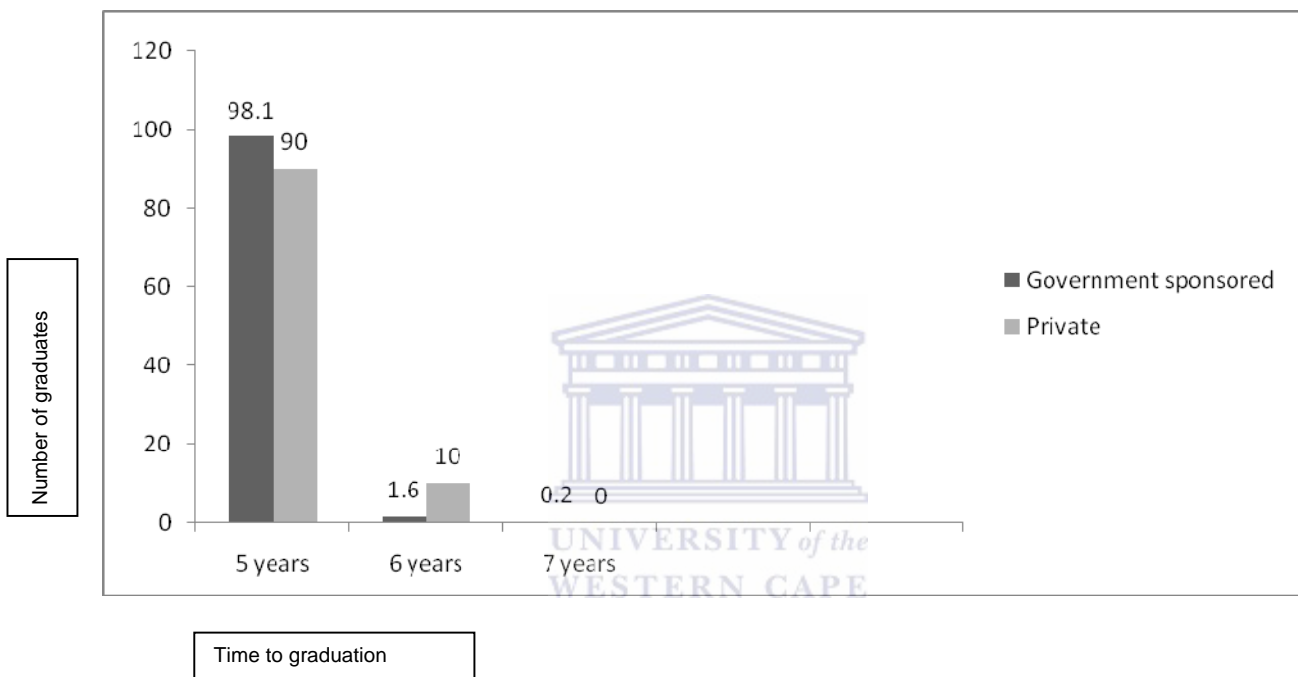


Figure 6: Time to graduation for government-sponsored and private students post-PSS

4.6 Attrition Rates

4.6.1 Attrition (*Drop-Out*) in the Entire Study Period and During the Post-PSS Period

Of the total 895 Ugandan students enrolled over the ten year period (1988-1997), 34 students (3.8%) did not complete their medical education. There was a higher *drop-out rate* pre-PSS of 22 (5.5%) compared with the post-PSS period rate of 12 (2.4%), and this difference was not statistically significant ($p=0.06$). Male students were more likely to *drop out* - 31 (4.4%)

compared to female students - 3 (1.2%). According to the Chi-square test, this difference in *drop out* rate was statistically significant (p value = 0.001).

4.6.2 Attrition (Drop Out) During the Post-PSS Period

Of the 494 students enrolled post-PSS, 12 (3.2%) *dropped out* of medical school. These comprised of 10 males (2.9%) and two females (1.4%). Two percent (9/447) of government students *dropped out*. The corresponding rate for private students was 6.4% (3/47). Among the 12 students who *dropped out*, nine were government sponsored students while three were private students. All private students who *dropped out* were male. According to the Chi-square test, male private students were more likely to *drop out*, i.e. 3 (10.3%) of 29 students compared to male government students 7 (2.2%) of 321 students ($p = 0.04$).

The reasons recorded for *drop out* included *discontinued* due to unsatisfactory academic performance which the record system implies poor academic performance, illness or fees problems. Of the 12 students who *dropped out*, four students, i.e. 36.4% were discontinued or required by the university to cease their studies on account of poor performance; five students (45.5%) absconded from school, that is, records available did not specify what happened to them; and three students (27.3%) died. This can be further disaggregated into government sponsored *dropped out* students, amongst whom three students were discontinued, three absconded and three died, while amongst the three private students, one was discontinued and two absconded.

4.7 Summary of Findings

Of the 895 students enrolled in the study period, 401 were enrolled pre-PSS and 494 post-PSS, a net increase of 93 students. During the post-PSS period, 90.5% of the students were government sponsored, of whom 71.1% were males and 28.9% females; in the same period, 47 (9.5%) private students were enrolled, and of them 30 (63.8%) were male and 17 (36.2%) were female. Graduation rates for the entire study period were 96% (859), which represented 44% (378) in the pre-PSS and 56% (481) in the post-PSS periods. Private students contributed 8.9% (43) of the graduates in the post-PSS period.

