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Impact of Undergraduate Research "Special Study Module (SSM)" on Universiti Kebangsaan Malaysia Medical Students and Alumni

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ABSTRACT

Introduction: Mastering the art of conducting a research along with the competitive era of publishing papers showed the importance of undergraduate research. The purpose of this research was to study the impact of undergraduate research "Special Study Module (SSM)" on Universiti Kebangsaan Malaysia (UKM) medical students and alumni. **Methodology:** This was a cross-sectional study whereby 64 fifth year UKM medical students of academic-session 2014/2015 and 49 alumni of year 2010 were participated on their SSM research activities. The questionnaire administered online which enquired on participants' level of interest, confidence and SSM research experiences. Frequency and percentage distribution were used for descriptive analysis. **Result:** Out of 119 participants, 113 responded giving a response rate of 95%. More than 90% respondents in both group felt that SSM experience was enriching and 80%–90% felt SSM experience was pleasant. In both groups 47%–50% respondents believed, SSM experience contributed their high level of interest on research. The most influencing factors on their level of interest were supervisor guidance as reported by 73%–80% respondents. It was said that SSM supervisor was academically stimulating, impressive as role model and supportive. The most confidence skill was the ability to function within a group and least confidence skill was manuscript writing. **Conclusion:** Undergraduate SSM research showed positive impact on participants' research activities. More in-depth analysis should be considered especially on manuscript writing as the students were least confident in this skill.

Keywords: *Medical undergraduate, Research, Interest, Confidence, SSM*

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INTRODUCTION

Research is defined as "a systematic investigation, including research development, testing and evaluation, designed to develop or contribute to generalizable knowledge" (1). Research helps medical students to sharpen their analytical, creative, and critical thinking skills (2), as well as improves their oral and written communication skills (3). Furthermore, research experience helps to nurture evidence-based practice in clinical setting and promotes medical student interest in academic medical careers and postgraduate research (4). A number of

medical schools have made it mandatory for medical students to undergo research experience in order to be a competent doctor and research has been an essential component in undergraduate curriculum (5–8). It is evidenced that research programmes have a positive impact on the motivation of medical students. Furthermore, participants having experience in scientific programmes during the academic careers are better in their clinical, may make more accurate diagnoses and better professional decisions (9).

In Universiti Kebangsaan Malaysia (UKM) Faculty of Medicine, the undergraduate medical research is introduced to the medical students as early as in first year and students are being taught about how to search and read journal under "Medicine and Society-I module". In second year, students are taught about epidemiology, biostatistics and critical appraisal under "Medicine and Society-II module". In third year, students are required to prepare a research proposal and present it during "Medicine and Society-III" module. All these basic knowledge were the pre-requisite for Special Study Module (SSM) in fourth and fifth year whereby a research is conducted from the beginning till the end.

This SSM is a compulsory medical research module for the medical undergraduates in UKM starting from year 2007. It is conducted concurrently with other clinical training during fourth year and in the first seven weeks of fifth year. This module hoped to develop research and interpersonal skills to produce all-rounded doctors who are well versed in the research aspect as well. It is done in a group of five to six students under a supervising doctor with research experience to guide them along the way. The groups of students are given the opportunity to choose the type of research that they are interested in namely, clinical based, laboratory based, community medicine and health system based. The SSM is a pre-requisite for the medical students' Final Professional Examination. At the end of the module, the students are expected to develop skill in writing research proposal, identify the ethical elements, organise and implement data collection, analyse the data, present the results in a scientific meeting named "Medical Undergraduates Annual Scientific Research Meeting" (MUASRM), write a scientific report in the form of manuscript appropriate for submission to medical journal and able to function within a group.

Students' experience towards scientific research is a fundamental component of modern undergraduate medical curricula (10). Teaching research methodology in undergraduate medical courses makes students more confident toward research activities (10–11). However, a little is known about how medical students experienced undergraduate research (12). It has been reported that appropriate faculty supervision is an essential part for the development of research skills in students (13). Lack of proper supervision is one of the main barriers in the development of students' research activities (9). In UKM Medical Centre, the SSM has been part of the medical program for the past seven years and thus undergraduate medical students are expected to have some impact of this research module. The objective of this study was to explore the impact of SSM research in terms of educational and emotional point of views, research interest, confidence level in research skills and involvement in research activities of UKM fifth year medical student and alumni graduated in year 2010.

METHOD

This was a questionnaires-based cross sectional study which was conducted between March 2015 and August 2015 at UKM Medical Centre. Participants were UKM fifth year medical students and alumni. Selection criteria include the participants who have completed the SSM project. Fifth year 2014/2015 batch of students were chosen as they were the most recent batch to complete this SSM project. Among the alumni, the batch graduated in

year 2010 was chosen as they were the first batch who has completed this module and are currently pursuing their post-graduate studies. We would be able to see the impact of the undergraduate research module on their current stage of career.

