**MEDICAL STUDENTSADMISSION CRITERA AND THEIR RELATIONSHIP TO ACADEMIC PERFORMANCE AMONG MEDICAL STUDENTS INMOI AND EGERTON UNIVERSITIES, KENYA**

**BY**

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**MOI UNIVERSITY**

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## DEDICATION

To my late FatherStephen Obwoge for his parting shot saying in Ekegusii “ *genda osome*” translated as “go and study”.

## ABSTRACT

**Background:**  Admission into Kenyan public universities’ medical schools is either by Kenya Universities and Colleges Central Placement Service(KUCCPS) or on self-sponsorship programmes (SSP) basis. The KUCCPS selected students have strong O-level grades in all subjects, with specific cluster science subjects and cumulative points. The SSP students need to have minimum university entry requirements and cluster subjects for admission unto the medicine and surgery (MBCHB) programme. **Objectives:** The study aimed at analysing the relationship between Medical Students Admission Characteristics (sponsorship, sex, KCSE grade) and their performance in preclinical and clinical levels at Medical schools of Moi University (MU) and Egerton University (EU). The Study sought to; i) determine the relationship between medical students’ KCSE grades and their performance. ii)Analyzesponsorship basedthe performance of medical students. iii)Analyze the performance by gender in preclinical and clinical courses.

**Methods:** The study utilized ex post facto research design for Retrospective record review (3R) of 272 medical students of academic year 2007/08, 2008/09 and 2009/10 as cohort classes of Moi and Egerton Universities. The Target Population was Public Universities’ Medical students (MBChB) who had been examined at both preclinical and clinical levels. A Data sheet document was used to capture study data. The performance analysis used the t-test and coefficient correlation with the aid of the Statistical Package for Social Sciences (SPSS).

**Results:** The results indicated that students’ KCSE grades did not influence performance at preclinical courses at MU (*p=0.090*) and EU (*p=0.088*), nor performance at clinical courses at MU (*p=*0.*154*) and EU (*p=0.474*) medical schools. Student’s sponsorship did not influence their performance in preclinical courses at MU (*p =0.120*) though it did influence at EU (*p=0.004*), in clinical courses it significantly influenced students’ performance at both schools of MU (*p*=0.005) and EU (*p =0.005*) medical schools. Gender did not influence students’ performance in preclinical courses at MU (*p=0.949*) and EU (*p=0.629*), but significantly influenced clinical courses performance at MU (*p=*0.001), However, it and didn’t influence performance at clinical courses atEU (*p*=0.819). . **Conclusion:**  The study concludedthat: i) KCSE aggregate grade was not a predictorat performance in preclinical courses and clinical courses at MU and EU medical schools respectively. ii) Sponsorship did not predict performance in clinical courses at MU though it did at EU and clinical courses at both MU and EU medical schools. iii) Gender did not predict students’ performance in preclinical courses at MU, EU and clinical courses at EU, though it predicts clinical courses performance at MU medical school.

**Recommendation:** The study recommended Medical schools to consider an open entry Examination system for applicants who meet minimum cluster requirements regardless of the KCSE aggregate grade. Sponsorship of students in Medical schools should be considered on equal basis. Farther study on a larger population should be used to carry out a study on the gender influence in the performance in Pre-clinical and clinical courses.

*Key words:*academic performance, admission characteristics, clinical performance, medical student, preclinical performance

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Glory unto God

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## ABBREVIATIONS AND ACRONYMS

**3R** – Retrospective Records Review

**A-Level** – Advanced level (grade XIV)

**AMCAS** - American Medical College Application Service

**ANOVA** – Analysis of Variance

**ARMS** – Academic Records management System

**ATAR–** a medical interview and finally Australian Tertiary Admission Rank

**BMAT** - Biomedical Admissions Test

**CUE -** Commission of University Education

**EOS** - end of semester examinations

**EU –** Egerton University

**GAMSAT -** Graduate Medical School Admissions Test

**GAMSAT** - Graduate Australian Medical School Admissions Test

**GPA** - Grade Point Average

**GSP** – Government Sponsored Program

**HSC** - High School Certificate

**KCSE** - Kenya Certificate of Secondary Education

**KUCCPS - Kenya Universities and Colleges Central Placement Service**

**MBBS -** Bachelor of Medicine and Bachelor of Surgery

**MBCHB** - Bachelor of Medicine and Bachelor of Surgery

**MCAT** - Medical College Admissions Test

**MU –** Moi University

**O-level** – Ordinary level

**PPMCC** - Pearson product-moment correlation coefficient (sometimes referred to as the **PPMCC** or PCC or Pearson's r)

**RN** – Registered Nurse

**SSCE** – Secondary School Certificate of Education

**SSP –** Self Sponsor Programmes

**UKCAT** - United Kingdom Clinical Aptitude Test

**UMAT** - Undergraduate Medical Admissions Test

# OPERATIONAL TERMS

**Academic Performance:** Academic achievement by [examinations](http://en.wikipedia.org/wiki/Test_%28assessment%29) or [continuous assessment](http://en.wikipedia.org/wiki/Continuous_assessment) scores in percentage converted into grade A,B,C,D,E for preclinical and clinical courses.

**Admission Criteria**: thebasis Medical Schools or government considersforselecting students for MBChB programme, including of KCSE grade achieved, sponsor and gender.

**Clinical courses-**These are courses that are taught during the Clinical years at medical school, herein this study include: Forensic Medicine, Occupational Health, Radiology and Diagnostic images, Surgery, Internal Medicine, Reproductive Health, Mental Health and Paediatrics and Child Health and Dermatology andSTD.

**Government sponsorship:**the monetary inputs or resources available for regular students’ educational program. Including money allocated by governmentand paid directly to support the student by government.

**Medical student**: a student following a course of study leading to qualification as a doctor of medicine.

**Performance in Clinical courses:**Academic theoretical and Practical coursesmeasured by [examinations](http://en.wikipedia.org/wiki/Test_%28assessment%29) or [continuous assessment](http://en.wikipedia.org/wiki/Continuous_assessment) scores in percentage and converted into grade A,B,C,D,E for clinical courses.

**Performance in Preclinical courses:**Academic theoretical and practical courses measured by[examinations](http://en.wikipedia.org/wiki/Test_%28assessment%29) or [continuous assessment](http://en.wikipedia.org/wiki/Continuous_assessment) scores in percentage (%) and converted into grade A,B,C,D,E for preclinical courses.

**Preclinical courses –** Courses that are taught inpreclinical years at medical schoolincluding: Human Anatomy, Biochemistry, Human Physiology, Immunology, Microbiology and parasitology, Pharmacology and Therapeutics, and Pathology.

## 

# CHAPTER ONE

# INTRODUCTION

## 1.0 Overview

Thischapter discusses issues concerning the study background information, problem statement, rationale, research questions, broad objective, specific objectives, hypotheses, limitation and assumptions.

## 1.1 Background

Kenyan Universities’ medical schools are among the schools that produce the medical doctors for the Eastern Africa region and beyond. Egerton University (EU) and Moi University (MU) are among the five public universities with medical schools. The selection of candidates to the medical schools is regulated by a national admission policy that spells out the criteria for admission.

The Medical Schools Council (2006) on Guiding Principles for the Admission of Medical Students in the United Kingdom indicated that selecting candidates fortraining as tomorrow’s doctors is a huge and challenging task for medical schools. The unique nature of the medical profession requires certain capabilities to produce future doctors who are competent in cognitive, psychomotor and affective skills. The desired characteristics/criteria have to be addressed in the admission process. Identification of these asfuture performance predictors at the admissions process will lead to selection of applicants who upon graduation will practice effectively. Leon &Kolstad (2010) who investigated on Wrong schools or wrong students found that the differences in admission policies among universities and financing possibilities available to individual students could influence the characteristics of studentsultimately joining medical schools.

Globally, different schools have drafted their criteriafor admission into a medical school. Some medical schools base student admission criteria on straight high school scores while others subject applicants to college admission tests. Universities like Egerton University, University of Florida and University of Utah medical schools’have unique entry requirements stressing on core subjects. These admission requirements may either be; high school subjects grades, high school aggregate grade, first science degree or general degree or/and entry examinations.

This aims at selecting applicants who upon graduation aremore likely to become good doctors, fulfilling community expectations and protectors of public health.Ferguson&Madeley(2002) in their study onFactors associated with success in medical school indicatedthat previous academic performance was a good, but notperfect predictor of achievement in medicaltraining, while among others genderwas associated with success in medical training.Carpio&Hezekiah(1996), Foti &DeYoung (1991), McClelland*et al.,* (1992),Roth*et al.,* (1996) and Alexander and Brophy (1997) in their studies on performance indicators found that high school grades were predictive of performance at medical schools”. Salvatori (2001) in the study on validity of admission tools used to select students to health professions educationcalls for more studiestoprovidemore reliable and valid ways of assessing non-cognitive characteristics of applicants. The question as to which admission characteristics are rational, fair and humane to potential applicants, medical schools and the public remain unanswered.

Inconsistence in gender differences in performance exist in several studies as others found significance while others not. [Aldous *et al.,*](http://www.ncbi.nlm.nih.gov/pubmed/?term=Aldous%20CJ%5BAuthor%5D&cauthor=true&cauthor_uid=9076269)(1997), Blackman &Darmawan (2004)andGeiser & Santelices (2007) indicated that gender had a direct influence on achievement inclinical courses. Overall female students performed better than male students in their clinical assessments.Against Haist *et al.,* (2000) whosestudy found men performing better than women in preclinical years.While Dixon (2007) found that performance of women in clinical years was equal to that of men. However, Al-Mulhim*et al.,* (2012)found no significant difference between male and female students in the written examination scores, in a study that analysed the situation in the two universities, in relation to gender based performance in both the preclinical and clinical courses.

In Kenya, admission of medical students intoPublic University’Medical Schools is a hotly contested exercisedue to the limited chances availableand resource constrained facilities. The undergraduate medical course takes six years. Moi University and Egerton University are among five public Universities managing medical schools in Kenya. There areclear guidelines thatKenyan medical schools use to select futuredoctors across the country.The guidelines allow admission either through Kenya **Universities and Colleges Central Placement Service** (KUCCPS) orindividual university senatesfor self-sponsored programmes (SSP).The question worth answering is‘What is the evidence base for using theseadmission criteria?’The KUCCPS selected students have strong O-level grades in all subjects, with specific cluster science subjects and cumulative points specified for medicine (MBCHB).

TheSSP students have minimum university entry and cluster subject requirements.Currently the emphasis is on general aggregate comprising arts and science subjects. Applicants are expected to have a high level of secondary school academic attainment. However, should be recognized that attainment of high academic grades at the secondary school level may not necessarily be an assurance for success in a career in medical school.

The formerKenyan education system (7 years primary, 4 years’ secondary and 2 years in high school) absorbed medical students after secondaryOrdinary Level (O level) examination to specialize in eitheran art or science –based track in high school(A-level). After completion oftwo years in high school,admission into medical schools was basedon the score of high school subjects. Are the admission criteria fair to potential students, medical schools and the public?Patrick(2002) onTraining Research and practice indicates that“getting the right policy for admission into medical school is a balancing act. It has to be fair to society by selecting people with the potential of qualifying as competent doctors and fair to applicants- that diverse group of people who for many reasons want to set out on a long road to the medical career”. The admission procedures should aim at selecting students with the ability and will to complete the program successfully, fitin the medical professionand perform effectively as expectedbythe profession.

This study focused onMedicalschoolstudents who had completed both the preclinical and clinical sciences in their medical training. In each academic year students were evaluated individuallyon their academic performance. The evaluations were rated in the respectivecompetency-aligneddomains in line with medical knowledge, patient care, interpersonal and communication skills andprofessionalism.

Thestudyanalysed admission characteristics:- gender, KCSE grades in relation to students’ performance in preclinical and clinical subjects while at medical schools. It aimed atascertaininghow the admission criteria predictsapplicantfitness to joinprofessional training at medical school.

This study perceived student performance in both preclinical and clinical courses to be an influence arising from student characteristics at admission. The various characteristics if well thought out enough may predict the students’ performance at the two levels.

## 1.2 Statement of the Problem

Globally there are no standard admission criteria into medical schools. Moi University,Egerton University, University of Florida and University of Utahmedical schools have developed unique entry requirements stressing on cognitive factors (core subjects). Some universities consider high school scores, others require applicants to have a first degree in either sciences or specific fieldsand others subject applicants to entry examinations. Some medical schools considerboth cognitive criterianamely previous academic abilityandnon-­cognitive factors (personality, learning styles, interviews, references, personalstatements), and demographic factors (sex, ethnicity)before admitting prospective students either on KUCCPS or SSP.

There are five Kenyanpublic universities managingmedical schools and offering a six year full program of MBChB. This program is divided into two phases: -first three years are basic sciencesor preclinical years and the remaining years are clinicalsciences. Uponcompletion, a student is awarded a bachelors degree in medicine and surgery (MBChB).

Both Moi and Egerton universities government sponsored programs candidates are required to have attained mean grade of A- at KCSE: A- in Biology and Chemistry; and either Maths or Physics; and either English or Kiswahili.

The SSP requires; minimum of a mean grade B (Plus) and cluster of; Language (English and Kiswahili) B+, Mathematics/Physics B+, Biology B+, Chemistry B+, or Diploma in Clinical Medicine with at least credit pass C+ in the cluster subjects in K.C.S.E.Some schools raise the criteria higher for SSP students while some admit at the minimum set criteria. Interestingly, the two admission criteriahave met the minimum entry requirement as per the KUCCPS, Commission for University Education(CUE) and [Medical Practitioners and Dentists Board](http://medicalboard.co.ke)guidelines for medical schools. [www.egerton.ac.ke/index.php/Faculty-of-Health-Sciences/faculty-of-health-sciences-programmes.html](http://www.egerton.ac.ke/index.php/Faculty-of-Health-Sciences/faculty-of-health-sciences-programmes.html)Retrieved 13th October, 2017.<http://admissions.med.ufl.edu/admission-requirements/regular-admission-requirements/>Retrieved 13th October, 2017.

Theacademic performance takes a central role in defining whether or not learning has occurred. It is not clear how the current admission criteriarelate to students’ performance in preclinical and clinical courses. There is no evidence in the literaturethat indicates the suitability of the selection criteria in use for Kenya. The admission criteria based on cognitive ability (previous academic grades) is yet to prove its effectiveness in predicting future performance, as Ferguson *et al.,* (2002) arguesin their study onfactors associated with success in medical schoolshowing that previous academic performance was a good, but not perfect predictor of achievement in medical training. While at medical schoolsometimes students repeata year, retake supplementary examinations, or are even discontinued on failing to meet the pass mark. Evidence is required to prove academic and non-academic factors that may lead to poor performance.Without shading light on the relationships, the poor performance among students may continue to be experienced.

In view of the foregoing, this study investigated the relationship that exists between Medical Students Admission criteria (sponsorship, gender, KCSE grade) and their performance in preclinical and clinical courses.

## 1.3: Justification

Several reasons make this study significant based on the theoretical and practical view. These arguments are;

Students are not blank slates upon which knowledge is etched as purported by behaviourists. The beaviourist theory according to Amri *et al.,* (1993) suggests that learning will occur and behaviour will be shaped in the direction a teacher wants if the behaviour is rewarded. To achieve learning information should be presented in small amounts so that response can be reinforced (‘shaping’).

While theConstructivists argue that humans generate knowledge and meaning from interactions between their experiences and their ideas,so students admitted to learning institutions have already formulated knowledge, ideas, and understandings (at high school sciences). This previous knowledge (cognitive) and non-cognitive ability are the raw material for the new knowledge they will create. The medical student admission process should consider their relevant previous formulated knowledge at either O-level or other relevant non cognitive ability. The O-level scores should indicate the previouslyformulated knowledge levels and ideasassociated withperformance in preclinical sciences, while the preclinical knowledge, skills and attitudes acquired should form the prerequisite for the clinical sciences.Knowledge is actively constructed as a result of active discovery as learners construct their knowledge through a process of active enquiry. This is agreeable withsocial constructivists who support collaborative learning as a process of student-peerinteraction anddiscussion, introduction and clarification of concepts, and references to previously learned material.

Currently, admission into the Medical schools of Moi University (MU) and Egerton University (EU) is based on KCSE grades. [www.egerton.ac.ke/index.php/Faculty-of-Health-Sciences/faculty-of-health-sciences-programmes.html](http://www.egerton.ac.ke/index.php/Faculty-of-Health-Sciences/faculty-of-health-sciences-programmes.html)Retrieved October 13th, 2017. (<http://admissions.med.ufl.edu/admission-requirements/regular-admission-requirements/>retrieved October 13th,2017.