Time to graduation was generally good with 90.4% graduating in the regulatory five years. Thirty four students (3.8%) *dropped out* in the entire period, constituting significantly more the pre-PSS (5.5%) than post PSS-period (2.4%). Males were more likely to *drop out*. In the post-PSS period, males made up 83.3% of the *attrition rate*. Nine of them were government sponsored while three were private students.

From this analysis it is evident that the PSS resulted in a 10% increase in enrolments when compared to the pre-PSS period. Furthermore the number of private medical student enrolments contributed 8.9% of the total graduations indicating that PSS. The implications of these results for the impact of PSS on increasing the number of doctors trained and the duration of their training in Uganda are discussed in the next chapter.

CHAPTER FIVE: DISCUSSION

5.0 Introduction

Findings regarding the effect of the PSS on increasing the number of medical students enrolled at and graduated from Makerere University School of Medicine are discussed below. Training modalities and equity implications emerging from the PSS are considered as well.

5.1 The PSS: The Potential to Increase Enrolments of Medical Students

According to its Human Resources For Health Strategy 2005-2020, Uganda needs to produce 229 medical doctors per year across its four medical schools to contribute to the total of all health workers, in order to achieve its goal of achieving a health worker population ratio of 1.7 for 1 000 population by 2020 (Government of Uganda, 2007).

The benefits of privatising the public sector are such that privatisation of higher education countries have been enabled to expand access to higher education for those who did not obtain government scholarships, yet qualified to enrol into university. In this study, the partial privatisation of higher education in government training institutions like MUSM resulted in an 8.9% increase of medical doctors produced. Although efforts were being made to expand the number of medical students enrolled each year even prior to the PSS, the overall increase in the enrolment of medical students post-PSS is reassuring to note, since it indicates that the PSS has the potential to contribute to the health workforce development strategy. The PSS target of enrolling 5% private students was obviously achieved as evidenced by the 10% increase in

enrolments post-PSS. The number of private students constituted 18.9% of the cohort total in 1996, a peak over the period. In spite of this increase, Uganda's three medical training institutions, at their current rate of output of approximately 210 graduates per year still fall short of achieving the goal of 229 medical doctors per year. There remains a need to explore additional approaches to increasing the number of doctors they produce annually. However, since PSS seems to work, further investments and innovations to facilitate it might be of benefit.

At the same time, policy-makers must be cautioned that studies have revealed that the lack of finances is highlighted as one of the barriers for students seeking to enrol privately at university. For instance low uptake of the Private Student Scheme in Tanzania was reported at 0.9-4.7% between 1992 and 2001, which was said to relate to high tuition fees (Ishengoma, 2004b). This study did not explore the extent to which lack of financing might affect enrollment and completion of medical studies and this might be an area for further research. In the meantime however, alternative means of financing education at university could be explored. Furthermore, higher attrition rates of private students in this study may suggest that this was a factor, and should be further explored.

If private sponsorship is too onerous for families, increasing enrolments could be facilitated by several other strategies. Some options to consider might include tapping resources from the burgeoning private sector which competes with the public sector for human resources in Uganda, but does not contribute to their training; in other words, it utilises government produced resources (health workers) without making any investment in them. Indeed the private sector in

Uganda and perhaps in many other low and middle income countries has even undermined the public sector by out-competing it in terms of offering better employment opportunities for health workers. Perhaps a policy demanding some form of contribution towards health worker training from the private sector in Uganda is long overdue. Some contributions could be put to use to provide partial or full scholarships for students who qualify for medical school but cannot afford it or those private students who experience financial challenges during their study period.

Expanding enrolment inevitably implies pressure on institutional resources, and contributions from the private sector could also be negotiated to improve or expand the capacity of existing training institutions (Ndetei, Mathai, Khasakhala, Mutiso and Mbwayo, 2010). Alternatively, a policy could be introduced which calls for the establishment of additional training institutions funded by private sector providers. Indeed Nwamuo (2001) in his commentary on increasing access to higher education in Africa argues that private universities are much needed, since neither the public nor the private sector by themselves are able to provide the necessary quantity and quality of education needed especially in developing economies.

Since the development of human capital is seen as critical for any society to progress economically, socially, culturally and technologically, another approach that could be used to raise revenue for scholarships or institutional infrastructure would be to seek international funding from donors. Uganda needs to explore the possibility of obtaining funding from multilateral organisations to develop its higher education sector just like Nigeria which

benefitted from a US\$120 million loan in 1990 by the World Bank (Babalola, Sikwibele & Suleiman, 2000).

