

Early undergraduate research experience at Makerere University Faculty of Medicine: a tool for promoting medical research

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Abstract

Background: Research is one of the key distinguishing features of an academic institution. The way an institution grooms its future researchers determines its long term survival. The ability to do and communicate ones research findings is so important that it is now an internationally recognized minimum competency for graduate of any medical school. To remain relevant the Faculty of Medicine Makerere University needs to identify research enhancing opportunities like undergraduate research experiences.

Methods: This was a cross sectional study involving 424 graduate and undergraduate students of Makerere University Medical School on the traditional curriculum. A self administered questionnaire was used to capture reported details of individual research experiences.

Results: There were 424 student respondents, 88% of whom were undergraduates (372/424). About 41% (176/424) of these respondents reported having had a previous research experience. Among the postgraduates 74% (37/50) reported having had a previous research experience compared with 68% (139/342) of the undergraduates [OR=4.16, 2.07-8.57]. The sum of individual undergraduate experiences had the strongest positive correlation with the total number of studies done by an individual [R=0.801].

Conclusion: Early, guided undergraduate research experience can be used to promote research within the Faculty of Medicine Makerere University.

Running Head: Research Undergraduates Makerere

Keywords: research, medical, students, Makerere

African Health Sciences 2006; 6(3): 182-186

Introduction

The Faculty of Medicine has always been one of the leading faculties in Makerere University with respect to doing and communicating research findings¹. The ability to do research is an important skill for the academic advancement of an individual². Individuals who effectively acquire this skill are in a position to make an impact on the body of knowledge through exploration and scientific communication³. It is for this reason that

research is now a required competency for any well trained health professional⁴. Since this is an acquired skill the survival and recognition of any health training institution depends on how effectively it promotes research².

Internationally a lot of emphasis is now being placed on evidence based medical practices⁵. For the general population to benefit from these and other new locally developed practices there is a need to promote research as a culture among health professionals and the students now in training². The nature of work and poor information retrieval habits even in developed settings makes it difficult to recruit the already qualified health professionals into research⁶. The alternative is to equip students so that at the time of qualifying they are conversant with various aspects of research methodology. Training students should then lead to a bottom-up change in research related practices over time².

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The Makerere University Faculty of medicine has introduced and is currently implementing a problem based learning (PBL) curriculum for the undergraduate students⁷. The emphasis on student self directed learning is what makes the difference between this new curriculum and the previous traditional curriculum⁷⁻⁹. Once fully implemented the faculty should be in position to train a larger number of competent graduates to meet the demands of the communities they serve⁷. This paper documents the status of research among the graduate and undergraduate students before the change to the new problem based curriculum. This baseline information will be of use in the planning and promotion of faculty research related activities and for future reference.

Methods

This was a cross sectional study carried out between June and August 2003 at the Makerere University Medical School, with the aid of a self administered questionnaire. At the time of the survey the eligible targeted study population was 800 students. The student body was comprised of undergraduates taking various five and four year courses all following the traditional curriculum. All students pursuing either bachelor or post graduate diplomas or degrees of Medical school were eligible to participate in this study. All visiting students were excluded from the study.

The sample size was determined based on the assumption that 50% of the undergraduate population would report having had a previous research experience. The ratio of unexposed/exposed (undergraduate/postgraduates) was put at 7:1 and a least odds ratio of 3 within a 95% confidence limit and power of 0.95. Using the program for cross sectional studies contained in the statcalc utility in the epi2002 program¹⁰ the targeted sample population was 464 students. The students randomly sampled themselves by exercising their individual choice to return the appropriately filled questionnaire to the author. A research assistant, a member of each class, was recruited to distribute and receive the questionnaires. The primary outcome measure for this study was "conducting research" which included: reported research experiences, problems of doing research, resource options, and suggestions by the students for research curriculum improvement.

This study was presented and approved by the research committee of the Makerere University Medical School. Each questionnaire was hand delivered accompanied with a consent form to each respondent. The Return of a duly filled questionnaire was taken to imply the individual's consent to participate in the study.

There was no refund or any other monetary benefit given for individual participation. To safe guard the participant's confidentiality no record was made of respondent's institutional identifier marks or numbers and access to the returned questionnaires was restricted to the authors.