Therefore, there is need to explore if medical students’ admission criteria relate to performance in preclinical and clinical courses and also if the preclinical performance can predict performance in clinical courses.

The KUCCPS selected students benefit fromgovernment financial support over the SSP students.While SSP student depend on privately sourced support. What is likely to be the effect of such financial support on their performance in both preclinical and clinical courses? How effective is thebasis on cognitive (previous academic ability), at predicting clinical performance? Is it meeting the expectedprediction?

The Medical Schools Council (2006) on Guiding Principles for the Admission of Medical Students indicates ‘Admission policies will be informed and guided by current research and good practice’.

The findings of this study will inform higher institution stakeholders and policy makers on the current academic impact on the adopted admission criteria. This will be used as a basis in decision making and implementation in the admission process for medical schools.

## 1.4: Research Questions

### 1.4.1: Main research question

What is the relationship between Medical Student Admission Characteristics (sponsorship, gender, KCSE grade) and their performance at preclinical and clinical levelsat Medical schools of Moi University (MU) and Egerton University (EU)?

### 1.4.2: Research Questions

The following were the research questions for the study

1. What is the relationship between medical students’ KCSE grade(s) and their performance in preclinical and clinical courses at Moi and Egerton Universities.?
2. What is the performance in preclinical and clinical courses of medical students based on sponsorship (KUCCPS and SSP)at Moi and Egerton Universities.?
3. What is the performance by gender in preclinical and clinical courses of medical students at Moi and Egerton Universities?

## 1.5: Broad Objective

The study analysed the relationship between Medical Student Admission Criteria (sponsorship, gender, KCSE grade) and their performance (preclinical and clinical levels) at Medical schools ofMoi University (EU) and Egerton University (MU).

## 1.5.1: Specific Objectives

The specific objectives guided this study were to.

1. determine the relationship between medical students’ KCSE grade(s) and their in preclinical and clinical coursesperformance at Moi and Egerton Universities.
2. analyze the performance in preclinical and clinical courses of medical students based on sponsorship (KUCCPS and SSP)at Moi and Egerton Universities.
3. analyze the performanceby genderinpreclinical and clinical courses of medical studentsat Moi and Egerton Universities.

## 1.6: Hypotheses

Due to the questions that were to be answered the study generated the following hypotheses:

**HO1:** There was nostatistically significant relationshipbetween Medical students’ KCSE grade(s) andtheir performance in preclinical and clinical course at Moi and Egerton Universities.

**HO2**: There was no statistically significant difference in performance in pre-clinical and clinical courses between KUCCPS and SSP medical students at Moi and Egerton Universities.

**HO3:** There wasno statistically significantgender difference in performance of medical students in the Preclinical and Clinical Coursesat Moi and Egerton Universities.

## 1.7: Scopeof the study

This study analysed admission data and academicachievementof medical students’ thathad been assessed in preclinical and clinical courses. Excludedwere students fromdifferent educational systemsother than Kenya’s 8-4-4 system. The study matched the three cohorts between Moi University andEgerton University from academic year 2007/08, 2008/09 and 2009/10.The study arrived at three cohorts based on: 1) Need to have cohorts already assessed at Preclinical and Clinical levels, making 2009/2010 latest academic year assessed at two academic levels. 2) Egerton University’s first group was 2007/08 making it the first group included.

The study analysed the performance trends independently in relation to admission characteristics.

## 1.8: Assumptions

The studymade the following assumptions:

1. Thatstudent’s admission records and academic records were well maintained and were availableatboth universities.
2. That student admission and academic records captured all data for analysis in relation to student’s bio data and detailed academic performance over the three academic years.
3. The other confounding factors like learning environment, mode of instructional delivery was standard in the two universities. Since the two universities werenot compared, analysis was done on admission characteristics and their relationship in respective academic levels namely Preclinical and Clinical.

## 1.9: Theoretical Framework

The study adopted a philosophical framework of constructivism*.* Constructivism is a learning theory that tries to explain that learners learn by constructing knowledge by themselves. Constructivism is the assimilation of both behaviorism and cognitivism ideals. <http://www.thirteen.org/edonline/concept2class/constructivism/index_sub5.html> Retrieved Feb 26th, 2016.

Merriam & Caffarela (2001) describe constructivist learning as a process of constructing meaning; it is how people make sense out of their experiences. Learners actively build new knowledge by assessing past experiences, which are then used in assimilating new information in situations. Learners’ understanding is subjective in constructivism because it is created by the learner using new information and previous knowledge rather than the newly absorbed information. Knowles (2013) indicates that instruction should take into account the wide range of different backgrounds of learners; learning materials and activities should allow for different levels/types of previous experience.Constructivism taps into and triggers the student's innate curiosity about the world and how things work.

Knowels (2013)made five (5) assumptions about the characteristics of [adult learners](http://elearningindustry.com/tags/adult-learners) (andragogy) that are different from the assumptions about child learners (pedagogy).

1. **Self-concept:** As a person matures his self-concept moves from one of being a dependent personality toward one of being a self-directed human being
2. **Adult Learner Experience:** As a person matures he accumulates a growing reservoir of experience that becomes an increasing resource for learning.
3. **Readiness to Learn:** As a person matures his readiness to learn becomes increasingly oriented to the developmental tasks of his social roles.
4. **Orientation to Learning:** As a person matures his time perspective changes from one of postponed application of knowledge to immediacy of application, and accordingly his orientation toward learning shifts from one of subject- centeredness to one of problem centeredness.
5. **Motivation to Learn:** As a person matures the motivation to learn is internal

Medical students’ admission process should factor in the constructivist philosophical argument. It should be a process that recognizes that a learner is ultimately motivated to learn internally and more effective learning and meaningful occurswhen personal goals, interests, attitudes and beliefs come from learners rather than the instructor.

The graphical display of the Theoretical framework for Constructivism is presented in figure 1.1.

**Learner**

**Orientation to learn**

**Experience**

**Readiness to Learn**

**Motivation to Learn**

**Self-Concept**

Figure 1.1:*Theoretical framework for Constructivism*

<https://elearningindustry.com/the-adult-learning-theory-andragogy-of-malcolm-knowles>Feb 26th, 2016.

## 1.10: Conceptual framework

This study wasguided on the basis that in the past 20 years there has been a paradigm shift away from Behaviourism to Cognitivism Constructivism, a conception of a “learner as sponge/empty vessel, blank slates or passive observers to an image of “learner as an active constructor of meaning/ player””.

<https://elearningindustry.com/the-adult-learning-theory-andragogy-of-malcolm-knowles>Feb 26th, 2016.

“If result is not measured, success cannotbe identified from failure. And if success is not seen, we cannot learn from it, nor can we recognize failure to correct it”. (n)

Student gender, sponsorship and KCSE grades have an association with performance at preclinical and clinical levels. Also the preclinical performance has an association with clinical performance. This was illustrated in figure 1.2.

**INDEPENDENT VARIABLE**

**Admission characteristics**

(Gender, Sponsorship,KCSE grade)

**Performancein Preclinical**

-Mean Scores

-Specific Course Score

**DEPENDENT VARIABLE**

**Performance Assessment at Levels**

**Performance in Clinical**

-Mean Scores

-Specific Course Score

Figure 1.2: *Conceptual Framework*

# CHAPTER TWO

# LITERATURE REVIEW

## 2.0:Introduction

This chapter presentsliteraturereviewrelevant to variables of the study. It focused on student admission criteria into medical schools, academic andnon-academic factorsthat influence academic performance.

## 2.1: Admission into medical schools

The admission process into medical school is a paramount roadmap in preparation of the future doctors that require intensive and careful consideration of required criteria for the selection of the right candidate. The nature of the medical profession as indicated bySalahdeen& Murtala (2004)in their study on relationship between Admission Grades and academic Performance that requires that doctors have certain basic skills and abilities. Salahdeen& Murtala (2004) who in their investigation on analysis of high school grades that showed SSCE was a better predicator of students’ performance in pre-clinical sciences than any other criteria.Cleland*et al.,* (2012) in their study on identifying best practice in the selection of medical students indicatedthat academic criteria are a major component of selection to medical school in several countries.It should be made clear which attributes arerequired when admitting studentsinto medical school.A lot need to be done onthe relationship of admission criteria and performance at preclinical and clinical levels.

Admission may consider various students’ characteristics as cognitive and non-cognitive factors.Thesemay have a direct and in some cases an indirect influence on academic performance. The cognitive factorsinclude O-level performance, college entry examination scores, earlier qualificationseither a bachelor or diploma qualification and non-cognitive factors such as age and gender.

[According to Alfayez](http://www.ncbi.nlm.nih.gov/pubmed/?term=Alfayez%20SF%5BAuthor%5D&cauthor=true&cauthor_uid=2355866)*et al.,* (1990)in their study on academic, social and cultural factors influencing medical school grade performancequeries whether most studies conducted in countries with highly developed educational systems and similar cultural and social systems their findings can be applied to developing countries, where the educational and cultural experiences may be very different (admission is based on first degree, open entry examination systems). It is naive to assume that all learning environments such as resources availability and student support ratios support students positively.

The Queen’s University Belfast, School of medicine, in its admission policy statement states a two stage criteria process. The selection process Stage 1: Cognitive Ability considering the previous academic performance, including school, college and university grades as appropriate and Aptitude test. Stage 2: Non-Cognitive Ability evaluation through multi-mini interviews.. <http://www.med.qub.ac.uk/docs/AdmissionPolicyMedicine.pdf>Retrieved Feb 26th, 2016.

The University of Florida, College of Medicinerequires an applicant to have the minimum basic introductory subjectsincluding:

* Biology – 2 semesters, with labs (8 credit hours)
* General Chemistry – 2 semesters, with labs (8 credit hours)
* Organic Chemistry – 1 semester, with lab (4 credit hours)
* Biochemistry – 1 semester (3 or 4 credit hours)\*
* Physics – 2 semesters, with labs (8 credit hours)

<http://admissions.med.ufl.edu/admission-requirements/regular-admission-requirements/>Retrieved May13th, 2016.

University of Utah, School of Medicine, admits applicants with minimum and average standards in seven specific areas and a candidate should be average or above in 5 out of the 7 areas to be eligible for further consideration. The seven (7) areas are:

* [Grade Point Average (GPA)](http://medicine.utah.edu/admissions/criteria/index.php#gpa) - The minimum acceptable GPA is 3.2.[Medical College Admission Test (MCAT)](http://medicine.utah.edu/admissions/criteria/index.php#mcat), [Community or Volunteer Service](http://medicine.utah.edu/admissions/criteria/index.php#community) (involvement in a service activity without constraint or guarantee of reward or compensation).
* [Leadership](http://medicine.utah.edu/admissions/criteria/index.php#lead) namely position of responsibility for others, with a purpose to guide or direct others in employment, church, community and school organizations including coaching, tutoring and mentoring will satisfy this requirement.
* [Research](http://medicine.utah.edu/admissions/criteria/index.php#research) involvement in a scholarly or scientific hypothesis investigation that is supervised by an individual with verifiable research credentials.
* [Physician shadowing that](http://medicine.utah.edu/admissions/criteria/index.php#physician) is the observation of a physician as that individual cares for and treats patients and carries out the other responsibilities of a medical practice.<http://medicine.utah.edu/admissions/criteria/> RetrievedMay12th, 2016

Regular Admissions to enter the College of Medicine requires the applicant to apply initially through the American Medical College Application Service (AMCAS).Acandidateisthen invited to submit a secondary application. Applications are reviewed by selected committee members and competitive applicants are invited for an interview. Applicants are carefully appraised on the basis of personal attributes, academic record, evaluation of achievements, references, performance on the Medical College Admissions Test (MCAT) and personal interviews. The College of Medicine does not discriminate on the basis of race, sex, creed, age, nationality origin or disability. The College of Medicine welcomes applications from underrepresented minorities. Applicants must have a Bachelor’s degreenon-science or liberal art) conferred prior to matriculation from a regionally accredited American institution’.<http://admissions.med.ufl.edu/admission-requirements/regular-admission-requirements/>Retrieved May13th, 2016.

European universities vary from each other and from one country to another in their admission criteria into a medical school. High grades are required particularly in Chemistry, biology and Language subjects at Advance level (A-Levels), or its equivalent. European medical universities accept International Baccalaureate and European Baccalaureate (college bachelor’s degree) qualifications. A few medical universities require additional tests such as the UK Clinical Aptitude Test (UKCAT), the Biomedical Admissions Test (BMAT) and the Graduate Medical School Admissions Test (GAMSAT). For other universities, the personal experience and achievements in the fields of medicine is an added advantage.<http://www.medicalstudyguide.com/medical-study-requirements.html>.Retrieved June 21st, 2016.

Traditionally in Kenya like the UK, selection for admission to a medical school was based on actual A-levels examinationresults. Currently in Kenyathe admission is based on Ordinary level (O-level) aggregate grade and cluster subjects (Language:English or Kiswahili, Biology, Chemistry, Physics/ mathematics) examination results

In Bulgaria medical schools, the minimum requirement is two A-levels (biology, chemistry or physics).[www.medicalstudyguide.com/medicine-in-bulgaria-now.html](http://www.medicalstudyguide.com/medicine-in-bulgaria-now.html). Retrieved June 21st, 2016). Most Australian universities require a combination of Undergraduate Medical Admissions Test (UMAT) score, a medical interview and finally Australian Tertiary Admission Rank (ATAR) score to gain entry into medical school. Some universities also require specific pre-requisite subjects, such as high-schoolchemistry. Others require: Completed a basic degree in science.Appear for the Graduate Australian Medical School Admissions Test (GAMSAT) or MCAT. These test the extent of the applicant's knowledge of science subjects.([http://www.medicalstudyguide.com/medicine ine-in-australia-now.html](http://www.medicalstudyguide.com/medicine%20ine-in-australia-now.html). Retrieved June,21st, 2016).

The various medical schools’ admissions are governed by professional bodies. At theUniversity of Central Lancashire (UCLan) applications require a significant amount of time and effort becauserecruitment into medical school is very rigorous and competitive. The University of California medical school screens applicants based on minimum GPA and MCAT scores before secondary applications are sent. For faculties of medicine in Canada number of available places is determined by provincial governments based on educational and financial resources as well as country’s future physician workforce requirement.

The Kenyan universities consider the secondary school scores (O-level aggregate and Cluster grades) to select applicants to medical schools. Both Moi University and Egerton University admitSelf-SponsoredProgram (SSP) students in addition to KUCCPS students.

Moi University, admits SSP candidates based on the KUCCSP common requirements for entry into the University as stipulated. In addition, candidates must obtain at least the minimum cut off points for the year as determined from the following cluster drawn from the Kenya Certificate of Secondary Education structure.Mean grade of B+ (Plus) at KCSE: B+ in Cluster Subjects of:- English or Kiswahili, Mathematics or Physics, Biology and Chemistry. (<http://admissions.med.ufl.edu/admission-requirements/regular-admission-requirements/>).

Candidates having qualifications equivalent to the above from institutions recognized or affiliated to Moi University Senate also be admitted. Candidates with suitable diplomas or University degrees in relevant fields who fulfil all other University entrance requirements may be considered for admission provided the School of Medicine Board recommends, and the Senate approves the admission.<http://admissions.med.ufl.edu/admission-requirements/regular-admission-requirements/>Retrieved October13th, 2017.

In Egerton University, SSP applicants must meet the minimum requirements as follows;Requirements: Mean gradeof B+ (Plus) at KCSE: B+ in Cluster Subjectsof: - English or KiswahiliMathematics or Physics, Biology and Chemistry.

OR

Holders of Diploma in Clinical Medicine, Bachelors and Master degree in related subjects of with a KCSE mean grade of B and B in Biology, Chemistry, mathematics or physics, and English or Kiswahili.([www.egerton.ac.ke/index.php/Faculty-of-Health-Sciences/faculty-of-health-sciences-programmes.html](http://www.egerton.ac.ke/index.php/Faculty-of-Health-Sciences/faculty-of-health-sciences-programmes.html) Retrieved October 13th, 2017.

The a foregoing literature review indicates that admission criteriadiffersfrom university to university in different regions.The different universities have their guiding admission policies. Some have adopted cognitive that is based on high school grades in addition to cluster subjects while other universities require additional basic degree as admission requirements.