Moreover, by their very nature, private education schemes are themselves able to generate additional revenue if fees are effectively calculated to recoup institutional costs. The 10% increase in enrolments at MUSM as a result of enrolment of private students may have resulted in additional revenue for the School, although it is not known how fee levels relate to costs. It is also not known whether the increases in private students, or indeed overall number of students translated into additional institutional resources (teaching staff and materials) to facilitate their learning. This is also an area for further study within the process of assessing the effectiveness of the PSS. It goes without saying that it is important for universities which generate additional financial resources from Private Student Schemes to put them to good use and to be able to show accountability for these resources. However, if the PSS is to be regarded as an income stream for universities, it is important to note that private enrolments at MUSM did not follow a continuous increasing trend: after reaching a peak of 21 students (18.9%) in 1996, private student enrolments dropped in the subsequent year (1997) to only 15 (14.4%), implying perhaps that the additional revenue earned by the university might not be consistent across the years, thereby limiting long term planning. The reasons for these fluctuating enrolments are not, however recorded, but could be further interrogated.

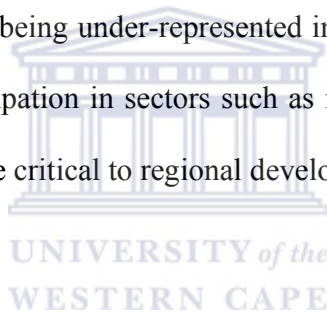
Equity of access to higher education could in part be said to be addressed by government scholarships being provided: however, in that they are awarded on academic merit, they would

not necessarily facilitate academically able but economically disadvantaged students from accessing higher education. Rather, scholarships awarded on merit may actually perpetuate privilege rather than address disadvantage, in that advantaged students are likely to perform more ably than those who are not. As has been pointed out, inadequate measures for means testing contribute to this problem.

Furthermore, gender inequities exist as noted in enrolments, with fewer females than males enrolled across all the years. This is indicative of the tendency of many females in Uganda to pursue non-health related careers as noted in some reports (Government of Uganda, 2004). Indeed this situation has long been acknowledged given that girl child enrollment and completion of education has historically dwindled with advancing age and years in school. The education strategic plan clearly mentions the government's efforts to boost female education with the recognition that socio-cultural barriers exist hindering girl child education. Some of these barriers include early marriages, teenage pregnancies, heavier family responsibilities, gender insensitive learning environments for young girls and parental preference for boys to access education among others. Initiatives such as the Affirmative Action for females in higher education, which have awarded more points to female students to facilitate their entry into institutions of higher learning have not yielded much success because the progress in enrollment (from lower to higher levels of education) has not been accompanied by interventions to address the structural gender inequalities that continue to undermine females' education. As the literature suggests, cultural restrictions on females attaining higher education might be so great as to necessitate the facilitation of their training in neighbouring countries, as was the case in the

Nigerian state of Bauchi, where females were sponsored by the government to study Gynecology in Egypt (All Africa, 2008).

Uganda has not experienced the feminization of medicine where the numbers of female doctors exceeds that of male doctors reported in some developed economies (Phillips, and Austin 2009). In fact according to the Komuhiimbo (2009), little progress has been made towards improving females in science based disciplines. She notes that although the implementation of affirmative action in favor of females on admission to higher institutions of learning succeeded in improving the percentage of females at tertiary level of education, the impact was more on arts based disciplines. She concludes that by being under-represented in science based disciplines, females effective representation and participation in sectors such as industrial development, mining and infrastructural development that are critical to regional development is undermined.



5.2 Graduation of Medical Students: Implications for Private Financing

Overall the graduation rate at MUSM was high (96.2%) between 1988 and 1997 implying that the majority of students enrolled ultimately graduated. These rates are only slightly higher than those reported in American Medical Schools in 1995 (90.1%) (Association of American Medical Colleges, 2007). Almost all private students (91.5%) 43/47 enrolled at MUSM between 1993 and 1997 completed their studies. Of statistical significance is the fact that more government sponsored students graduated post-PSS (98%) ($p=0.006$). Despite this, the high number of private students graduated might imply that the private students were on the whole academically proficient and sufficiently motivated to complete their education.

In terms of evaluating the effectiveness of the PSS, not only is the ultimate graduation rate important, but time to completion has cost implications for either the government or private student as well as the effect of using resources within an institution which could otherwise be allocated to other students. The median time taken by students from enrolment to graduation for the overall period was 5.12 years with most students taking the required five years to complete and a few taking seven years. Although median time to graduation was significantly different between government sponsored and private students (median 5.02 range 5-7 years and median 5.10 range 5-6 year respectively; $p < 0.01$), private students took slightly longer to complete their studies. This implies that to some extent private students carry an additional burden of extra fees due to delayed completion although the majority of them completed within the required five years. This is consistent with an American-based study assessing completion rates for medical students enrolled for seven consecutive years, which reported a 96% completion rate and suggested that medical students, compared to other professions, are less likely to leave their education (Association of American Medical Colleges, 2007). Moreover, the time to graduation in the current study is similar to that reported from the University of Witwatersrand, South Africa which reports an average of 6.1 years instead of 6 years, while the University of Natal (South Africa) reports an average time to graduation of 7-9 years for those students coming from secondary schools with inadequate science facilities such as laboratories (Lehmann, Andrews & Sanders, 2000). However since this study did not make any assessment of the reasons for delayed completion and did not access data regarding the schools from which the students came, it cannot draw any conclusions regarding the reasons for delays in completion except in cases