Findings

There were 424 student respondents who returned their questionnaires to the authors, reducing the power of the study to 0.93. About 88% of the respondents were the undergraduate students (372/424) and 22% (52/424) were postgraduate students. The sex composition was 40% (169/424) female, 60% males (258/424) and 1% (7/424) who did not indicate their sex. Approximately 41% (176/424) of the respondents reported having had previous research experience while 51% (216/424) had none. There were 8% (32/424) respondents who did not indicate a history of having had any research experiences. The average number of reported experiences per respondent was 2.32, SD 2.35, and range of 1 to 6 experiences.

Among the postgraduates 74% (37/50) reported having had a previous research experience compared with 40.6% (139/342) of the undergraduates [OR=4.16, 2.07-8.57]. Undergraduate respondents with previous reported research experiences (Table 1) were significantly more likely to indicate active involvement in an ongoing research experience [OR=4.42, 1.84-10.94]. The majority (61%) of research experiences by the undergraduates were as research assistants. Among postgraduates the trend of responsibility (Table 2) was more towards being principal investigators. There was a significant positive correlation between the total number of research experiences of an individual as a postgraduate student with those for the same individual as an undergraduate student (R=0.78). The total number of research experiences for an individual as an undergraduate had a strong positive correlation with the final total number of experiences for the same individual (R=0.801).

Table 1 Research experience

		Ongoing research experience				
Status		Yes	No	Total	Odds ratio (95%CI)	
Previous research experience	Undergraduates	Yes	33 (25)	99 (75)	132	4.42 (1.84-10.94)
		No	8 (7)	106 (93)	114	
	Postgraduates	Yes	20 (54)	17 (46)	37	4.71 (0.76-49.8)
		No	2 (20)	8 (80)	10	

Note that previous research experience was more important predictor for participation in an ongoing research experience among the undergraduates.

Table 2; Research experiences and levels of investigative responsibility

	Undergraduates/Total (%)	As Undergraduates	Postgraduates/Total (%)	As Postgraduates
Responsibility				
Research assistant	66/108 (61)	17/31 (55)	1/10 (10)	
Co-principal investigator	14/108 (13)	6/31 (19)	4/10 (40)	
Principal investigator	28/108 (26)	8/31 (26)	5/10 (50)	
Total	108/149 (72)	31/149 (21)	10/149 (7)	

Note more postgraduates were principal investigator.

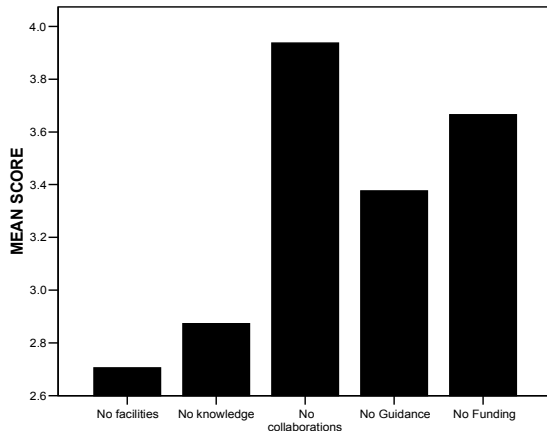
Table 3: Factors Relating To Or Affecting Research

	Undergraduates (% total)			Postgraduates (% total)			Odds ratio (CI)
	Not important	Very Important	Total	Not important	Very important	Total	
Peer reviews	142 (78)	39 (22)	181	26 (65)	14 (35)	40	1.96 (0.88-4.36)
Relevance to Clinical work	73 (40)	109 (60)	182	17 (42)	23 (58)	40	0.91 (0.43-1.92)
Relevance to learning	111 (61)	71 (39)	182	26 (65)	14 (35)	40	0.84 (0.39-1.81)
Library resources	85 (52)	78 (48)	163	21 (62)	13 (38)	34	0.67 (0.3-1.53)
Lack of Funding	63 (39)	98 (61)	161	2 (20)	8 (80)	10	2.57 (0.49-25.5)
Lack of Facilities	112 (67)	55 (33)	167	6 (55)	5 (45)	11	1.70 (0.39-6.98)
Lack of Know how	101 (60)	65 (40)	167	7 (70)	3 (30)	10	0.67 (0.11-3.05)
No collaborations	52 (31)	118 (69)	170	4 (40)	6 (60)	10	0.66 (0.15-3.33)
No Guidance	83 (51)	80 (49)	163	5 (50)	5 (50)	10	1.04 (0.23-4.69)