## 2.2: Entry grades and performance

The selection of new medical students is one of the most important activities of medical schools. They aim at selecting students who perform well not only in the pre-clinical years, but also in the clinical years of study and for future practice. Wilkinson*et al*., (2008) in their study on Medical school selection criteria and the prediction of academic performance found that the selectionof students into medical programs must aim to serve twopurposes. First,toreduce the large number of otherwise qualifiedas perthe availableplaces at medical school. Second,to enrolstudents thought most likely to succeed inwhat is an arduous program of study. Also to select candidates who can servecountry-specific educational goal, institutional and departmental objectives.

Arzuman*et al.,*(2012a) in their study on the Influence of Pre-Admission Tracks on Students' Academic Performance indicates that High School Certificate (HSC) track and Biology background may be helpful for the medical school in selecting future students. Yoho *et al.,*(2012) in their study on Undergraduate GPAs, MCAT scores and academic performance cautionedthe usage of MCATscore to predict performance. The usage of the MCAT score islimited in predicting academic performance of medical students. Though the usage of MCAT is applicable in a set up where a quota system applies. It allows lower O-level grade achievers to have a chance for the test into admission. Usage of HSC aggregate scores as admission criteria may lockothers out, who might have had low aggregate grade butmet cluster courses scores.

[Yoho](http://www.ncbi.nlm.nih.gov/pubmed/?term=Yoho%20RM%5BAuthor%5D&cauthor=true&cauthor_uid=22826330)*et al.,* (2012b) investigated therelationship between student academic and clinical performance. Their findings indicated that there is a positive a relationshipbetween student academic and clinical performance.Radhakrishnan *et al.,* (2012) in their study on the influence of admission qualifications on the performance of first and second year medical students concluded that students with better grades in their pre-university examinations achieved better performance in their end of semester (EOS) examinations. This has left most medical schools to perceive that academic qualification provides the most objective and fair method for fair selection of the best applicants. Attaining the high academic qualification will not guarantee an applicant a place especially when there is a higherdemand for available places in a medical school.Patrick (2002) in his book on Training Research and practice suggests that changes in selection criteria also may offer a solution to a performance problem. Selecting people either on the basis of higher aptitudes or abilities or with previous training in related skills may improve performance. He furtherindicated that selection of persons who have the appropriate abilities, attitudes or previous training scope would enable them to cope with the task(s).

Wilkinson*et al.,*(2008) in theirinvestigation on Medical school selection criteria and the prediction of academic performanceconcludedthat most variation in academic performance is not explained by the selection criteria. It ispresumably a consequence of both intrinsicpersonal factors and the effect of the teachingitself.

In practice, Universities tend to differ in basic admission requirements for medical students, either emphasizing on high school scores the general degree as basis of admission.‘Arzuman *et al.,*(2012) in their study on Influence of Pre-Admission Tracks on Students' Academic Performance suggest that understanding science was core to the understanding of medicine.However, it must be recognised that some students are not suitablefor a career in medicine, even though they attained the necessary academic criteria. They should not be admitted in the interest of the students and public, rather than subsequently leave the profession’.

The literature reviewed indicates that entry grades can predict academic performance at early and later years. It serves as filter criteria to sort the many applicants who have the appropriate abilities, attitudes or previous training scope required and in relation to available chances.

## 2.3: Non cognitive abilities and performanceof students

Selection based on academic performance, should also take into consideration socio-demographic characteristics of the applicants. Wilkinson*et al.,* (2008) in their study on Medical school selection criteria and the prediction of academic performancecaution that admission based on cognitive ability may lead to the admission of students with attractive non-cognitive attributes. Some personal factors like gender, age and region of origin are non-academic, non-cognitive and not directly related to performance but serve as admission conditions. Thepersonal factor selection criteria may influence the learning behaviour of potential applicants which may influence future performance in medical school. [Alfayez](http://www.ncbi.nlm.nih.gov/pubmed/?term=Alfayez%20SF%5BAuthor%5D&cauthor=true&cauthor_uid=2355866) *et al.,*(1990)in their study on Academic, social and cultural factors influencing medical school grade performance indicates that medical student performance can be influenced by non-academic factorssuch as; premedical academics, maturity, familial background and support, and personal experiences with illness. [Yoho](http://www.ncbi.nlm.nih.gov/pubmed/?term=Yoho%20RM%5BAuthor%5D&cauthor=true&cauthor_uid=22826330) *et al.,* (2012b) in theirstudy on the investigation of therelationship between student academic and clinical performance identifiedthat non-academic characteristics may play a pivotal role in clinical abilities. These characteristics need to be further identified and incorporatedto the academic curriculum since they may also influence the admission criteria. Though the non-academic characteristics may not directly influence academic performance, they may impact on the learning behaviour and motivation of a student.Non-academic factors are socio-economic in nature and should not be ignored. Hughes (2002) in astudy on how to improve selection of medical studentsagreed that the non-academic factors also predict success or failure in student academic performance.

### 2.3.1: The Gender factor versus academic performance

Studies have indicated thata student’s gender and age relate to academic performance. In their investigations [Aldous *et al.,*](http://www.ncbi.nlm.nih.gov/pubmed/?term=Aldous%20CJ%5BAuthor%5D&cauthor=true&cauthor_uid=9076269)(1997),Blackman &Darmawan (2004),andGeiser & Santelices (2007) indicate that socio-demographic factors like student’s gender and age all have a direct influence on theirachievement in clinical courses.Blackman &Darmawan (2004)studiedon variables that predict preclinical performance and found that overall,female, students performed better than male students overall in their clinical assessments. The study lacked a strong explanation of the gender differences at clinical level with dismal performance over male students.Why these influences on the academic differences need to be studied further.

Haist *et a.,*(2000) in their investigation on the Effect of Gender and Age on Medical School Performancefound that males performedbetter than females in preclinical years that are knowledge-basedand basic-science content oriented. Dixon (2007) examined Gender Differences in Academic Qualifications and Medical School Performance foundthat in later years the performance of females in clinical years was equal to that of males.Al-Mulhim*et a.,l* (2012)in their study on the Influence of Gender on Saudi Students’ Performancefound that there was no significant difference between male and female students in the written examination.Haist *et al,*(2000)assumed that at theage of 24 years both gender have completed their maturation process. However at the age of 18 years, the maturation of the brain of males laggedbehind the brains of female by 3 years and males can be considered to lag behind females by 2 years in physical maturation.

A Study by Salem et al., (2013) explored Academic and socio-demographic factors influencing students’ performance and affirmed that socio-demographic characteristics do influence their performance. In particular gender significantly influence the male and female student’s cumulative GPA.

KUCCPS(2014) placement processing Policy on section (4.6) indicate in the Gender Affirmative indicate: - i|) Lowering by up to 2 points onthe overall cut-off point fordegree programmes forfemale applicants. ii) Lowering the specific programme cut-off points by up to 2 points subject to attaining of a representation of a third for either gender and not exceeding the declared capacity of the programme by more than 10%. This shows that gender is a factor that is considered during admission process into the universities in Kenya.

The Literature review has revealed that the gender influence to academic performance is not towards one direction. The reason as to why differing influence lacks explanation, making it an area that requires further studies to determine its impact on academic achievement.

### 2.3.2: Sponsorshipversus academic performance

Non-cognitive factors includingsponsorship or financial support and their influenceon performance in medical school attract attention and this deserves investigation.As emphasised in spoken words by President Johnson in his “Great Society” speech of 1964 (Johnson, 1963-64),“Poverty must not be a bar to learning, and learning must be an escape from poverty, further said that the Great Society is a place where every child can find knowledge to enrich his mind and to enlarge his talents.”<http://www.presidency.ucsb.edu/ws/?pid=26262> Retrieved 21st June 2016.

Coonrod(2008), in the investigation on the Effects of Financial Aid amounts on Academic Performance found that financial aid either as grant, loan, and job, is what makes higher education affordable to the children of families who would otherwise be excluded by price.Further thestudy indicated that loan and job aid amounts had no significant connection with academic performance. Although not all loans are need based, and a student without financial need may still want to take a loan in order to ease the financial burden on the family.It is further indicated thatadditional money will encourage and motivate a student to put in more effort since the student realizes that it is essentially a gift rather than a natural right.[Equal Justice Works](http://www.usnews.com/topics/author/equal-justice-works) (2013) study on Effects of Financial Aid on College Student Success[Education](file:///E:\omenge\AppData\Roaming\Microsoft\Word\Education) indicatedwhy Scholarships would not be adequate to help college students succeed. Avery’s (2014) investigation on the Relationship between Financial Aid Type and Academic Success in a Public Two-Year College in Georgia, Georgia Southern University showsno significant relationship in performance as the student financed and not financed groups performed equally.

Literature reviewed indicated that sponsorships do not amount to influence to academic achievement. But all this is done in resource sufficient societies. What about in developing societies where basic needs are limited. It is worth to study whether these factors influencing medical school performance in developed countries have similar impact on medical students in Kenyan context.

## 2.4 Predicting performance at medical schools.

It is important to select students capable of going through the programmesuccessfully; becoming competent and safe practitioners. The dilemma is which selection criteria can best predict students’ future performance. Gough & Hall (1975) in their study on  [prediction of academic and clinical performance in medical school](http://www.springerlink.com/index/JG45M8L601855687.pdf) concluded that prior studies suggested the importance of distinguishing between performancein the earlier and later years of medical education and recommended the need forfactor analysis of grades by year. This study agreed with [Sam](http://www.ncbi.nlm.nih.gov/pubmed/?term=Shaban%20S%5Bauth%5D) & Michelle pp94.,(2011) in their study on Predicting performance andidentifying at-risk studentsfound that it may be possible to identify at-risk students early in their years of study.

The identificationcan be relatively early through continuous data archiving and regular analysis.Blackman &Darmawan (2004),in their investigation on variables predicting preclinical performance found thatundergraduate GPA scores and the type of undergraduate studies undertaken werethe significant predictors with direct influence. The entryinterviews used in the selection process werenot predictors to the assessed performance outcomes.Gough & Hall (1975) in their study on the prediction of academic and clinical performancethat foundMCAT criterion was more important than academic attainment, the study byJulian’s (2005) on Validity of the MCAT for predicting medical school performance concluded that the MCAT wasan indicator in learner’s academic preparation.[Basco *et al*](http://www.ncbi.nlm.nih.gov/pubmed/?term=Basco%20WT%20Jr%5BAuthor%5D&cauthor=true&cauthor_uid=10926028)*.,* (2000) in their study on ability of a medical school admission process to predict clinical performance indicated that admission ranking and interview process at the medical school did not predict performance in clinical studies.

Pepple*et al.,*(2012)in their investigation on Prediction of Preclinical Students’ Performance concluded that performance in one subject couldrelate to the performance in the other subjects,implying that performance in one subject can predictthe performance in other subjects. The prediction can be used to identify at-risk students for early intervention and appropriate academic support.It isthought that several subject scores can reflectbetter andsignificantly generalise studentperformancethan one subject.

Academic Performance of Medical students can be monitored at two major phases: - basic sciences and clinical sciences. The basic sciencescanfurther be used to predict performance inclinical sciences. In their study on performance in basic science as predictors of performance inclinical sciencesand licensure examination,Lavine & Watkins (1999) indicated thatpreclinical performance was a strong predictor.Salahdeen & Murtala (2004) in their investigation on the Relationship between admission grades and Performances indicatedthat high school grade was a better predicator of student performance at pre -clinical sciences than entry examinations.Geiser & Santelices (2007*)*in theirstudy on Validityof High-school grades in PredictingStudent outcomes indicated that student background characteristicsincluding applicants’ age, gender, regionalism (quota) where applicableand should not be excluded in predicting their preparedness.

Salvatori (2001) in their studies on Reliability and Validity of Admissions Tools Used to Select Students and Sandow *et al.,* (2002) on Correlation of admission criteria with performanceindicateda less clear relationship between pre-admission GPA and clinical performance.Since Students with lower undergraduate science GPAs were more likely to remediate, to repeat an academic year, or to be dismissed.That is why Clinical performance is not only predicted by pre-entry academic scores, but can also be predicted by preclinical scores which is a foundation of clinical performance. It is necessary for the prediction to be done at anearlier level.[James](http://www.ncbi.nlm.nih.gov/pubmed/?term=James%20D%5BAuthor%5D&cauthor=true&cauthor_uid=11703642) and Chilvers (2001)in their investigation onthe Academic and non-academic predictors of success indicated that when usinghigh school A-Level grades as predictors lower grades scores shouldalso be factored.This is still vague; it needs further explanation and study.

In conclusion it is important for medical schools to be able to predict the future performance of their students. Once the right predictors are identified the unnecessary dropouts and low graduation rates will be avoided once the right intervention measures are put in place.

Alnasir & Abdel-Karim (2013),in their investigation on Prediction of Medical Students’ Performance in the Medical School concluded that dropout was costly to the training schools. Dropout impacts negatively on the junior doctors’ completion rate. This also affects the academic reputation of a medical school and staff morals, denying the training schools income.

It is clear from the foregoing literature reviewed that there are varied admission requirements for medical schools. The admission requirements have varied from country to country, university to university and one education system to another. Some base admission on;secondary or High school grades, Basic degree, Medical school entry tests or affirmative action. This study purposed to analyse the current three admission characteristics (KCSE grade, Sponsorship and gender) among others that are considered in Kenyan public university in the admission process in relation to their influence into academic performance while at medical school.

CHAPTER THREE

METHODS

## 3.0 Introduction

This chapter discusses the methodology and materials used in this study. These include study; design, site, population and sample size (inclusion and exclusion criteria), sampling procedures,data collection method and tool,data handling procedures, data management and analysis.

## 3.1 Study Design

The study adopted an*ex-post-facto research design*. Fraenkel et al (2012) describe ex-post-facto research design as a systematic empirical inquiry in which the scientist does not have direct control of independent variables because their manifestations have already occurred or because they are inherently not manipulated. In the Ex-post-facto research design participants are not randomly assigned. It examined an independent variable present prior to the study that affects a dependent variable. The study examined thestudents’ performancewithout alteration. The students were placed into their grouping as they were prior to the study. Thisstudy’s groupings wereKCSE grades, sponsorships and gender. Therefore, the application of this design was considered suitable for the study in that the researcher did not manipulate the variables of interest.

## 3.2 Study Area

The study was conducted at two purposively selected Kenyan public universities namely; Medical schools ofMoi University (MU) and Egerton University (EU), Kenya. Purposely selected because MoiUniversity wasan older Innovative medical education medical School admitting both male and female students on government sponsored (KUCCPS) and Self-sponsored (SSP) program. Egerton University a traditional and newer medical school also admit male and female students ongovernment sponsored (KUCCPS) or self-sponsored (SSP) program. The universities ensure students meet minimum entry requirements.Thus, the study had representation of the uniqueness of medical schools’ teaching approach and the duration of existence.

### 3.2.1 Moi University, School of Medical

Moi University is a [public university](https://en.wikipedia.org/wiki/Public_university) locatedat Kesses, Uasin Gishu County, in Rift Valley, Kenya. Moi University was established in 1984. It has (15) fifteenschools and (2) two institutes.The College of Health Sciences, Moi University is located in Eldoret town within the Moi Teaching and Referral Hospital. The College has a total of four Schools (Schools of Medicine, Public Health, Dentistry and Nursing). The Student population for cohort classes at preclinical was2007/08 (60), 2008/09 (62) and 2009/10 (67). The College offers both undergraduate and postgraduate programs including doctorate degrees.

### 3.2.2 Egerton University, Faculty of Health Sciences

Egerton University is a Public University located at Njoro 27 kilometres off Nakuru Town.Egerton University was established in 1987. It has three campuses and one Campus College. Nakuru town is 156km North-West of Nairobi City, bordering Lake Nakuru. The area is famous in wheat, horticultural flowers farming and Flamingos at the Lake Nakuru. The Egerton University hasnine (9) faculties and fifty one (51) departments. Egerton University’s faculty of Health sciences is located at two campuses of Njoro main campus (pre-clinical courses) and Nakuru Town campus next to the Nakuru County Referral Hospital, Nakuru. Currently the Faculty of Health Sciences has a total of three programmes (Bachelors of; MBChB, Clinical Medicine and Nursing).  Medical student population for cohort class at preclinical was 2007/08 (30), 2008/09 (17) and 2009/10 (46).

## 3.3 Study population

The target population for this study was allenrolledmedical students Moi University andEgerton University’s Medical schools. The accessible population was282 of three cohort classesof students comprising: -2007/08 (90), 2008/09 (79)and 2009/10 (113)of whom (35%) female and (65%) male. The cohort classes were matched and combined among the two medical schools.