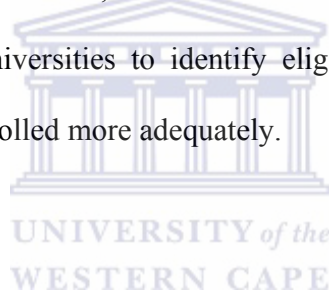
where they are specified in the documentation as on academic grounds. The challenge faced by secondary school facilities particularly in rural Uganda which teach science related subjects has often been highlighted (Black et al, 1998, Katahoire, Baguma and Etta, 2004) and since 2005, the government of Uganda has been involved in constructing and equipping laboratories in science teaching secondary schools located in rural districts on the country (Paliament of Uganda, 2006). The impact of inadequate secondary science education on the learning of medical students could be an area for further research as is the capacity of the facilities at MUSM to accommodate increasing student numbers.

5.3 Attrition of Medical Students

There is paucity of literature documenting attrition of students from medical schools in Africa. The overall attrition in our study population was low (3.8% , over a 10 year period) compared to rates reported in other African countries. This level of attrition can also be considered minimal compared to that reported by Simpson and Budd (1996) who retrospectively assessed the records and demographic data of all medical school enrolment cohorts who left the medical training course prematurely between 1983 and 1992 at the University of Leeds, and found attrition at 14% (283 students) over the 10 years, with more males than females *dropping out*. This study also noted that those that *dropped out* were academically less able than the students who did not *drop out*. In addition, they noted that as the entry cohort increased in size, student attrition increased (Simpson and Budd, 1996). Consistent with this finding, in the MUSM study, the *dropout* rate among private students was highest for the cohort of 1996 (n=21) which was the highest intake of private students across the years. Indeed all private student dropouts (n=3) were

from this cohort. Of these three students, one was discontinued (for academic reasons); however, since since no particular reason was recorded for the two students who absconded from their studies, it is not possible to deduce to what extent financial difficulties led to their attrition. It is possible that financial pressures contributed to their *drop out*.

According to Lehmann *et al* (2000), academic performance and financial constraints are among the major reasons for attrition reported in available literature. Data from this study was limited in explaining the reasons for attrition. This suggests the need for research on the financial experiences of private students; in addition, research is needed around causes of attrition because it provides an opportunity for universities to identify eligible medical school entrants more accurately and to support those enrolled more adequately.



The attrition rate amongst the PSS students was also low compared for instance to a study from South Africa which revealed rates averaging 11.4% over a five year period (1994-1998) from one South African Medical School (Lehmann *et al*, 2000). This study must, however, be read in the light of South Africa's past discriminatory schooling policies for all but white children, particularly as regards science and mathematics education. In our population, the percentage of attrition was significantly higher among male students (2.9%) compared to female students (1.4%). Furthermore, attrition was also significantly higher (6.4%) among private students compared to government-sponsored students (2.0%), implying the need to collect data in order to

understand the reasons for attrition, and to address these factors, be they financial, academic or motivational, so as to assist them to complete their studies successfully.

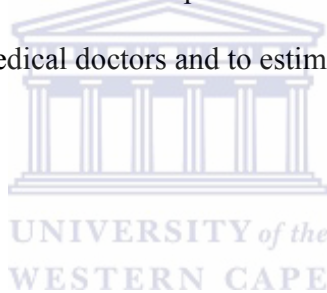
5.4 Conclusions

Studies of this nature can provide vital information for human resource planners enabling them to estimate graduation numbers and attrition rates from medical schools in order to make training projections for the country's human resource needs and their possible cost implications.

What has been demonstrated is that the Private Students Scheme (PSS) resulted in the increased enrolment of private students at MUSM. However at the rate demonstrated in this study, the increase is insufficient to meet Uganda's medical doctor training goals (Government of Uganda, 2007). Additional channels of funding for private students need to be explored to increase enrolments further. It is heartening to note that attrition was low and that the average time to graduation was five years implying that the cost of delayed completion for private students was not a major factor and that additional costs as a result of delayed completion are likely to be low at MUSM. It does imply however, that students who undergo delayed completion take on additional places that could be filled by other students. The strong throughput at MUSM might also suggest that the MUSM's intake criteria are appropriate, and that intake of students and the infrastructural resources at MUSM are well matched, thereby not overwhelming the training institution.

Although the rates of completion are high in this study, efforts need to be made to increase them further through the PSS and other innovative strategies.

An incidental conclusion of this study is the recognition that the lack of electronic records for medical student enrolment and training prior to the year 2000 at MUSM is a problem. Information on medical students enrolment and progression prior to 2000 was only available in student files which places them at a possible risk of loss in case of fire or other disaster. Given the current global human resource crisis, it is crucial for Uganda and other countries to have this information in an electronic database because it provides an easy and quick way to assess this institution's capacity to produce medical doctors and to estimate the country's training needs.