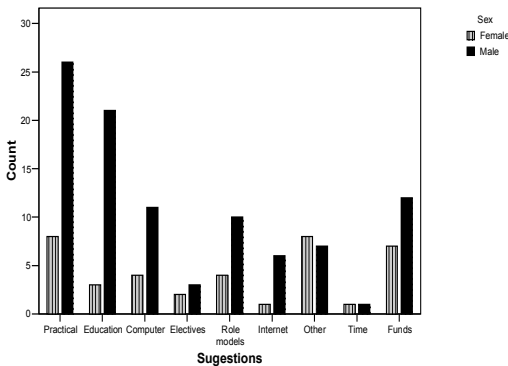
Figure 1, shows the different reasons given by respondents for not doing research. Analysis revealed weak correlations between lack of technical facilities and lack of access to collaborations, lack of technical knowledge and lack of guidance, and lack of guidance and lack of funding. In table 3 note that the undergraduates were more likely to consider Peer review as not being important for research. This was not

significant [OR=1.96, 0.88-4.36]. The top three items viewed as important for improving the research curriculum were; to have more computer related work, more education on research and a greater emphasis on the practical aspects of research (Figure 2).

FIG 1. REASONS FOR NOT DOING RESEARCH



SUGGESTIONS FOR THE RESEARCH CURRICULUM



Discussion

Early exposure of an individual to the various aspects of medical practice, while in training, has the advantage of making that individual more likely to participate in subsequent similar experiences, joyfully⁹. This can be seen by the strong positive correlation between the number of studies done by an individual as an undergraduate and later as a postgraduate student (Rho=0.78 P=0.007). The influence of research experiences is seen as a significant predictor of undergraduate students participation in research [p<0.001] (see Table 1). Considering the students life time in medical practice, such an experience as an undergraduate does translate into a larger number of total experiences (Rho=0.801 P<0.001).

In the traditional undergraduate curriculum little emphasis was placed on the practical hands on aspects of research. As such of the few students that picked an interest in research even fewer got to actually participate in research. This lack of exposure creates a lack of student confidence with respect to doing research

possibly explaining the high rating given to lack of knowledge and guidance as one of the top reasons for not doing research. The other possibility could be that this lack of knowledge and the low value attached to peer review are (Table 3) evidence of a similar deficiency on the part of the students' mentors/lecturers!^{1, 11, 12}.

In this study the odds of a postgraduate student reporting a previous research experience were four (4) times those of an undergraduate student [OR=4.16, 2.07-8.57]. Within the postgraduates, previous research experience was not as important a predictor for participation in an ongoing research as in the undergraduates. This difference could be the result of the emphasis placed on research by the postgraduate curriculum¹³. Were this to apply to the undergraduate curriculum in the form of early practical of research exposure the result would hopefully be the production of more research oriented/friendly health professionals¹⁴⁻¹⁶. It is such health professionals who would then spear head the creation of a locally relevant, research based, community specific, scientific, medical interventions². Since the undergraduate class is much larger than the postgraduate class, early research exposure would impact a wider segment of the general population.

Research must have a value added impact on the quality of service given to the local community². The current high demands placed on health professionals⁷ leave very little time for research experiences. This may be made worse by the possible lack of confidence in an individual's own research methodology skills as shown by the small number of studies per individual (mean 2.3). Positive program evaluations by students have been associated with good academic performance scores¹⁷. The inclusion of these student suggestions and findings into the curriculum should make research more popular within the student body. It is this strong student interest in research that will form the basis for value added, research related services by these students, tomorrows health professionals, to the community¹⁸.

Conclusion

Among the pre-PBL undergraduates previous research experience was an important factor for determining a student's participation in subsequent research experiences. Undergraduate research experiences also had a strong correlation with a respondent's final total number of research experiences. This makes early guided undergraduate research experiences a useful tool for the development and promotion of research related activities by the Makerere University Faculty of Medicine.

Way forward

The introduction of the problem based curriculum has created several opportunities for the development of an early, integrated, hands-on, undergraduate research curriculum⁷. As the Faculty continues to further reduce or remove the research impediments like the lack of funding and lack of technical facilities. There is a need to identify, train and later monitor staffs mentoring of undergraduate student research experiences. Also members of staff should be encouraged to engage in intra and extra institutional collaborations that make provisions to actively involve/mentor undergraduate students. These activities should help the faculty and university at large regain their lead position as internationally recognized research establishments¹.

Acknowledgements

This study was made possible thanks to a research grant from sida-sarec. We would also like to appreciate the statistical assistance rendered by Mr. John Baptist Lwanga of the child health and development center. Our greatest appreciation goes to all the respondents for giving us an insight into the research needs of our institution.

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