### 3.3. 1 Inclusion Criteria

The study included all MBChB students of three cohort classes 2007/08, 2008/09 and 2009/10 academic yearsof Moi University and Egerton University. This comprised those who completed the course, repeated or dropped out in during the study period. The Study factored admission criteria as independent variables and academic performance as dependent variable at preclinical and clinical levels. Where student admission criteria were missing, the individual was tracked to provide the missing information, for example age.

### 3.3.2 Exclusion Criteria

The study excluded any student who transferred from another university to either study university. Since,upon abstraction their academic records werefound to be incomplete. Also any student admitted and never took the course was excluded. Also those with other bachelors before joining MBChB program were not included as their prior knowledge could influence the constructive learning process.

## 3.4:Sample size

The study included all 282MBChB enrolled students of the three cohort classes of2007/08, 2008/09 and 2009/10 academic years. Only 272 medical students’ records were analysed having met the inclusion criteria, comprised 179 and 93 for Moi University and Egerton University respectively.

## 3.5: Sampling Procedures

The study utilized purposive sampling technique in selectingMoi and Egerton Universities and sites for data Collection. Fraenkel *et al,* (2012)argues that purposive sampling is appropriate when the researchersneed to use their judgment to select a sample that they believe based on prior information, will provide the data they need. There are five public universities (University of Nairobi, Moi University, Egerton University, Maseno University, and Kenyatta University (<https://medicalboard.co.ke/functions/approved-training-institutions/> retrieved on 13th October, 2017)that have medical schools in Kenya.

The researcher purposively selectedMoi and Egerton universities. It was considered thatMoi University Medical School is much older (started 1984)and Egerton University started in 2007 year). Other studies have been done comparing Moi and Nairobi Universities of which both are older medical schools. This choice allowed a study on an older university and relatively a new one, which did not have similar teaching and Learning approaches and resource capacities.

## 3.6:Data collection Tools

The study used the data abstraction method. This method used an electronic data abstraction form to capture data from admission and examinations office(s). The data abstraction form was developed from the system used to systematically collect student bio-data and academic records. The system electronic records contained several data although not all were needed. The abstraction data sheet was a combination of the section of student’s bio-data including gender, KCSE aggregate cluster subjects and academic records at preclinical and clinical levels.The study utilized assistance of a data abstractor. Abstraction of student data was achieved through the assistance of data abstractor.

## 3.7: Pilot Study

The data abstraction form was tested atUniversity coded 03 (named blinded)that did not participate in this study. Thereafter the tool wasvalidated accordingly to ensure its reliability and validity, by aligning it to core courses in the Core MBChB Core Curriculum of 2013, aligning them as per Core Curriculum course titles.

## 3.8: Confounding factors

The studyrecognized existence of confounding factors as a threat to the study. The two schoolshavea difference in learning environment,teaching and learning approaches. The study employed restriction and matching as strategies for avoiding confounding factors. They ensured thatstudy sample were of cohorts of thesame levels across the two medical schools.The cohorts of the same academic years werematched into three cohorts from each school. This standardized confounding factors through the respondents. Also the data analysis used linear regression to eliminate confounding effects. The linear regression analysis examines the association between multiple covariates and a numeric outcome. This model isolates the relationship of interest.

## 3.9: Data Entry

The Offices of Admissions and Examinations of both EU and MU maintain records of student admissions requirements and progress report on their performance. Data from these Officeswere captured using an electronic data sheet document an excel sheet then transferred to SPSS for analysis. The abstracted data excluded the students’ names. Cleaning was done to exclude records of the student transferred in and out.

## 3.10: Data Management

The study captured data on admission characteristics and academic performance of the medical students. The admission characteristicswere student’s O-levelgrades (KCSE) (the five clustersubject: - English/Kiswahili, Mathematics, Chemistry, Physic, Biology and aggregate grade,sponsorship, Gender, andage.These subjects were weighted A (1), A-(2), B+(3), B (4), B-(5), C+(6), C (7). The Academic performance scoreswere at preclinical and clinical Level examination performance. The assessment scores at this levels were entered as raw marks as appeared in the student’s transcript. The coded individual MBChB student details were entered.Sponsorship was code as 1(KUCCPS) and 2(SSP).

## 3.11: Data analysis

Analysis was done forindividual course scores and mean scores at the completion of each level (preclinical and clinical examination performance). All data captured was analysed with aid of SPSS package version 20. Data analysis wasdone using a t-test at confidence level of 0.05 and General Linear Model regression analysis.

To test for the null hypothesis 1 and 2, the Spearman rank-order correlation coefficient (Spearman’s correlation) was used to measure the strength and direction of association that existed between admission grades and performance at preclinical and clinical levels.Also linear regression analysis wasused. Its output ascoefficient correlation (PPMCC, Pearson's*r*) was a measure of the linear [correlation](https://en.wikipedia.org/wiki/Correlation) between two variables *X* and *Y*, giving a value between +1 and −1 inclusive, where 1 is total positive correlation, 0 was no correlation, and −1 the total negative correlation. Pearson r is widely used in the sciences as a measure of the degree of linear dependence between two variables.Pearson’s r or correlation coefficientsmeasure the strength of linear relationships. Linear regression was interpretedusing the scale below:

* -1.0 to -0.7 strong negative association
* -0.7 to -0.3 negative association
* -0.3 to +0.3 little or no association
* +0.3 to +0.7 positive association
* +0.7 to +1.0 strong positive association

Further analysis on the null hypothesis 1 and 2, a*t-test*for comparison of means through Independent-Sample t-testwas used.It was used to determineif any statistical significance existed forperformance in preclinical and clinical courses means for sponsorship and gender category. All samples were measured using two-tailed *t* tests at Significance level analyses of =0.05.

To test null hypothesis 3a*t-test*for comparison of means through the Independent-Sample T testwas used. It was to determine if there was any statistically significantgender difference in performance inpreclinical and clinical courses of medical students. Further to determine if any statistically significant difference existed between preclinical or clinical performance of students with diploma and those without during admission. This was done to infer any differences exist between the means of two population samples. According to Bryman and Cramer (2001),in their writing on Qualitative Data Analysis SPSS Release 10Independent-Sample T test determines if the means of two unrelated samples differ.

*t =* sample one mean-sample two means

\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Standard error of the difference in means

The results are presented and discussed in chapter four.

## 3.12: Ethical Consideration

This study was approved by Institutional Research and Ethics Committee (IREC) of Moi University and Moi Teaching and Referral Hospital. Approval Number: 0001417 dated 28th May, 2015. The Offices of Dean, School of Moi University and Registrar Academic affairs, Egerton University consented for data access.Abstracted data wascaptured without student name for confidentiality and protected password in computers.

The study did not use any animal or human, instead available student admission and academic data was used.

# CHAPTER FOUR

# RESULTS

## 4.0: Introduction

This chapter presents the results of the study. Quantitative data wasgenerated. Data analysis was done based on the study’s specific objectives. The data analysis was done on correlation and prediction basis and results are presented in bars graphs,and tables.

## 4.1: Characteristics of the Subjects of the study

A descriptive analysis of the total of 272 students was done to generate the study sample’s socio-demographic characteristics statistics.The results are presented in Table 4:1.

The results in table 4.1 below indicated that the study sample in the medical schools comprised 179(66%) Moi university and 93(34%) Egerton University. Most students were in the 17-20 age group on admission, 150(84 %) and 80(86%) for Moi and Egerton Universities respectively. Overall Gender composition was 95(35%)) female and 117(65 %) male. There were 116(65) Male students in Moi University while Egerton University had 61(66 %). Sponsorship of the MBChB students was in two categories: government sponsored students103 (38%) while SSP 169(62%) were self (private) sponsored. Self-sponsored students in Moi University were 121(68 %) and 48(52%) in Egerton University.Both medical schools admitted most KCSE candidates with an aggregate grade of A (plain) 121(68%) in Moi University and 35(38%) in Egerton University.

Table 4:1Characteristics of the Cohorts of MBChB Students

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Medical School attended (N=272) | | Moi % | Egerton % | Overall % | |
| 2007/08, 2008/09 and 2009/10 (Cohorts)  Age (Age groups) | 17 - 20 | 179 (66)  150 (84) | 93 (34)  80(86) | 272 (100)  230 (85) |
| 21 - 25 | 20 (11) | 6(7) | 26(10) |
| 26 – 30 | 4(2) | 7(8) | 11(4) |
|  | 31 - 35 | 5(3) | 0(0) | 5(2) |
| Gender | Male | 116 (65) | 61(66) | 117 (65) |
| Female | 63 (35) | 32(34) | 95(35) |
| Sponsor Government  Self-Sponsored | | 58 (32) | 45(48) | 103 (38) |
| 121 (68) | 48 (52) | 169 (62) |
| KCSE Aggregate grade on admission | A | 121 (68) | 35 (38) | 156 (57) |
| A- | 42 (24) | 20 (22) | 62 (23) |
| B+ | 6(3) | 11(12) | 17(6) |
| B | 2(1) | 6(7) | 8(3) |
| B- | 3(2) | 3(3) | 6(2) |
| C+ | 3(2) | 0(0) | 3(1) |
| 99(Missing) | 2(1) | 18(19) | 20(7) |
| Diploma attained before admission? | Yes | 7(4) | 11(12) | 18(7) |
| No | 172 (96) | 82(88) | 254 (93) |
| Progression ability at medical school? | Repeated | 22(12) | 15(16) | 37(14) |
| Dropped out | 3(2) | 2(2) | 5(2) |
| Completed | 154 (86) | 76(82) | 230 (85) |

Students joining medical schools with a diploma qualification accounted 7(4%) for Moi University and 11(12 %) in Egerton University admissions. Student completion rate among the 272 MBChB students admitted to the two medical schools was 230(85 %). Completion rate was 154(86%) and 76(82%)for Moi and Egerton Universities respectively.

Among the 272 MBChB students, 37(14%) repeated an academic year during their course of studies, of which 15(16% were Moi University students and 22(12%) were Egerton University students. Non completion rate (repeat and drop outs) were 25 (14 %) in Moi University and 17 (18%) in Egerton University.

### 4.1.1: Gender based Students’KCSE grades on admission

Gender based analysis of the 272 students on distribution of their KCSE aggregate grades was carried out. The results are shown in table 4.2.

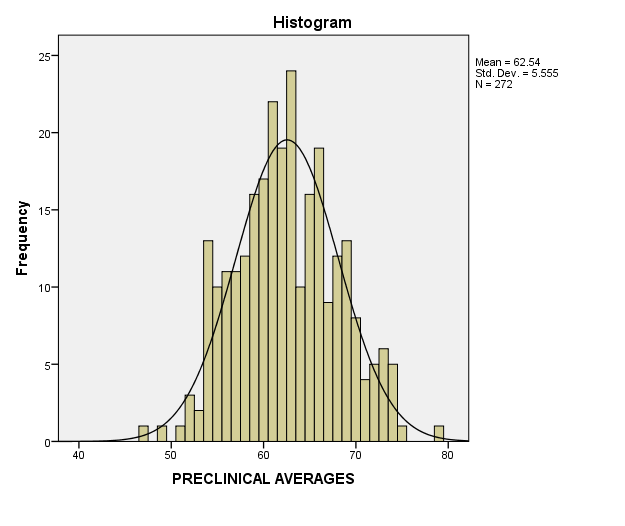
Table 4.2: KCSE admission grades by Gender

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | KCSE grade | | A | A- | B+ | B | B- | C+ |
| Gender % | MU | Male | 72 | 20 | 4 | 2 | 1 | 2 |
| Female | 63 | 31 | 2 | 0 | 3 | 2 |
| EU | Male | 50 | 25 | 14 | 6 | 6 | 0 |
| Female | 42 | 31 | 15 | 10 | 0 | 0 |

Results in table 4.2 indicate that on admission across the KCSE aggregate grades were; grade A (62%), grade A-(25%), grade B+ (7%), grade B (2.5%), grade B-(2%)and grade C+ (1%).The majority KCSE aggregate on admission was; grade A (62%) and grade A-(minus) (25%). The female students were fewer in all grades. Lowest grades of C+ and C were the mature entry students admitted with diploma in clinical medicine.

### 4.1.3: Performance in Preclinical Courses

The scores distribution of students’ performance in preclinical courses was plotted on a graphical presentation of the preclinical means scores and displayed using a histogram with normal curve distribution *(see Appendix II*). The results are shown in figure 4.3.



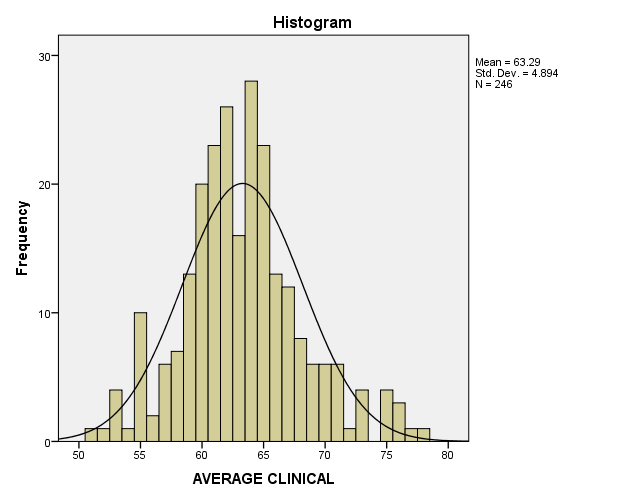
|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| N | Mean | Median | Mode | Skewness | Range | Minimum | Maximum |
| 272 | 62.54 | 62 | 63 | 0.118 | 32 | 47 | 79 |

Figure 4.3*:Histogram showing preclinical performance at Medical school*

Result in figure 4.3 indicate that 272 students’ performance in preclinical courses had a mean= 62.54, mode = 63, median =62 and SD = 5.555. These were on a normal distribution curve. Those whoscored less and above the mean score are equally spread

### 4.1.3: Performance in Clinical Courses

The scores distribution of students’ performance in clinical courses were plotted on a graphical presentation of the clinical meanscoreswere displayed on a histogram with normal curve distribution *(see Appendix II*). The results are shown in figure 4.4.



|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| N | Missing | Mean | Median | Mode | Skewness | Range | Minimum | Maximum |
| 246 | 26 | 63.29 | 63 | 64 | 0.375 | 27 | 51 | 78 |

Figure 4.4:*Histogram showing performance means scores in Clinical courses*

Result in figure 4.4 indicate that 246 studentshad a mean score of 63.29% in clinical scores, mode = 64, median =60and SD =4.894. Thesewere on a normal distribution curve.Those who scored less and above the mean score are equally spread.

### 4.1.5: Student progression

The study aimed at determining the spread of the scores of repeaters, drop-outs and those who completed. An analysis and subsequent display was done on graphical presentation using Boxplots.The results are shown in table 4.3 and figure 4.4.

Table 4.3: Student Progression based on sponsorship

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| sponsor | | EVER REPEATED | | |  |
| Repeated | Dropped | Completed | Total |
|  | Government Sponsored | 10(27) | 2(40) | 91(40) | 103(38) |
| Self-Sponsored | 27(73) | 3(60) | 139(60) | 169(62) |
| Total | | 37(14) | 5(2) | 230(85) | 272(100) |

Result in table 4.3 indicaterepeaters were 37(14%) of whom 10(27%)were government sponsored and 27(73%) self-sponsored. Also drop-outs were5(2%) of whom 5(1.8%) in whom 2(1.00 were government sponsored and 3(1.8) were self-sponsored. Students who completed their degree program at medical schools were 230(84.5%) in whom 103(38%) were government and 169(62%). In all the two categories the self-sponsor was majority.

## 4.2: The Relationship between medical student KCSE aggregate grades and their performance in preclinical and clinical courses

The first specific objective of the study sought to determine the relationship between medical students’ KCSE aggregate grade(s) and their performance in preclinical and clinical courses. The KCSE aggregate grade and preclinical performance and clinical performance were used to test the relationship (see*appendix II on abstraction sheet*). The Spearman rank-order correlation coefficient (Spearman’s correlation, rho) was used to measure of the strength and direction of association that existed between KCSE aggregate grades andperformance mean.Further the null hypothesis “*There was no statistical significant relationship between student KCSE aggregate grades and performance in preclinical and clinical courses in both Moi and Egerton Universities”* was tested for difference in means using t-test, at significance of p ≥ .05. The results are shown in table 4.4 to 4.12.

### 4.2.1: Relationship between Medical students’ KCSE aggregate grades and preclinical performance means

The KCSE aggregate grades of Moi University and Egerton University medical students were correlated with their mean scores in preclinical and clinical courses. The Spearman rank-order correlation coefficient was used to measure the strength and direction of association that existed between KCSE aggregate grade and preclinical performance. The results areshown in table 4.4.