5.5 Limitations

This study was based on the assumption that thorough record keeping was done at the Registrar's office but that to a minor extent the findings may be limited by the degree to which these records are complete and reliable. A high level of confidence can however be placed in the findings of this study because there is a great likelihood of accuracy since these were the official records of a university, and both its institutional quality assurance measures and those informally imposed by its users would influence the quality of data capturing. The missing values within the records for some of the demographic variables (such as age) to some extent limited the conclusions that can be drawn.

On the other hand, this study did not access the reasons for delayed completion. The reasons for delayed completion could range from financial to academic or personal issues amongst others (Kwong *et al*, 2002). Therefore findings on differences in delayed completion pre- and post-PSS should be interpreted with caution especially in terms of causal inferences. To assess causality, data regarding reasons for attrition or long time to completion would be required and best collected in a prospective longitudinal study design or through qualitative research which would be difficult retrospectively. However, reasons for attrition were available for some students from the Registrar's records and provided insight into some of the possible underlying reasons. Consistent record keeping of reasons for attrition would be of benefit for future planning.

Despite these limitations, it is hoped however that the findings from the study on the effect of PSS across the five cohorts of medical students considered would in part elucidate the effect of PSS in Uganda. In the next section, recommendations from this study are presented.

5.6 Recommendations

In the light of this study, a number of recommendations will be made which pertain to the PSS itself, and to the more general strategy of expanding medical doctor production in Uganda.

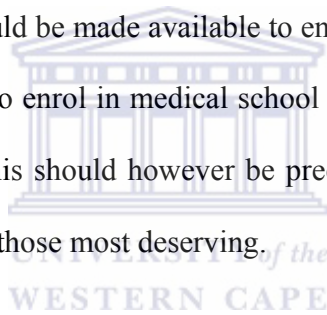
Increasing enrolment

In order to increase numbers of private students with the goal of ultimately increasing the numbers of medical doctors making up the country's health workforce, a policy ensuring that greater numbers of Ugandan students are enabled to enrol in the various medical schools in the

country is required. This should go hand in hand with a policy regarding the establishment of more training schools especially private ones. Additional enrollments should however be accompanied by close monitoring of the facilities or resources available in the training institutions to accommodate additional students.

Policies regarding additional funding such as private sector and international funder contributions should be pursued to generate more financing for additional private students to be enrolled.

Additional financial resources should be made available to enable eligible Ugandan students who are unable to sponsor themselves to enrol in medical school even as efforts are made to support them to complete their studies. This should however be preceded by rigorous means testing to enable targeting of scholarships to those most deserving.



Supporting existing students

Academic programmes should have in place mechanisms to identify students who are struggling financially or academically in order to target them for additional support.

Improving information system

Tracking the effect of financial pressures on private students' attrition and delayed completion warrants further study. Concerted efforts should be made by the Ugandan government and MUSM to consistently document and monitor student enrolment and training progression preferably in easily accessible electronic databases in order to facilitate future human resource planning. Reasons for attrition should be included in such a database. In Uganda and other countries struggling with an unprecedented crisis of human resources for health shortages, the need for establishing robust and regularly updated human resource information systems cannot be overstated.



5.7 Further research

Further studies are needed to determine the reasons for attrition and why males are at a higher risk of attrition in medical school than females and whether this is consistent across other medical schools in Uganda. Further research is needed to determine why low representation of females in medical training institutions persists.

A study determining reasons for attrition or long time to completion is necessary to stem drop outs and improve completion time. Data on this would be best collected in a prospective longitudinal study design or through qualitative research.

Studies on the feasibility of conducting means testing for students who qualify for medical school could help identify those likely to financially during their studies and help target them for assistance.

Finally, although not one of the issues assessed in this study, the quantification and monitoring and evaluation of the Inter University Council of East Africa in producing additional doctors needs to be undertaken in order to assess its contribution to the overall health workforce and its continued potential as an alternative strategy for training more medical doctors.



REFERENCES

African Development Fund. (May 2006). *Multinational Support for Higher Education in WAEMU Countries: An Appraisal Report*. Department of Social Development, Central and West Regions. [Online], Available: <http://www.afdb.org/pls/portal/docs/>. [Accessed 26-06-2008 4:39 PM].

Alwan, A. & Diaz-Herrera, C. (2006). *Resource Mobilization for Health Action in Crises: Uganda Saving Lives and Reducing Suffering*. [Online], Available: http://www.who.int/hac/donorinfo/cap/Uganda_advocacy_Dec06.pdf. [Accessed 09-08-2010 5:03 PM].

All Africa (2008). *Twenty Three Bauchi Female Students for Medical Training in Egypt*. [Online], Available: <http://allafrica.com/stories/200811070437.html>. [Accessed 13-02-2010 13:52 PM].



Association of American Medical Colleges (AAMC). (2007). Medical School Graduation and Attrition Rates. *Analysis In Brief*, 7 (2) [Online], Available: http://www.aamc.org/data/aib/aibissues/aibvol7_no2.pdf. [Accessed 23-01-2010 3:18 PM].

Arulampalam, W., Naylor, R. A. & Smith, J. P. (2007). Dropping Out of Medical School in the UK: Explaining the Changes Over the Years. *Medical Education*, 41: 385–394.