Table 4.4: Relationship of Medical students’ KCSE aggregate gradesto preclinical performance.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | | | | |
| KCSE admission Grade -preclinical Means | | | MU | EU |
| *Spearman's rho* |  | Correlation Coefficient(*rho*) | -.128 | -.199 |
| p value | .090 | .088 |
| N | 177 | 75 |
|  | Performance means | 62.25 | 63.11 |

The result in table 4.4 indicatesa *rho* (correlation coefficient value)of -0.128(MU). The result indicates a negative association. There was a negative association between medical students KCSE aggregate grades at preclinical performance.Its *p* value was.090(MU) which was greater than *p ≥ .05*. The null hypothesis was confirmed. This was insignificant at a *p* value of .05(5%). Therefore, the study confirms that students’ performance at preclinical courses was not associated tostudent’s KCSE aggregate grades.

Egerton University’s correlation coefficient value was -.199. The result indicates a negative association. The *p* value was.088(EU) which wasgreater than *p ≥ .05*. The null hypothesis was therefore confirmed.However,this was insignificant at a *p* value of .05(5%). Therefore, the study suggested that students’ performance at preclinical courses wasn’tassociated to student’s KCSE aggregate grades.

### 4.2.2: Relationship between Medical student KCSE aggregate admission grades and Performance inclinical courses

The medical students’ KCSE aggregate grades of Moi University and Egerton Universitymedical students were analyzed and correlated with their mean scores in clinical courses. The Spearman rank-order correlation coefficient (Spearman’s correlation, rho) was used to measure the strength and direction of association that existed between KCSE aggregate grades and the measures in clinical courses. The results of the 246 students at clinical level admitted using KCSE results are shown in table 4.5.

Table 4.5 : Correlations of Medical students’ KCSE aggregate grades andperformance in clinical courses

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| KCSE admission Grade – CLINICAL means | | | MU | EU |
| Spearman's rho |  | Correlation Coefficient | -.116 | -.085 |
| *p* value | .153 | .474 |
| N | 154 | 73 |
|  |  | Performance means | 62.15 | 65.27 |

The results in table 4.4 indicate *rho* value of - 0.116(MU).This result indicatesa negative correlation in KCSE aggregate grades and mean scores in Clinical coursesin Moi University, Medical school. Also the results indicate a *p*-valueof 0.153(MU), which is greater than *p ≥ .05,* the null hypotheses wasconfirmed. This was insignificant at a *p* value of .05(5%). The study confirms that students’ performance in clinical courses was not associated tostudent’s KCSE aggregate gradesin Moi University.

Table 4.4 indicates that Egerton University had a correlation coefficient value of - 0.085.This result indicates a negative correlation in medical students’ KCSE aggregate grades and the mean grade in Clinical courses in Egerton Universities. Medical school. Also results indicates a*p*-value of 0.474, which was greater than *p ≥ .05*the null hypothesiswas confirmed. However, this is insignificant at a *p* value of .05(5%).

### 4.2.3: Relationship between Medical students’ clusterKCSE grades with preclinical courses performance

The medical students’ cluster subject KCSE grades of Moi and Egerton Universitieswere correlated with their mean scores in preclinical courses. The results of the 272 students at preclinical level admitted usingclusterKCSE results are presented in table 4.6.

Table 4.6:Relationship between Medical students’ KCSE cluster grades and pre-clinical courses performance

|  |  |  |  |
| --- | --- | --- | --- |
|  | | ***MU*** | *EU* |
|  | | β | β |
|  | (Constant) | 62.996 | 66.363 |
| English | **.647** | -.246 |
| Kiswahili | -.534 | **.066** |
| Mathematics | -1.065 | **1.511** |
| Biology | **.094** | -.983 |
| Chemistry | **.635** | -.070 |
| Physics | -.442 | -1.348 |

The results in table 4.6indicatefor Moi University a β of English (.647) and .094(Biology) and Chemistry (.635) having a positive relationship to preclinical performance.

InEgerton University the result indicated aβ ofKiswahili(.066) and 1.511(Mathematics). This suggests that these subjects had a positive relationship to performance in preclinical courses.

### 4.2.4: Relationship between Medical student KCSE Cluster grades with performance in specific clinical courses

The 246 of Moi University and Egerton University medical students’ KCSE cluster grades were correlated with their mean scores in specific clinical courses using the PPMCC(r). This was to determine the relationship betweenthe KCSE aggregate grade(s) and theirperformance in specificclinical courses. The results are presented in table 4.7.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Model** | | **Unstandardized Coefficients** | | **Standardized Coefficients** | |
| **β** | **Std. Error** | MU | EU |
|  | (Constant) | 63.159 | .832 | 62.780 | 67.045 |
| English | **-.368** | .319 | -.069 | -.816 |
| Kiswahili | .095 | .285 | **.290** | **.288** |
| Mathematics | .438 | .455 | .**227** | **1.087** |
| Biology | .313 | .586 | -.010 | **.339** |
| Chemistry | .830 | .768 | .**320** | **2.048** |
| Physics | **-.731** | .405 | -.423 | -1.722 |

Table 4.7: Correlations of KCSE cluster grades with performance in specific Clinical courses*.*

1. Dependent Variable: Clinical performance means R square .030

The results in table 4.6 for MU indicate there was a positive correlation to performance in clinical course with aβ ofMathematics (.227), Kiswahili (.290) and Chemistry (.320).

Results for EU indicate there was a positive relationshipwith a β ofmathematics (1.087), Kiswahili (.288), Biology (.339) and Chemistry (.2.048), which positively influenced students’ performance in clinical courses.

### 4.2.5: Theperformance in Preclinical sciences as a predictor for performance in clinical courses

To determine if performance in preclinical courseswas a predictor of performance in clinical courses,a spearman-rank Correlation Coefficient (rho)was used. The Correlation Coefficient was used as a measure of the correlation between performance in preclinical courses and performance in clinical courses. This was to be determined at a correlation significant of 0.01 levels. To achieve this,the mean scores in preclinical courses were correlatedwith the means scores in clinical courses. The results are presented in table 4.8 and 4.9.

Table 4.8:Performance in Preclinical courses as predictor of performance inclinical courses

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | | P value | **Correlation Coefficient** | **Mean scores** |
| Preclinical means | MU(179) | .000 | .732\*\* | .479 |
| EU(93) | .000 | .775\*\* | .893 |
| \*\*. Correlation is significant at the 0.01 level (2-tailed). Preclinical mean 62.25, clinical means 62.15 | | | |  |

The results in table4.8 indicate that Moi University’s medical studentCorrelation Coefficientwas.744.there was a strong positive correlationbetween performance in preclinical course and performance in clinicalcoursesof MU’s medical students’ scores. TheMedical students’ performance in preclinical sciences strongly correlated to the performance in clinical sciences.The *p*-value was .000 for MU medical schools scores. This is less that p-value of .01; therefore, the Null hypothesis is not confirmed for MU medical schools scores.Therefore, there wasstatistically significant relationship with performance in preclinical courses and performance in clinical courses in MU’s medical school.

Results in table 4.8 indicated that Egerton University’ Medical students’ Correlation Coefficientwas.775.There was a strong positive correlation betweenperformances in clinical sciences.The results for EU,indicate*p*-value of .000, which is less than a*p*-value of .01; therefore, the Null hypothesis is not confirmed for EU medical schools scores. Therefore, there was statistically significant relationship between with performance in preclinical courses and performance in clinical courses at EU medical school.

## 4.2.6: The performance inspecific Preclinical courses as a predictor for performance in clinical sciences

To determine if performance in specific preclinical courses isa predictor forperformance in clinical courses, PPMCC(r) was used.The mean scores in preclinical courses were correlated with the mean scores in clinical courses. PPMCC(r)’s Unstandardized Coefficients Bwas used to determine the relationship of performance inspecific preclinical courses and performance inclinical courses. Using ’Sig’it determines if performance in preclinical sciences is a predictor of performance in clinical sciences. The results are presented in table 4.9.

Table 4.9: Performance in Specific Preclinicalcourses as predictor of performance in Clinical courses

|  |  |  |  |
| --- | --- | --- | --- |
| Unstandardized Coefficients | | MU | EU |
|  | Std. Error |
| (Constant) | 26.990 | .000 | .000 |
| Human Anatomy | .004 | .941 | .647 |
| Medical Biochemistry | .166 | **.000** | **.000** |
| Medical Physiology | .214 | **.004** | **.005** |
| Immunology | .079 | .186 | .225 |
| Microbiology and Parasitology | .027 | .661 | .661 |
| Pharmacology | -.008 | .874 | .874 |
| Pathology | .082 | **.023** | .035 |

The result in table 4.9 indicate thatMoi University’s specific preclinical courses’ *p* value asMedical Biochemistry(.000), Medical Physiology(.004)and Pathology(.023), which was less than .050. Therefore, these performances in these preclinical coursesare predictors in performance in clinical courses.

The result in table 4.9in Egerton University scores indicates that performance in specific preclinical courses’ p value was Medical Biochemistry(.000), Medical Physiology(0.005) and Pathology(.035) all were less than .050. Therefore, these specific courses’ performances are predictors in clinical courses performance.

### 4.2.7: Comparison of performancebetween KCSE and diploma holders medical students in preclinical courses

To compare theperformance in preclinical courses between medical students with and those without diploma a t-test was used. The t-test measurewas used to determine if Preclinical courses mean scores have a statistically [significant](https://en.wikipedia.org/wiki/Statistical_significance) differencebetween medical students with and those without a diploma qualification. The results are presented at table 4.11.

Table 4.10: Analysis of KCSE and diploma holder’s medical students’ performance in preclinical courses

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Preclinical means | With Diploma | No Diploma | t-test for Equality of Means | | | | | | | | |
| Mean Difference |  | df | **p-value** | 95% (b)  Lower |  |  | | | |
| Upper |  |
|  |  |  |  |  |  |  |  |  |  |  |
| MU(179)\*\* | 61.57 | 62.28 | -.730 |  | 177 | **.730** | -4.741 |  | 3.325 |  |
| EU(93)\*\* | 63.36 | 63.07 | .290 |  | 91 | **.882** | -3.574 |  | 4.155 |  |

*Test for Equality of Variances*

*Confidence Interval of the Difference*

*\*\* Equal variances assumed*

Results in table 4.10indicate that Moi University’s *p*-value was 0.730at a significance level of p ≥ 0.05. The *p*value wasfar greater than .05.The null hypothesis is confirmed. There wasno statistically significant difference in performance in preclinical courses between medical students joining with a diploma qualification and studentsjoining directly from high school.

For Egerton University results in table 4.10 indicatethat *p*-value was 0.882.The*p*value wasfar greater than .05. The null hypothesis is confirmed. There is no statistically significant difference in performance in preclinical courses between medical students joining with a diploma and those direct from high school.

### 4.2.8: Analysis of KCSE and diploma holder Medical Students’ performancein Clinical courses.

In determining the difference in performance in Clinical courses between medical students who join with a diploma qualification and those direct from high school, a t-test was used. The results are presented in Table 4.11.

Table 4.11: Independent-Samples t-test resultsof medicalstudents’performance in clinical between those with diploma and those without.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Lavene’s t--test for Equality of Means(Clinical scores) | | | | | | | | |
|  | With diploma | Without diploma | df |  | p-value | Mean d | Lower | Upper |
| MU(179 | )63.80 | 62.09 | 154 |  | **.241** | 1.707 | -1.158 | 4.572 |
| EU(93) | 66.80 | 65.08 | 88 |  | **.430** | 1.725 | -2.600 | 6.050 |

*(a)Test for Equality of Variances(b) Confidence interval of the difference*

The results in table 4.11indicated that the *p*- value in Moi University was 0.241, whichwas fargreaterthan *p*value of.05.The Null hypothesis wasconfirmed. There was no statistically significant difference in performance in clinical courses between medical students joining medical school with a diploma and those direct from high school.

For Egerton University results in table 4.11indicate a *p*- value was 0.430,alsowas far greater than a *p* value of.05. The Null hypothesis is confirmed. There was no statistically significant difference in performance in clinical courses between medical students with and those without a diploma qualification on admission.

## 4.3: Comparison of performance of medical students in pre-clinical and clinical courses based on sponsorship (KUCCPS and SSP)

The second specific objective of the study sought to compare medical students’ performance in pre-clinical and clinical courses based onsponsorship categories.The sponsorship category and preclinical performance and clinical performance generated data that was used to test the relationship (see *appendix II on abstraction sheet*). Further analysis to determine the distribution of their scores aBox plot was used. The Box plot displays the spread and difference in median, minimum score, maximum scores and score agreement of preclinical and clinical courses’ score as per the sponsorship categories.The results are presented in tables4. 12, 4.13 and figures 4.4.

### 4.3.1: Comparison of Performance in Preclinical courses between KUCCPS and SSP students

To determine the difference in means of performance in preclinical coursesbetween KUCCPS and SSP students a t- test was used. The means scores of the two categories were compared. The results are shown in table 4.12.

**Table 4.12:** Relationship in performance in Preclinical courses between KUCCPSand SSP students

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | KUCCPS | SSP | *p* **value** | | **Mean Difference** | **95%** | |
| **Lower** | **Upper** |
| MU(179) | 61.36 | 62.68 | **.120** | | -1.316 | -2.975 | .344 |
| EU(93) | 64.96 | 61.38 |  | **.004** | 3.581 | 1.197 | 5.964 |

1. Test for Equality of Variances b. Confidence Interval of the Difference

The results in table 4.12 indicate that Moi University had a *p*- value of .120 The null hypothesis was confirmed. There was nosignificant difference in performance in preclinical courses between government and self-sponsored medical studentsat MU at a*p*-value of 0.05.

For Egerton University results in table 4.12indicate that the p- value was .004.This is less than0.05. The null hypothesis is not confirmed.There wasa statistically significant difference in performance in preclinical courses between government and self-sponsored medical students for EU.

### 4.3.2: Comparison of Performance in clinical courses between KUCCPS and SSP Medical students

To determine the difference in means of performance in clinical courses (item no 33) as per their sponsorship category (item no 5), a statistical t test was used. The results are shown in table 4.13.

**Table 4.13:**Relationship between Studentsponsorship in Clinical courses Performance.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Means | |  |  |  |
| Clinical means | KUCCPS | SSP | df | ***p* value** | Mean Difference |
| MU(179) | 61.12 | 62.65 | 154 | **0.005** | -1.530 |
| EU(93) | 67.18 | 63.36 | 88 | **0.005** | 3.822 |

1. *Test for Equality of Variances b. Confidence Interval of the Difference*

The results in table 4.13 indicate thatMoi University had ap-valueof .005. This is was less than 0.05. andthe null hypothesis is rejected. The study showed that there is a statistically significant difference in performance in clinical courses between government and self-sponsored medical students at MU.

For Egerton University the results in table 4.13 indicate that the *p*-value was .005. This isless than 0.05. Therefore, the null hypothesis was rejected. Theresult suggests that there is a statistically significant difference in performance in clinical courses between government and self-sponsored medical students at EU. The KUCCPS students had higher mean scores than SSP.

## 4.4: Gender differences in Medical Students’ performance

The third specific objective of the study sought to determine the gender differences inperformance in pre-clinical and clinical courses.The null hypothesis was tested using t-test, at significance level of p ≥ .05. It stated that “*There was no statistically significant gender difference in performance in pre-clinical and clinical courses.* The results are shown in tables 4.14, 4.15 and 4.16.