Babalola, J.B., Sikwibele, A.L. and Suleiman, A.A. (2000). Education as Aided by the World

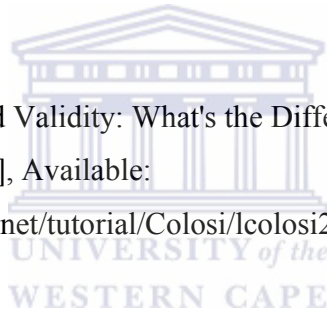
Bank; A Critical Analysis of Post-Independence Projects in Nigeria. *Journal of Third World Studies*, 17 (1), 155-163.

Beaglehole, R. & Dal Poz, M. (2003). Public Health Workforce: Challenges and Policy Issues. *Human Resources for Health*, 1:4. [Online], Available: <http://www.human-resources-health.com/content/1/1/4>. [Accessed 03-08-2010 3:49 PM].

Black, T.R., Atwaru-Okello, D., Kiwanuka, j., Serwadda, D., Birabi, O., Malinga, F., Byamigisha, A. & Rodd, A. (1998). Science education in Uganda: progress and possibilities *International Journal of Science Education*, (20) 2, 239 – 252.

Cambridge Online Dictionaries (2010). Cambridge University Press. [Online], Available: <http://dictionary.cambridge.org/dictionary/british/means-testing> [Accessed: 20-4-2010 10:54 PM].

Colosi, L.A. (1997). Reliability and Validity: What's the Difference? *The Layman's Guide to Social Research Methods*. [Online], Available: <http://www.socialresearchmethods.net/tutorial/Colosi/lcolosi2.htm>. [Accessed 03-08-2010 3:57 PM].



Dambisya, Y.M. (2004). The Fate and Career Destinations of Medical Doctors Who Qualified at Uganda's Makerere Medical School in 1984: A Retrospective Cohort Study. *BMJ* 2004; 329 : 600-601.

Department of Education (DOE), Republic of South Africa. (2004). *Education Management Information System (EMIS)*. [doi:10.1111/j.1365-2929.2007.02710.x]. Pretoria, South Africa.

Department of Education (DOE). Republic of South Africa. (2001). *Draft National Plan for Higher Education in South Africa*. [Online], Available: <http://www.education.gov.za/> [Accessed 06-11-2008 4:53 PM].

Elam, C. L., Scott, K. L., Gilbert, L. A. & Hartmann, B. A. (2003). A Comparison of Applicant and Matriculant Trends, and Rising Costs of Medical Education in United States Medical Schools and at the University of Kentucky College of Medicine. *Journal of Kentucky Medical Association*, 101(5): 201-207.

Government of Uganda. (2008a). State of Uganda Population Report. [Online], Available: <http://www.popsec.org/publications.php>, [Accessed 28-02-2011 11:44AM]

Government of Uganda. (2008b). *Revised Education Sector Strategic Plan 2007-2015*. Ministry of Education and Sports, Planning Education Department. [Online], Available: www.education.go.ug/MoE&S_Strategic_plan.pdf [Accessed 26-02-2011 4:53 PM].

Government of Uganda. (2006). *Human Resources for Health Policy*. Ministry of Health, Kampala, Uganda.

Government of Uganda. (2007). *Uganda Human Resources for Health Strategic Plan 2005-2020: Responding to the Health Sector Strategic Plan and Operationalising the HRH Policy*. Ministry of Health, Kampala, Uganda.

Gulu University. (2010). Faculty of Medicine. [Online], Available: http://gu.ac.ug/index.php?option=com_content&view=category&layout=blog&id=47&Itemid=67. [Accessed 02-03-2011 9:02AM].

Ishengoma, J. M. (2004a). *Cost-sharing and Participation in Higher Education in Sub Saharan Africa: The Case of Tanzania*. A Paper presented at the UNESCO Forum on Higher Education, Research and Knowledge. Paris, December 1-3, 2004.

Ishengoma, J. M. (2004b). Cost-sharing in Tanzania: Fact or Fiction? *Journal of African Higher Education*, 2 (2): 101-134.

Johnstone, B. D. (2001). *Response to Austerity: The Imperatives and Limitations of Revenue Diversification in Higher Education*. Unpublished paper presented at Lee Hysan Lecture at the Chinese University of Hong Kong, May 15, 2001.

Joint Learning Initiative. (2004). *Human Resources for Health: Overcoming the Crisis*. Boston, Massachusetts, USA: Harvard University Press.

Kampala International University. (2010). Western Campus. [Online], Available: <http://www.kiu.ac.ug/index.php/en/western-campus>. [Accessed 02-03-2011 8:57AM].

Katahoire, A.R, Grace Baguma, G & Etta, F. (2004). Ch 8- Schoolnet Uganda: Curriculumnet, In Information And Communication Technologies For Development In Africa: Vol. 3 Networking Institutions Of Learning. [Online], Available: http://www.idrc.ca/en/ev-71275-201-1-DO_TOPIC.html. [Accessed 02-03-2011 9:57AM].