### 4.4.1: Gender differences in performance in Preclinical courses

To determine whether there was difference in performance in preclinical course (item no 22) as per their genderitem 4 of data abstraction sheet *appendix II*was used to generate data used to test the hypothesis. A computation ofIndependent Samples t-test compared the Preclinical courses meansbased on gender.The results are presented in table 4.14

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Table 4.14: Gender based performance difference in preclinical courses in Moi University Medical school

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| MUEqual variances assumed | Means | | Levene's | | T-test for Equality of Means | | | | | | |
| F | Sig. | T | Df | Sig. (2-tailed) | Mean Difference | Std. Error Difference | 95% (a) | |
| Lower | Upper |
| Preclinical means | Male | Female | .974 | .325 | -.064 | 177 | **.949** | -.053 | .830 | -1.690 | 1.585 |
| 62.23 | 62.29 |
| Human anatomy | 67.41 | 67.21 | .000 | .999 | .178 | 177 | .859 | .207 | 1.169 | -2.099 | 2.514 |
| Medical biochemistry | 61.83 | 62.27 | .071 | .791 | -.501 | 177 | .617 | -.442 | .883 | -2.186 | 1.301 |
| Medical physiology | 62.40 | 61.65 | .003 | .958 | 1.086 | 177 | .279 | .746 | .687 | -.609 | 2.101 |
| Immunology | 61.68 | 59.84 | .290 | .591 | 2.117 | 177 | .036 | 1.840 | .869 | .125 | 3.554 |
| Microbiology & parasitology | 60.91 | 61.32 | 1.427 | .234 | -.408 | 170 | .684 | -.411 | 1.006 | -2.396 | 1.575 |
| Pharmacology | 62.97 | 63.73 | .062 | .803 | -.673 | 170 | .502 | -.755 | 1.122 | -2.970 | 1.459 |
| Pathology | 59.98 | 62.88 | .293 | .589 | -2.246 | 162 | .026 | -2.894 | 1.288 | -5.438 | -.349 |

a. Test for Equality of Variances

1. Confidence Interval of the Difference

The results in table 4.14indicated MU’s *p*- value was 0.949. This is fargreater than p value of 0.05. Therefore, the Null hypothesis was not accepted. There was no statistically significant gender difference in performance in preclinical coursesin MU..

Further results in table 4.14 indicate a p-value for Specific coursesas: - .859 (Human Anatomy), .617 (Medical Biochemistry), .279 (Medical Physiology), .036 (Immunology), .684 (Microbiology & Parasitology), .502 (Pharmacology) and .026 (Pathology). Performance in all preclinical courses except immunology had a p value greater than .05. The null hypothesis is not rejected. There was no statistically significant gender differencein performance between medical students except in immunology. Human Anatomy, Medical Biochemistry, Medical Physiology, Immunology, Microbiology & Parasitology, and Pharmacology’s performance is not influenced by students’ gender at MU. But Immunology’s performance appears to be gender influenced at p value of 0.05.

**Table 4.15 :** Gender based performance difference in preclinical courses in EU Faculty of Health sciences

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| EU(Equal variances assumed) | Merans | | Levene's | | T-test for Equality of Means | | | | | | |
| F |  | T | df | Sig. (2-tailed) | Mean Difference | Std. Error Difference | 95% (a) | |
| Lower | Upper |
| Preclinical means | Male | Female | .512 |  | .485 | 91 | **.629** | .640 | 1.321 | -1.983 | 3.264 |
| 63.33 | 62.69 |
| Human anatomy | 68.75 | 69.13 | .538 |  | -.207 | 91 | **.837** | -.371 | 1.794 | -3.934 | 3.193 |
| Medical biochemistry | 60.08 | 60.81 | .060 |  | -.449 | 89 | **.654** | -.723 | 1.609 | -3.921 | 2.475 |
| Medical physiology | 56.92 | 55.59 | .243 |  | .844 | 91 | **.401** | 1.324 | 1.568 | -1.791 | 4.440 |
| Microbiology & parasitology | 65.33 | 65.22 | .947 |  | .069 | 91 | **.945** | .109 | 1.582 | -3.033 | 3.251 |
| Pathology | 66.19 | 64.32 | .878 |  | .654 | 85 | **.515** | 1.865 | 2.851 | -3.804 | 7.534 |

The results in table 4.15on EU indicate that the*p*- value was 0.629. This is greater than 0.05. Therefore, the Null hypothesis confirmed. This means that there was no statistically significant gender difference in performance in preclinical courses for EU.

Further results in table 4.15of EU indicate there was no statistically insignificant difference in performance in specific preclinical course in EU for .837(Human Anatomy), .654 (Medical Biochemistry), .401(Medical Physiology), .945 (Microbiology & Parasitology), and .515 (Pathology)at a*p* value of .05.

### 4.4.2: Gender differences in performance in Clinical courses

To determine the difference in performance in Clinical coursesas per their gender item 4 of data abstraction sheet *appendix II* was used to generate data used to test the hypothesis. A computation of Independent Samples t-testperformed to compare the mean scores in clinical courses based on gender.The results are shown in table 4.16.

Table 4.16: Gender based performance difference in clinical courses

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| CLINICAL MEANS | means | | | | | | | | |
| male | female | t | df | P value) | d | 95% Confidence | |
| Lower | Upper |
| MU | 61.53 | 63.31 | -3.435 | 154 | **.001** | -1.785 | -2.812 | -.759 |
| EU | 65.15 | 65.48 | -.229 | 88 | **.819** | -.331 | -3.201 | 2.538 |

The results in table 4.16 indicated that MU’s p- value was .001. This isless than 0.05. Therefore, the Null hypothesis is not confirmed. There was a significance level of .05(5%), there was a statistically significant gender difference in performance in clinical coursesin MU.

For EU scores,result in table 4.16 indicatesa p value of 0.819. This is far greater than 0.05. The null hypothesis is thus confirmed. there wasno statistically significant gender difference in performance in clinical coursesin EU.

### 4.4.3: Gender differences in performance in Specific Clinical courses

To determine whether there was a gender difference in medical student performance inclinical courses, a t-test was used.Independent Samples t-testwas used to test the gender difference in medical students’ performance in clinical courses. This determines whether any statistical evidence significantly differin performance among male female students in clinical courses.The results are presented in table 4.17 and 4.18.

Table 4.17: Gender difference in performance in clinical courses for MU medical school

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Equal variances assumed | Means | | Levene's (a) | | t-test for Equality of Means | | | | | | | | | | | | |
| F | Sig. | t | | df | Sig. (2-tailed) | | Mean Difference | | Std. Error Difference | | 95% (b) | | | |
| Lower | | Upper | |
| Clinical Average | Male 61.53 | Female 6.3.31 | 3.395 | .067 | -3.435 | 154 | | | ***.001*** | | -1.785 | | .520 | | -2.812 | | -.759 | |
| Forensic Medicine & Toxicology | 60.15 | 60.91 | .196 | .658 | -.918 | | 154 | -.760 | |  | | .828 | | -2.396 | | .876 | |
| Occupational Health | 61.01 | 63.81 | .402 | .527 | -3.700 | | 154 | **.000** | | -2.805 | | .758 | | -4.303 | | -1.307 | |
| Radiology & Imaging | 62.44 | 63.78 | 1.572 | .212 | -1.494 | | 153 | **.137** | | -1.342 | | .898 | | -3.117 | | .433 | |
| Surgery | 63.38 | 65.89 | 5.679 | .018 | -3.515 | | 154 | **.001** | | -2.507 | | .713 | | -3.915 | | -1.098 | |
| Internal Medicine | 61.85 | 62.68 | .003 | .956 | -.895 | | 97 | **.373** | | -.821 | | .917 | | -2.641 | | .999 | |
| Reproductive Health | 63.45 | 65.06 | 1.721 | .192 | -2.007 | | 152 | **.046** | | -1.606 | | .800 | | -3.186 | | -.025 | |
| Mental Health | 62.44 | 64.15 | .061 | .806 | -2.473 | | 153 | **.014** | | -1.713 | | .692 | | -3.081 | | -.344 | |
| Child Health & Paediatrics | 58.83 | 60.38 | .041 | .841 | -1.729 | | 101 | **.087** | | -1.544 | | .893 | | -3.316 | | .228 | |
| Dermatology/STD | 83.81 | 57.87 | 1.699 | .199 | .598 | | 45 | **.553** | | 25.946 | | 43.394 | | -61.453 | | 113.345 | |

1. Test for Equality of Variances (b) Confidence Interval of the Difference

The results in table 4.17 for MU indicated that p-value was.001, which isless than .05.Therefore, the Null hypothesis is confirmed. There was statistically significant gender difference in performance in clinical courses.

At specific courses the results in table 4.17 for MU indicate that their p-valuewere; Forensic Medicine & Toxicology (.350),Occupational Health (.00),Radiology & Imaging(.137),Surgery(.001),Internal Medicine(.373),Reproductive Health(.046),Mental Health(.014),Child Health & Paediatrics(.087) andDermatology/STD(.553).

Occupational health, Surgery, Mental Health and reproductive health courses performance means had p valueless than 0.05. There was a statistically significant gender difference in performance in these specific clinical courses. Any differences between means of specific clinical courseswere likelynot due to chance but probably due to the gender differences. The result suggested thatstudents’ genderinfluence performancein Occupational health, Surgery and reproductive health and Dermatology/STD courses. While no gender influence was in Radiology & Imaging, Internal Medicine and Child Health & Paediatrics and Dermatology/STD coursesperformance.

Table 4.18: Gender difference in performancein clinical courses for EU medical school

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Equal variances assumed | Means | | Mean Difference | t | df | *p* value | 95% (b) | |
| Lower | Upper |
|  | Male | Female |  |  |  |  |  |  |
| Clinical Average | 65.15 | 65.48 | -.331 | -.229 | 88 | **.819** | -3.201 | 2.538 |
| Radiology & Imaging | 72.41 | 70.73 | 1.680 | .780 | 86 | **.438** | -2.603 | 5.964 |
| Surgery | 58.27 | 60.90 | -2.633 | -1.157 | 38 | **.255** | -7.242 | 1.975 |
| Internal Medicine | 61.33 | 60.00 | 1.333 | .467 | 38 | **.643** | -4.441 | 7.108 |
| Reproductive Health | 63.90 | 65.50 | -1.403 | -1.024 | 86 | **.309** | -4.129 | 1.322 |
| Mental Health | 67.69 | 65.26 | 2.119 | .610 | 25 | **.547** | -5.032 | 9.270 |
| Child Health & Paediatrics | 65.26 | 64.67 | 0.59 | .309 | 86 | **.758** | -3.220 | 4.404 |

The results in table 4.18 for EU indicatea *p*- value was.819, which was far greater than .05. Therefore, the Null hypothesis is confirmed. The result suggests thatthere was no statistically significant gender difference in performance in clinical coursesinEU.

In table 4.18 at specific courses the results indicatedthere was no statistically significant gender difference in performance in these specific clinical courses at EU in the following clinical courses namely;Radiology & Imaging (.438),Surgery (.255),Internal Medicine(.643),Reproductive Health(.309),Mental Health(.547) andChild Health & Paediatrics(.758) at p value of .05.

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# CHAPTER FIVE

# DISCUSSION

## 5.0: Introduction

This chapter presents the discussion on the findings of this study. Discussion of result is done based on the study’s specific objectives.

## 5.1: KCSE aggregate grade(s)’ relationship to performance in preclinical and clinical courses

Specific objectives 1 of the study sought to determine the relationship between medical students’ KCSE aggregate grade(s) and their performance in preclinical and clinical courses. Results in table 4.4 indicate a coefficient correlation value of -0.128 for MU and -0.199 for EU respectively in preclinical courses. This indicates anegative association for the three categories of MU and EU medical student cohorts.This suggests that as the KCSE grades increase the performance in preclinical courses decreasesin both MU and EU.Further resultson table 4.4 on mean difference indicate a *p*-value of 0.090 for MU and 0.088 for EU. These are greater than *p ≥ .05*. Therefore, the Null hypothesis for all the two medical school are confirmed. Results indicate that there was no statistically significant correlation between KCSE aggregate admission grades and performance in Preclinical courses in MU and EU medical schools. That means that scores in students’ KCSE aggregate admission grade variable do not significantly relate to performance in Preclinical courses.

This is contrary to Bamgboye et al.,(2001) whose investigations on high school grades andperformance preclinicalcourses in that showed that the high school grades were a better predictor of performance at preclinical MBBS examination. This is in disagreement with Salahdeen and Murtala (2004), who in their investigation on analysis of high school grades that showed SSCE is a better predictor of student performance at pre-clinical sciences examination than other criteria.The study suggested that students’ KCSE aggregate admission grades did not predict performance in preclinical courses. The students with lower KCSE aggregate grades worked hard to attain the expected pass marks. Students with lower admission KCSE aggregate grades Performance in preclinical courses was not different from performance of others students of higher KCSE grades during admission.

Results in Table 4.4 indicate coefficient correlation value as -0.116 for MU and -0.085 for EU medical schools respectively. These results indicate that the relationship is negative for both medical schools. This is in agreement with [Yoho](http://www.ncbi.nlm.nih.gov/pubmed/?term=Yoho%20RM%5BAuthor%5D&cauthor=true&cauthor_uid=22826330) et al., (2012) in their study on relationship between academic and clinical performance that found an existence of a relationship between student academic and clinical performance. Further results indicate p-value 0.153 for MU and 0.474 for EU, indicating that the Medical Students’ KCSE aggregate grade(s) had no statistically significant relationship with performance in clinical courses. The study suggests that student performance in clinical courses is not determined by their KCSE aggregate grades in both medical schools.

The results in table 4.6 indicate β in MU as:English (.467), Biology and Chemistry (.094). For Egerton University as:.066 (Kiswahili) and Mathematics (1.511) having a positive relationship to preclinical performance.

Therefore, specific subjects at admission had positive relationshipon students performance in preclinical courses. This is in agreement with Pepple et al., (2012) in their study on Prediction of Preclinical Students’ Performance concluded that performance in one subject significantly correlated with the performance in the other subjects. This is however contrary to Hughes (2002) in a study on whether we can improve selection of medical students showed that previous high school sciences did not predict clinical performance, but English correlates with performance in clinical courses.

In MU, KCSE subjects namely Mathematics, Kiswahili and Chemistry had a positive correlation with performance in clinical course, whilein Egerton University mathematics, Kiswahili, Biology and Chemistry had a positive correlation with performance in clinical courses. Therefore,performance KCSE Mathematics, Kiswahili, Biology and chemistry influenced student performance positively in clinical courses. As asserted by Cleland et al, (2012) who in their investigation on identifying best practice in the selection of medical students showed that academic criteria should be clear on attributes needed when admitting students into medical school.

The KCSE grade in Kiswahili had influence on performance in clinical courses. Therefore, for a better performance in clinical courses it was necessary for the students with better KCSE grade in Biology, Kiswahili, mathematics and chemistry. Seemingly Kiswahili might be due to the fact that clinical services were given in this national language. This enabled the student to interaction better on clinical issues.

The results in table 4.8 indicatedinMU and EU performance scores in preclinical courses had a positive correlation with performance in clinical courses. TheMedical students’ performance in preclinical courses correlated positively to the performance in clinical courses in both MU and EU schools.

The results in table 4.8 indicate PPMCC’S r coefficient correlations as: .732 for MU and .775 for EU medical schools. This result suggested that Medical students’ performance in preclinical sciences was a predictor for performance in clinical sciences courses in MU and EU Medical schools. Those students who performed well in preclinical courses performed equally well in clinical courses. Therefore, performance in preclinical courses has a direct impact on the performance at clinical courses. Among other prerequisites for performance in clinical courses, the performance in preclinical courses at medical school is important. The results for MU and EU indicate thatMedical Biochemistry, Medical Physiology, and Pathology are good predictors of performance in clinical courses. This is in conformity with Stegers-Jager et al., (2015) who in their investigation on predicting performance found that the GPA of pre-clinical courses positively predicted performance in clinical courses. This is contrary with Bel-Banna et al., (2015) who in their investigation on whether prior Registered Nurse (RN) clinical experience predict academic success in graduation found no relationship between years of prior RN clinical experience and (cumulative grade point average [GPA] of clinical course and having failed any courses or been put on probation.

Therefore, students should be well prepared in performance inPreclinical courses to be able attain a better performance in clinical courses; the former is a prerequisite of the latter level. The preclinical courses are more cognitive based unlike the clinical level courses which in addition have more of motor and affective based courses. This is in support of Sandow et al., (2002) who in their study on Correlation of admission criteria with dental school performance suggested that performance in Clinical courses is not generally predicted by pre-entry academic qualifications.

Further results in table 4.8 indicate there is statistically significant relationship between performance in preclinical courses and performance in clinical courses in MU and EU medical schools.

Though,the results in table 4.9 suggestthat there is no association between performances in individual pre-clinical coursesand performance in with clinical courses. Therefore, performance in individual preclinical courses could not solely predict performance in clinical courses. In preparation of tomorrow’s doctor starting at junior levels the emphasis for better performance should start at preclinical courses. This agrees with Pepple et al, (2012) whose study on Prediction of Preclinical Students’ Performance concludes that performance in one subject significantly correlated with the performance in the other subjects. The preclinical courses are a prerequisite to clinical courses in the training of a medical doctor. A school can take remedial interventions at the preclinical level to avoid failures or poor performance in clinical courses.