Kipchumba, S. (2008). Kenya: Parallel Degree Programme Changing Education. *The Nation*. [Online], Available: <http://allafrica.com/stories/200807140232.html>. [Accessed 06-11-2008 1:52 PM].

Komuhiimbo, S. (2009). Gender Inequalities in Education. The Sub-Regional Conference of Women in East Africa. [Online], Available: <http://www.wougnet.org/cms/content/view/557/1/> [Accessed 26-02-2011 1:52 PM].

Kwong, J. C., Dhalla, I. A., Streiner, D. L., Baddour, R. E., Waddell, A. E. & Johnson, I. L. (2002). Effects of Rising Tuition Fees on Medical School Class Composition and Financial Outlook. *Canadian Medical Association Journal*, 166 (8): 1023-1028.

Landis, J. & Koch, G. (1977). An Application of the Hierarchical Kappa-type Statistics in the Assessment of Majority Agreement Among Multiple Observers. *Biometrics*, 33: 363-374.

Lehmann, U., Andrews, G. & Sanders, D. (2000). *Change and Innovation at South African Medical Schools - An Investigation of Student Demographics, Student Support and Curriculum Innovation*. Health Systems Trust - Research Programme. [Online]. Available: <http://www.healthlink.org.za/uploads/files/medschools.pdf> [Accessed 13-02-2010 13:52 PM].

Lussier, T.G. (1995). *Doctoral Students at the University of Manitoba: Factors Affecting Completion Rates and Time to Degree by Gender and by Field of Study*. Masters' Thesis. University of Manitoba, Canada.

Makerere University. (1997a). Ch 3 - The Financial Reform Which Has Transformed Makerere University. *Makerere University Strategic Framework 1996/7-1998/9*. [Online], Available: http://www.makerere.ac.ug/makict/documents/strategic_framework/chap3. [Accessed 26-02-2008 3:09 PM].

Makerere University. (1997b). Ch 4 - Makerere University in Transition, 1993-2000: Opportunities and Challenges. *Makerere University Strategic Framework 1996/7 – 1998/9*. [Online], Available <http://www.foundation-partnership.org/pubs/makerere/>. [Accessed 26-02-2008 3:29 PM].

Matsiko, C.W. & Kiwanuka, J. (2003). A Review of Human Resource for Health in Uganda. *Journal of Health Policy and Development*, 1 (1): 15-20.

Mayanja, M.K. (2006). *The Makerere University Lessons in Privatization: Affirmative Action for Science*. [Online], Available, <http://www.nai.uu.se/publications/>. [Accessed 03-03-2008 6:47 PM].

Mbarara University of Science and Technology (MUST). (2001). Faculty of Medicine; Background. [Online], Available: http://www.must.ac.ug/view_fac_ins.php?faculty_code=medicine. [Accessed 29-11-2010 5:22 PM].

McPake, B. (2007). AIDs and Human Capacity in the Health Sector. Institute of International Health and Development, Queen Margaret University Edinburgh. A Paper Prepared for the Economic Resources Group, UNAIDS and World Bank. [Online], Available: www.heard.org.za/downloads/erg-meeting-1-mcpake-final-draft.pdf. [Accessed 25-11-2010 2:20 PM].

Ndetei, D.M., Mathai, M., Khasakhala, L.I., Mutiso, V. & Mbwayo, A.W. (2010). University medical education in Kenya: The challenges. *Medical Teacher*; 32 (10) : 812-815.

Norwegian Agency for Development Cooperation (NORAD). (2006). *Investing in the Future: Education for Health in Africa (EHA) Initiative*. [Online], Available: www.norad.no/. [Accessed 19-01-2008 2:24PM].

Nwamuo, C. (2001). Increasing Access to Higher Education in Africa: Emerging Issues. *EAIE Forum* (Spring 2001), [Online], Available: www.eaie.org/pdf/F31art7.pdf . [Accessed 15-11-2010 2:24 PM].

Oketch, M. O. (2003). Affording the Unaffordable: Cost-sharing in Higher Education in Sub-Saharan Africa. *Peabody Journal of Education*, 78 (3): 88-106.

Parliament of Uganda. (2006). A Report of the Committee of Social Sciences on the Ministerial Policy Statement and Budget Estimates for the Health and Education Sectors for Financial Years 2006/2007. [Online], Available: www.parliament.go.ug/files/Committee%20on%20Social%20Services.pdf. [Accessed 02-03-2011 10:07AM].

Phillips, S.P & Austin E.B. (2009). The Feminization of Medicine and Population Health. A commentary *In, Journal of the American Medical Association*. JAMA. 2009; 301(8):863-864. doi: 10.1001/jama.2009.155

Saint, W., Hartnett, T.A. & Strassner, E. (2003). *Higher Education in Nigeria: A Status Report Higher Education Policy*. [Online], Available: http://www.bc.edu/bc_org/ [Accessed 26-06-2008 3:09 PM].

Simpson, K.H, Budd, K (1996). Medical student attrition: a 10-year survey in one medical school. *Medical Education*, 30 (3): 172–178.

SPSS. 15. 1 (2006). [Online], Available: <http://www.spss.com/> [Accessed 06-11-2008 5:04 PM].