Further the results in table 4.10 indicate that gender and Preclinical means are statistically significant. This is contrary to[Murshid](http://www.sciencedirect.com/science/article/pii/S1658361213000061) (2013) who in his investigation on individual admission criteria as predictors of academic performance showed that high-school gradeswere the most predictive. Also contradicts Julian (2005) who in her study on Validity of the Medical College Admissions Test (MCAT) for predicting medical school performance indicated that the MCAT is a predictor of academic preparation.

The result of KCSE aggregate grade as predictor of performance in preclinical courses differs with Salahdeen & Murtala (2004) who in their study on relationship between admission grades and Performances in preclinical courses found that high school gradeis their better predicator. This in support of [Basco et al](http://www.ncbi.nlm.nih.gov/pubmed/?term=Basco%20WT%20Jr%5BAuthor%5D&cauthor=true&cauthor_uid=10926028), (2000) who in their study on ability of a medical school admission process to predict clinical performance found that admission ranking and interview process at this medical school did not predict performance in clinical courses. This is also in contrary to Balogun (1988) & Higgs (1984) who in their investigations on Predictors of academic and clinical performance concluded that pre-admission academic grades were predictive to clinical performance. This is in agreement to Hughes (2002) who in his study on whether we can improve how we select medical students indicates that age does predict performance in clinical courses.

Results in Table 4.11 indicate that p-value s for MU and EU was greater than 0 .05. Therefore, the resultssuggest that there was no statistically significant relationship inPerformance between students with a diplomaon admission and those direct from high schoolin both MU and EU medical schools.Students with a diplomaon admission did not perform any better than those without it in pre-clinical courses. Therefore, performance in Preclinical courses is not dependent on qualification on admission. Thus having a diploma can’t guarantee better performance at preclinical courses. This is unlike findings by [Murshid’s](http://www.sciencedirect.com/science/article/pii/S1658361213000061) (2013) whose investigation on individual admission criteria on academic a performance found that Prior academic achievement is highly reliable and moderately a valid indicator of the ability to assimilate the medical knowledge. Blackman & Darmawan (2004) in their study on variable that predict preclinical performance found that thetype of undergraduate studies undertaken is the significant predictors with direct influence.

The results in table 4.11 indicates the p value in MU was .241and .430 in EU. Both are greater than the p-value .05. This suggests that there was no statistically significant difference between performance in clinical courses between medical students with previous diploma and those without (direct from high school). This contradicts Blackman& Darmawan (2004) who investigation on entry grade in Predicting Academic and Clinical Achievement in preclinical course found that a relationship existed since those students with a science degree perform better and do well in medicine. It alsocontradicts Arzuman et al, (2012) who in their study on Influence of Pre-Admission Tracks on Students' Academic Performance indicated that understanding science is core to the understanding of medicine. Therefore, any difference in performance in clinical courses between medical students with diploma and those direct from high schoolin admission was not associated with earlier acquired knowledge at diploma level.

The result seems not in agreement to other studies maybe because the diploma curriculum extent as compared to degrees in other studies had a lesser impact to the students achievement in the subjects. Patrick (2002) on Training Research and practice suggests that Changes in selection criteria also may offer a solution to a performance problem. Selecting people either with higher aptitudes or abilities or with previous training in related skills may improve performance.

## 5.2: Relationship betweenSponsorship’s and performance in Preclinical and Clinical courses.

The secondspecific objective of the study sought to determine the relationship between medical students’ sponsorship category (KUCCPS and SSP) and their performance in pre-clinical and clinical courses. On preclinical courses, results in table 4.12 indicated that the *p*- values were .120 for MU and .004 for EU. This result suggested that performance in preclinical courses was not influenced by sponsorship of medical students in MU scores. The SSP students had a slightly higher mean score than KUCCPS. In EU, performance in preclinical courses was influenced by sponsorship, whereby the KUCCPS had higher scores than SSP students.

On clinical courses, the results in table 4.14 indicated p-values of 0.005 for MU and 0.005 for EU. This suggests that the performance in clinical courses was influenced by sponsorshipof medical students in both MU and EU medical schools. These findings both support and contradict other findings as documented in the literature.

The findings in MU for Clinical courses and EU for both Preclinical and Clinical coursesshow that there was a statistically significantrelationship between sponsorship and academic performance. This is in support of Stater (2009) investigation on the Impact of Financial Aid on College GPA at Three Flagship Public Institutions that suggested positive effects throughout college academic achievement in students. However, this result contradicts Avery’s (2014) investigation on the Relationship between Financial Aid Type and Academic Success in a Public Two-Year College in Georgia Southern University. The study found no statistically significant difference in performance as the student groups performed similarly. Similarly, it was not in agreement with Timmons et a.,l (2013) survey on financial aid effect on academic performance that found financial aid and grade point average (GPA) had no correlation. This is also contrary to Conrod’s (2008) investigation on the Effects of Financial Aid Amounts on Academic Performance which established that loan amounts and job aid amounts had no significant connection to academic performance. However, the result indicated that government sponsored students had slightly higher scores than self-sponsored students in clinical courses. Contextualizing this may be due to the fact that as years advance in medical schools also financial demand forthese resources constrained facilities.

The statistically significant difference based on sponsorship, seemed motivational. Conrod’s (2008) investigation on the Effects of Financial Aid Amounts on Academic Performance found that financial aid either as grant, loan, and job, made higher education affordable to the children of families who would have been excluded by price. Additional money would encourage and motivate a student to put in more effort after realizingthat it is essentially a gift rather than a natural right. Though U.S News and world report by [Equal Justice Works](http://www.usnews.com/topics/author/equal-justice-works)(2013) Study on Effects of Financial Aid on College Student Success indicated that Scholarships alone may not be enough to help college students succeed. The sponsorship in isolation cannot be a measure to students’ academic performance.

## 5.3: Gender’ difference in Performance in Preclinical and Clinical Courses

The study sought to determine whether there was astatistically significant gender difference in performance in preclinical and clinical courses. As indicated by[Alfayez](http://www.ncbi.nlm.nih.gov/pubmed/?term=Alfayez%20SF%5BAuthor%5D&cauthor=true&cauthor_uid=2355866) *et al,* (1990) in their study on Academic, academic performance in medical school can be influenced by non-academic factors such as social cultural factors.The results in table 4.14 and 4.15 indicated that the *p*- values were.949 for MU and .629 for EU respectively. This implies that there was no statistically significant difference in gender in performance in preclinical coursesin MU and EU. Any differences in performance in preclinical courses were likely due to chance and not due to the gender differences. The students performance in preclinical courses was not influenced by genderin both medical schools.

This is in supportofAl-Mulhim et a.l, (2012) who in their study on the influence of gender on Students’performance foundthat there wasno significant gender difference medical students’ performance.This is contrary to Blackman & Darmawan (2004), and Geiser & Santelices’ (2007) who in their investigations indicated a direct influence of student gender on performance in clinical courses. It is also contrary to, Blackman & Darmawan’s (2004) study explored on variables that predict preclinical performance. The findings from this study indicated that female students scored higheroverall compared to the male students in their clinical assessments.However, Haist *et al.*, (2000) investigation on the Effect of Gender and Age on Medical School Performance found that males perform better than females on early years that are knowledge-based and basic-science content oriented. This is in supportofVeloski et al., (2001) who in their policy letter indicate a slight difference between men and women with men scoring somewhat higher in the pre-clinical examination.

The reasons for this difference are not clear. Though there is evidence that at the age of 24 years both gender have completed their maturation process. However, at age of 18 years, the maturation of the brain of male lag behind the brains of female by 3 years and male can be considered to lag behind females by 2 years in physical maturation. Dixon (2007) examined the Gender Differences in Academic Qualifications and Medical School Performance indicates that at later years the performance of women in clinical years was equal to that of men.

Results in table 4.14 indicated that Human Anatomy, Medical Biochemistry, Medical Physiology, Immunology, Microbiology & Parasitology, and Pharmacology performance is not influenced by students’ gender at MU. Therefore, male and female students’ performance in all courses was not statistically significant. Similarly, to EU in table 4.15 where Human Anatomy, Medical Biochemistry, Medical Physiology, Microbiology & Parasitology, and pathology performance was not influenced by student gender. This was in concurrence with Dixon (2007) study on Gender Differences in Academic Qualifications and Medical School Performance affirmed that there were no significant gender differences in performance. However, research by Nayloret al., (2014) on whether gender of physiotherapy students does affect performance in the final clinical noted differences in the clinical marks.

The results in the study were not in agreement with Haist et al, (2000) on their inquiry into Effect of Gender and Age on Medical School Performance that found men perform better than women, in early years that are knowledge-based and basic-science content oriented. Considering that the preclinical courses offered at preclinical level are more basic and written examinations, while at clinical courses which are sciences the female performance might have improved due age factor. As Dixon (2007) who examined the Gender Differences in Academic Qualifications and Medical School Performance indicates that at later years the performance of women in clinical years was equal to that of men.

The results in table 4.16 indicated thatthe p-values were .001 for MU in performance in clinicalcourses means. The result indicated that there was a statistically significant gender difference between performance in male and female studentsintheir clinical coursesin MU. Any gender differences between the students’ performance in clinical courses means are likely due to chance and not due to gender in MU. The studentsperformance in clinical courses means is not influenced by their gender in MU.

Results in table 4.18 indicatedEU students’ scores p value was .819 which was greater than p value of 0.05. This indicatedthere was no statistically significant gender difference in performance in clinical courses. This was in support to [Dixon](http://www.ncbi.nlm.nih.gov/pubmed/?term=Dixon%20D%5BAuthor%5D&cauthor=true&cauthor_uid=25830578) (2015) who on their study on medical school performance and preadmission variables between genders found that no statistically significant differences between women's and men's undergraduate GPAs.This is in agreement with Dixon (2007) who in astudy on Gender Differences in Academic Qualifications and Medical School Performance found that in later years the performance of females in the clinical years was equal to that of males.

It is ccontrary to[Aldous et al](http://www.ncbi.nlm.nih.gov/pubmed/?term=Aldous%20CJ%5BAuthor%5D&cauthor=true&cauthor_uid=9076269).,(1997), Blackman & Darmawan (2004), and Geiser & Santelices (2007) who in their studies on student’s gender and age found that all have a direct influence on the clinical achievement variable’. Further, Blackman & Darmawan (2004) on their study on variable that predict preclinical performance found that female students performed better than male students overall in their clinical assessments. It is contrary with [Omigbodun](http://www.ncbi.nlm.nih.gov/pubmed/?term=Omigbodun%20OO%5BAuthor%5D&cauthor=true&cauthor_uid=14986594) et al.,(2003) on their study on the Influence of gender on undergraduate performance found a significant genders differences between the in performance in clinical subjects such as paediatrics, obstetrics and gynaecology and internal medicine. Though, the female students had slightly higher mean score in both preclinical and clinical courses. Male students had higher means in Child health and Paediatrics, Mental health, internal medicine and Radiology and Imaging. Though there is evidence that at the age of 24 years both gender have completed their maturation process. However, at age of 18 years, the maturation of the brain of male lag behind the brains of female by 3 years and male can be considered to lag behind females by 2 years in physical maturation. This was insupport toHaist et al., (2000)who on their study on the Effect of Gender and Age on Medical School Performance found thatolder women as a group had the highest mean than younger women.

In MU Occupational health, Surgery, Mental Health and reproductive health courses performance means indicate there is a statistically significant gender difference in performance in these specific clinical courses at MU. Female students’ scores are slightly higher than male students in clinical scores except in dermatology/STD. This was in support to Haist et al, (2000) study on the Effect of Gender and Age on Medical School Performance that older women as a group had the highest mean than younger women.

There was no gender influence in performance in Radiology & Imaging, Internal Medicine and Child Health & Paediatrics and Dermatology/STD courses at MU. While at EU all clinical courses; Radiology & Imaging, Surgery, Internal Medicine, Reproductive Health, Mental Health and Child Health & Paediatrics indicate there was no statistically significant gender difference in performance. It is contrary to [Stewart](http://www.jdentaled.org/search?author1=Carol+M.+Stewart&sortspec=date&submit=Submit) et al, (2006) who on their investigation on the Impact of Gender on Dental State Licensure Examination Performance indicate that male students demonstrated significantly higher state board clinical examination scores than females. According to [Shaban](http://www.ncbi.nlm.nih.gov/pubmed/?term=Shaban%20S%5Bauth%5D)& Michelle (2011)in their study on Predicting performance and whether we can identify at-risk students found that it may be possible to identify “at-risk at earlier years of study”. This can be relatively early in their studies through continuous data archiving and regular analysis.

# CHAPTER SIX

# SUMMARY, CONCLUSION AND RECOMMENDATION

## 6.0: Introduction

This chapter givespresentation in three sections. Presentations are as per specific objectives. Section one presents a summary of the major findings. Section two presentsconclusions ofthe study based on the findings. Section three presents the recommendations based on the findings and conclusion.

## 6.1:Summary of the Findings

The following is a summary of the major findings of the study.

1. There was no statistically significant relationship between Medical Students’ KCSE grade(s) with performance in preclinicaland clinical courses at MU and EU medical schools’ scores.KCSE aggregate grades at admission did not influence Students’ performance in preclinical and clinical courses.Medical students withvaried KCSE aggregate grades on admission performed the same in their preclinical and clinical courses in both schools.
2. There was no statistically significant difference inperformance in preclinical courses between government and self-sponsored medical students. There is howevera statistically significant difference in performance in clinical coursesin MU.The differences in performance in preclinical courses are likely due to chance and not influenced by sponsorship in MU, thought performance in clinical courses was due to sponsorship. The students’ performance in preclinical courses was not different between government and self-sponsored students. However, in performance in clinical courses Self-sponsored students had s slightly higher score than government sponsored students.

In Egerton University there was a statistically significant difference in performance in preclinical and clinical courses between government and self-sponsored medical students. Government students scored higher in both preclinical and clinical courses.Thedifferences in students’ performances in preclinical and clinical courses are likely due to the sponsorship differences.The government sponsored students performed higher than self-sponsored students in both preclinical and clinical courses.

Gender didnot influence performancein preclinical courses, as it did in clinicalcourses inMoi University’s medical school. Female students scored slightly higher in medical biochemistry, Microbiology and Parasitology, pharmacology and Pathology, also at clinical courses they scored slightly higher in Occupational health, Radiology and Imaging, internal medicine, Reproductive health and mental health.

EU’s medicalstudents’ performancein preclinical and clinical courseswas not influenced by gender. Though in preclinical courses male students scored slightly higher in all preclinical courses except in Human Anatomy in EU. Though, in Clinical coursesfemale students scored slightly better in Surgery and Reproductive health.

## 6.2:Conclusions

On the basis of the findings, the following conclusions are made:

* 1. A KCSE aggregate grade on admission hadno influence on students’ performance in preclinical and clinical coursesin Moi and Egerton Universities.As Medical students with varied KCSE aggregate grades on admission performed the same in their preclinical and clinical courses in both schools. The KCSE grades in English, Biology and Chemistry grades positively impacted on students’ preclinical performances in MU. KCSE’s Kiswahili, Mathematics, and Chemistry positively influence performance in Clinical courses in MU. In EU KCSE’s grade in Kiswahili, and Mathematics influenced on performance in preclinical courses performance. And Kiswahili, Mathematics, Biology and Chemistry had influence on performance in clinical courses. Of interest is Kiswahili influence on performance in clinical courses, due to likely language of clinical service delivery at clinical experience. Emphasis is necessary for students to have better grades at admission. Performance in Specific preclinical courses like Medical Biochemistry, Medical Physiology, and Pathology CoursesPredictsperformancein clinical courses.
  2. Sponsorshiphad noinfluence on student performancein preclinical courses as it had in Clinical coursesin Moi University. Both government and self-sponsored students performed the same in preclinical courses, however, in clinical courses Self-sponsored students scored slightly higher than government sponsored.In Egerton University sponsorship influencedpreclinical and clinical courses performance. The performance in both preclinical and clinical courses was different, as the government students scored higher in both preclinical and clinical courses.
  3. Genderfactor hadno influence on performance in preclinical courses as ithad on performance inclinical courses in Moi University. Althoughgender influenced performance in specificcoursesin preclinical and clinical courses.In Egerton University gender factor did not influence performancein preclinical and clinical courses.The performance in both preclinical and Clinical courses was similar. Though, the male students scored slightly higher in all preclinical courses except in Human Anatomy as compared to Clinical courseswhere female students scored slightly higher in Surgery and Reproductive health.

## 6.3: Recommendations of the study

In view of the above conclusions the following recommendations are made.

1. Medical schools should consider an open entry Examination for applicant who meet minimum cluster subjects’requirementsregardless of the KCSE aggregate grade. This will give wider opening to those interested intothe career. The cluster should emphasise on; English, Biology, Mathematics, Kiswahili and Chemistry. Considering that KCSE grades did not influence performance at preclinical and clinical courses. Also enhance student support and guidance interventions appropriately at preclinical level to students whose performance indicate weakness at preclinical level. This will reduce further casualties in clinical performance level. This will caution them and boost their learning ability as it’s predicted at this level.
2. Since this study result indicates a variance in the two schools, further studies are necessary on wider medical student populations to assess the impact of sponsorship on student’s performance in preclinical and clinical levels. This can informHigher Education Loans Board and other financiers on basis of sponsorship decision-making.
3. Further studies are needed to generate more and precise information on gender differences at specific courses in preclinical and Clinical courses performance.

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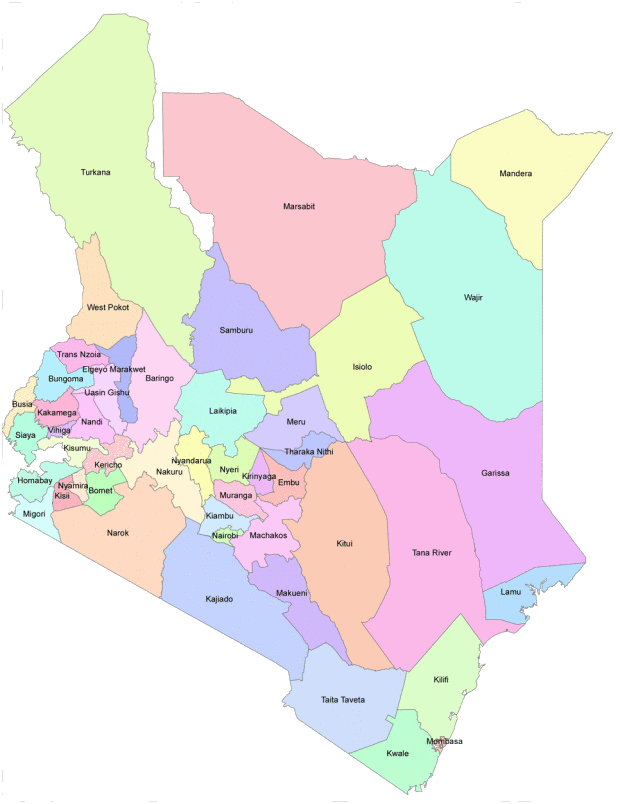
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APPENDICES

## Appendix I: Map of Kenya showing Study Area

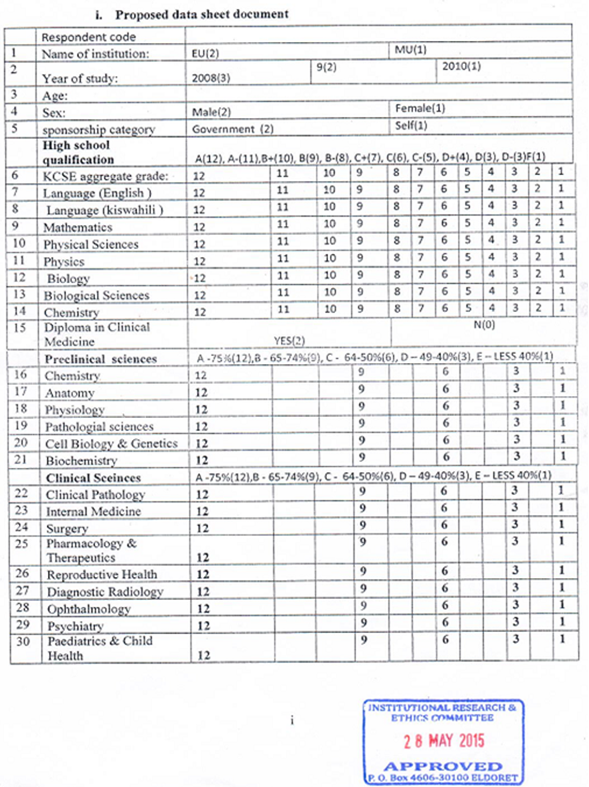
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Egerton University

Moi University

***Source:***Map showing Counties underthe new kenyan constitution..gif https://commons.wikimedia.org/wiki/File:Map\_showing\_Counties\_underthe\_new\_kenyan\_constitution..gif

## Appendix II: Proposed and approved abstraction sheet



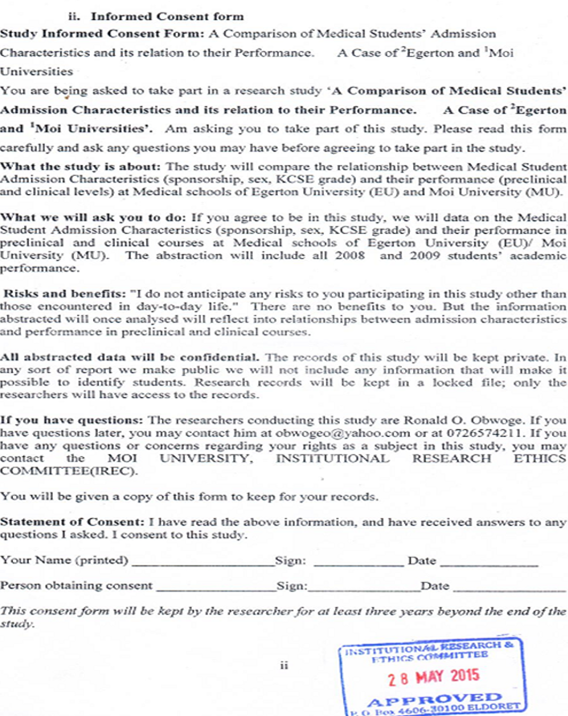
*Source: Obwoge R.O 2015, study Proposal(MU)*

## Appendix III: Piloted and adjusted data abstraction sheet

Source: *Obwoge R.O, 2015, Abstraction Sheet, Final draft*

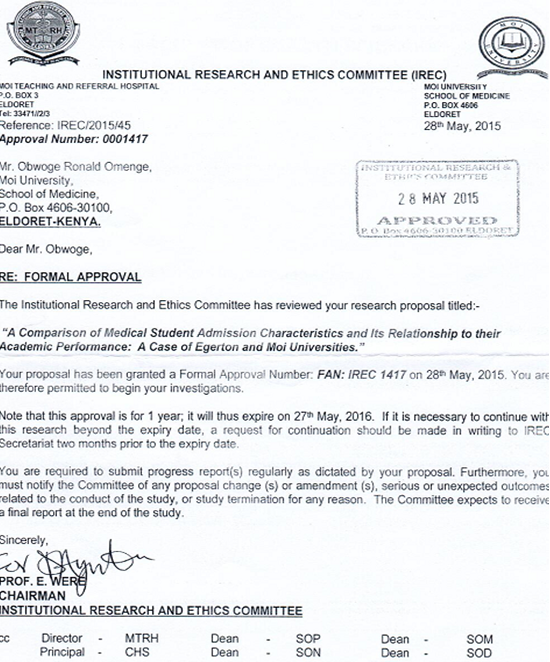
|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Respondent code | | | | | | | | | **1** |
| 1 | medical school | | | | (1)   MU | | | (2)EU | |  |
| 2 | Year of study | 2007/08 | | 2008/09 | | | | 2009/10 | | |
| 3 | Age |  | | | | |  | | |  |
| 4 | Gender | Male(2) | | | | | Female(1) | | |  |
| 5 | sponsor category | KUCCPS (1) | | | | | SSP(2) | | |  |
|  | **High school qualification** | | ( A(1), A-(2), B+(3), B(4), B-(5), C+(6), C(7), C-(8) | | | | | | |  |
| 6 | KCSE aggregate grade: | | | | | | | | |  |
| 7 | Language (English ) | | | | | | | | |  |
| 8 | Language ( Kiswahili) | | | | | | | | |  |
| 9 | Mathematics | | | | | | | | |  |
| 10 | Biology | | | | | | | | |  |
| 11 | Chemistry | | | | | | | | |  |
| 12 | Physics | | | | | | | | |  |
|  | **Exceptional Qualification** | | | | | | | | |  |
| 13 | Had Diploma in Clinical medicine | | | | | 1.Diploma | | | 2. No |  |
| 14 | repeated at medical school | | 1. Yes | | | | 2. No | | |  |
|  | **PreClinical Sciences** | | **Raw Marks** | | | |  | | |  |
| 15 | Human Anatomy | | | | | | | | |  |
| 16 | Biochemistry | | | | | | | | |  |
| 17 | Human Physiology | | | | | | | | |  |
| 18 | Immunology | | | | | | | | |  |
| 19 | Microbiology | | | | | | | | |  |
| 20 | Pharmacology & Therapeutics | | | | | | | | |  |
| 21 | Pathology | | | | | | | | |  |
| 22 | PRECLINICAL MEANS | | | | | | | | |  |
|  | **Clinical Sciences** | | | | | | | | |  |
| 23 | Forensic Medicine | | | | | | | | |  |
| 24 | Occupational Health | | | | | | | | |  |
| 25 | Radiology and Diagnostic images | | | | | | | | |  |
| 26 | Surgery | | | | | | | | |  |
| 28 | Internal Medicine | | | | | | | | |  |
| 29 | Reproductive Health | | | | | | | | |  |
| 30 | Mental Health | | | | | | | | |  |
| 31 | Paediatrics & Child Health | | | | | | | | |  |
| 32 | Dermatology/STD | | | | | | | | |  |
| 33 | CLINICAL MEANS | | | | | | | | |  |

## Appendix IV: Approved Informed Consent form



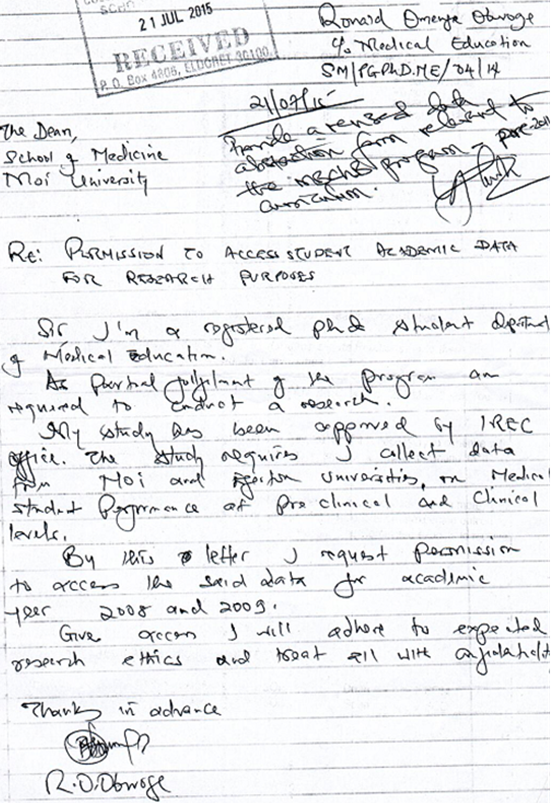
*Source: Obwoge R.O, 2015, study Proposal(MU)*

**Appendix V: IREC approval**



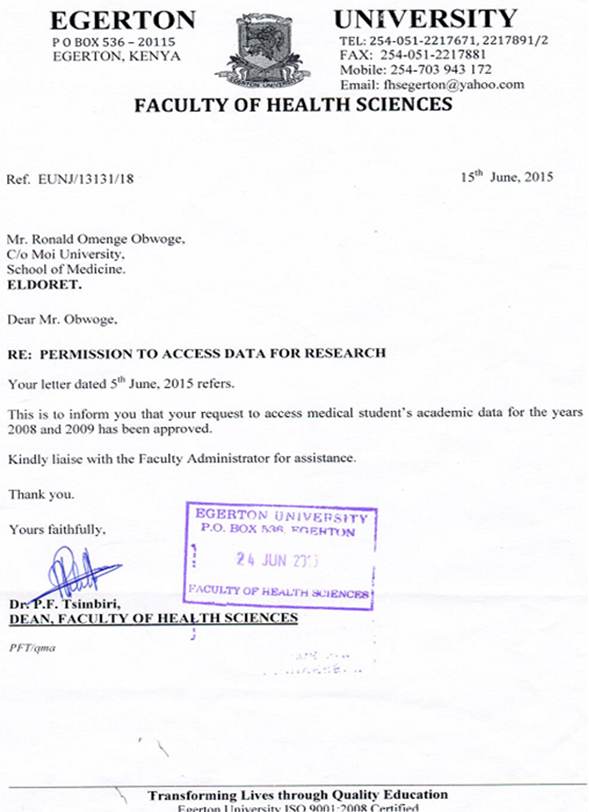
*Source: IREC, Obwoge R.O, 2015, Study Proposal(MU)*

## Appendix VI: Authority to access Moi University data



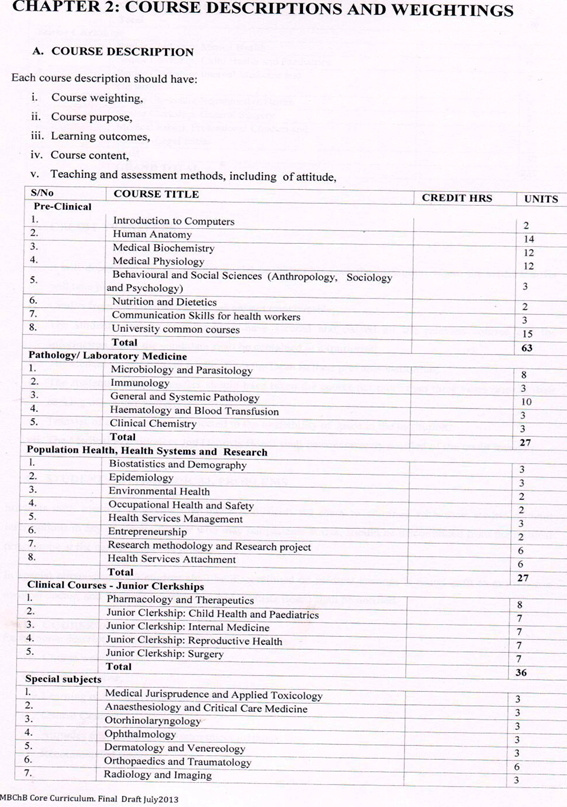
*Source: Obwoge R.O, 2015,Study Proposal(MU)*

## Appendix VII: Authority to access Egerton University Data



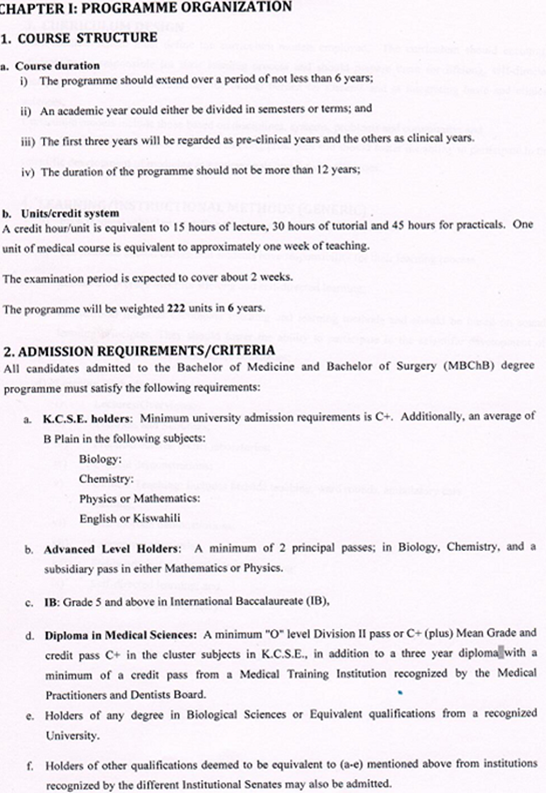
*Source: Egerton University, Obwoge R.O, 2015,Study (MU)*

Appendix VIII: MBChB Core Curriculum Criteria ( [Medical Practitioners and Dentists Board](http://medicalboard.co.ke)***)***



***Source:***Medical Practitioners and Dentist Board, Bachelor of Medicine and Bachelor of Surgery,Core Curriculum, Final Draft 2013

Appendix IX: Admission Criteria( [Medical Practitioners and Dentists Board](http://medicalboard.co.ke))



***Source:*** *Medical Practitioners and Dentist Board, Bachelor of Medicine and Bachelor of Surgery,Core Curriculum, Final Draft 2013*