Thorne, S. (1996). Medical School Tuition Fees Reach Record Levels as MD Incomes Shrink. *Canadian Medical Association Journal*, 155 (7): 21-27.

United Nations Development Program (UNDP). (2008). Uganda Facts and Figures. [Online], Available: <http://www.undp.or.ug/resources/45> [Accessed 28-02-2011 12:00PM].

University of New York & University of Dar es Salaam. (2002). *Financing Higher Education in Eastern and Southern Africa. Diversifying Revenue and Expanding Accessibility*. A Conference Report Sponsored by the University of Dar es Salaam and International Comparative Higher Education Finance and Accessibility Project of the State University of New York at Buffalo Royal Palm Hotel, March 24-28, 2002, Dar es Salaam, Tanzania.

World Health Organization. (2006). *The Global Shortage of Health Workers and its Impact. Factsheet 302*. [Online], Available: <http://www.who.int/>. [Accessed 27-03-2008 2:00 PM].

World Health Organization. (2007). *Task Shifting to Tackle Health Worker Shortages: Strengthening Health Services to Fight HIV/AIDS, Taking Stock*. [Online], Available www.who.int/healthsystems/task_shifting_booklet.pdf . [Accessed 21-10-2010 5:00 AM].

APPENDIX I: DATA EXTRACTION FORM

1. Student number:
2. Age:
3. Gender:
 - a. Male
 - b. Female
4. Tribe:
5. Region of origin:
6. Sponsorship for tuition:
 - a. Government
 - b. Private
7. Year of enrolment:
8. Year of completion (based on graduation records):
9. *Drop out*/attrition:
 - a. Yes
 - b. No
10. Reason for *drop out*/attrition (if available):
11. Year of *drop out*



APPENDIX II: STUDY INFORMATION SHEET/CONSENT FORM



UNIVERSITY OF THE WESTERN CAPE



School of Public Health

Private Bag X17 • BELLVILLE • 7535 • South Africa

Tel: 021- 959 2809, Fax: 021- 959 2872

STUDY INFORMATION SHEET FOR THE OFFICE OF THE REGISTRAR, MUSM

Dear Sir,

My name is Dr. Suzanne Kiwanuka, a Master of Public Health student at the University of the Western Cape (South Africa). I appreciate your taking time to participate in this research which will form the basis for a mini-thesis required for the aforementioned Masters degree. Below you will find a description of the study and your potential involvement in it. Feel free to ask me for any clarifications now and /or at any point during the study. My contact address and that of my supervisor are at the end of this letter.

Title of study:

The Ugandan Private Students Scheme at Makerere University School of Medicine and its Effect on Increasing the Number of Medical Doctors Enrolled and Trained from 1993 to 2004

Aim of study: To assess the effect the Private Students Scheme initiated in 1993 had on enrolment and graduation of students at the medical school in order to inform decision making about possible avenues for increasing health worker throughput at Makerere University.

Description of study and your contribution to it: A retrospective study will be used to describe changes in enrolment and graduation for five years before (1988/9-1992/3) and five years after (1993/4-1997/8) the Private Student's Scheme. Changes in student enrolment, graduation and attrition before and after the Private Students Scheme will be described. Your participation in this study by granting the principal investigator permission to access the archives with student enrolments and graduation data would be appreciated.

Confidentiality: In order to protect the identities of the students, after extraction of the relevant data, identification codes will be used during data entry for each student.

Voluntary participation and withdrawal: Your permission is sought in order to proceed with this study, which hopefully will provide insights on the effect of cost-sharing on medical school enrolments and graduation. If you require further information about the nature of this study, do not hesitate to contact the principal investigator or the supervisor using the addresses below. You are free to decline to participate in this study; however your participation is welcomed and highly appreciated.

If you are in agreement, would you be kind enough to complete the attached Consent Form indicating your agreement.

Yours faithfully



Suzanne Kiwanuka (Dr.)

Contact addresses:

Suzanne Kiwanuka (Dr.)

MU-School of Public Health,

P.O. Box 7072, Kampala Uganda,
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**APPENDIX III: CONSENT FORM FOR THE USE OF MAKERERE UNIVERSITY
SCHOOL OF MEDICINE'S STUDENT RECORDS (1988/9-2004/5) FOR THE
STUDY: *THE UGANDAN PRIVATE STUDENTS SCHEME AT MAKERERE
UNIVERSITY SCHOOL OF MEDICINE AND ITS EFFECT ON INCREASING THE
NUMBER OF MEDICAL DOCTORS ENROLLED AND TRAINED FROM 1993 TO
2004***

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Agreement of the Office of the Registrar, MUSM:

The Office of the Registrar of the MUSM has been informed of the purpose of the study and that his/her participation is voluntary. The participant is requested to grant the investigator permission to review and use students' enrolment and graduation data for this study.

Signed..... Date.....

Investigator's agreement:

The investigator will ensure that all records are treated with utmost confidentiality. Students registration numbers will be extracted instead of names. The data collected will not be used beyond the purpose of this study and any publications produced as a result of this work will acknowledge the contribution of the Office of the Registrar of the MUSM.