The name list and contact information of all the participants were collected from Medical Education Department and simple random sampling was used to select the respondents from both groups. The sample size was determined as total 119 from both groups. All of them has completed SSM and presented their research project in MUASRM. Questionnaire was prepared aimed to identify the educational as well as emotional experience of the participants while conducting the SSM research and to determine the impact of SSM based on level of interest towards scholarly research activities, confidence level in conducting medical research and current involvement in research. The questionnaire was divided in four sections. The first section was the demography section that includes the year of study and type of research accomplished. The second section was their experience based on educational point of view and emotional point of view and to answer the question, yes/no options were given. In the third section, participant level of interest was examined while in the fourth section, their confidence level was examined. Both this third and fourth sections were rated by a five point Likert scale ranged from highly agree to highly disagree and highly confident to not confident respectively. To ensure the validity, the questionnaire was pretested by introducing to a group of students and alumni on December 2014 and finalised before actual research was undertaken.

Questionnaires were administered through online powered by Survey Monkey programme. The respondents were notified via email and Facebook messengers with link to the online questionnaire attached. Collection was anonymous and questionnaire was answered voluntarily. Data was collected from the Survey Monkey and exported into Microsoft Excel and Statistical Package for the Social Science (SPSS) Version 21 used for analysis. Descriptive analysis was done to analyse the results and presented in the form of frequency, percentage and average rating.

RESULT

Types of Medical Research Performed

A total of 113 participants responded in this study out of 119, giving the response rate 95%. Table 1 revealed the distribution of respondents and types of medical research performed by them. Of 113 respondents, 57% were of fifth year medical students and 43% were alumni of year 2010. Most of the respondents completed clinical based research (49%) followed by laboratory based (28%) and community and health system (22%).

Table 1: Distribution of respondents and types of medical research performed by them

Variables	Fifth year n (%)	Alumni n (%)	Total n (%)
Number of participants	64 (57)	49 (43)	113 (100)
Types of research done:			
Clinical based	30 (47)	25 (51)	55 (49)
Laboratory based	20 (31)	12 (25)	32 (28)
Community based	14 (22)	11 (22)	25 (22)
Unable to recall	0 (0)	1 (2)	1 (1)

SSM Experience

Respondents' SSM experience from educational point of view showed that both groups felt that it was enriching. This trend was maintained in the respondents' SSM experience from emotional perspective as 80%–90% of the respondents felt SSM experience was pleasant (Table 2).

Level of Interest

Both final year students and alumni group were showed high level of interest and agreed that SSM experience contributes their interest towards research. Furthermore, 73%–80% of the respondents agreed that their supervisors were academically stimulating, supportive and helpful as well as impressive as a role model (Table 3).

Factors Influence Level of Interest

Table 4 showed that the most influential factor affecting their level of interest was mentor guidance for fifth year medical student and personal interest for the alumni, followed by prior research experience, prior research skill training, opportunity to present research paper and grant.

Confidence Level in Research Skill

Figure 1 showed the highest confidence level in particular skill was the ability to function within a group with 57.9% for fifth year medical student and 57.2% for alumni. The least confident skill for fifth year medical students manage and analyse the data was (39%), and writing a scientific report in the form of manuscript (37%), while for alumni it was the writing a scientific report in the form of manuscript (40.8%).

Table 2: Distribution of respondents based on SSM experience in terms of educational and emotional point of views

Respondents' SSM experience	Fifth year (n = 64) n (%)	Alumni (n = 49) n (%)
From educational point of view, my SSM experience was:		
Not enriching	6 (9.4)	3 (6.1)
Somewhat enriching	14 (21.9)	11 (22.5)
Enriching	44 (68.7)	35 (71.4)
From emotional point of view, my SSM experience was:		
Not pleasant	13 (20.3)	4 (8.2)
Somewhat pleasant	20 (31.3)	12 (24.5)
Pleasant	31 (48.4)	33 (67.3)

Table 3: Level of interest of the participants

Level of interest of the participants	Fifth year (n = 64) n (%)	Alumni (n = 49) n (%)
Current level of interested in research activities:		
Highly interested	5 (7.8)	1 (2.0)
Interested	23 (35.9)	27 (55.1)
Neutral	23 (35.9)	16 (32.7)
Less interested	10 (15.6)	4 (8.2)
Not at all interested	3 (4.7)	1 (2.0)
Contribution of SSM towards level of interest:		
Highly impactful	6 (9.4)	4 (8.2)
Impactful	26 (40.6)	19 (38.8)
Neutral	24 (37.5)	20 (40.8)
Less impactful	6 (9.4)	6 (12.2)
Not at all impactful	2 (3.1)	0 (0)
My SSM supervisor was academically stimulating:		
Highly agree	19 (29.7)	13 (26.5)
Agree	28 (43.8)	24 (49)
Neutral	10 (15.6)	10 (20.4)
Disagree	7 (10.9)	2 (4.1)
Highly disagree	0 (0)	0 (0)
My SSM supervisor was supportive and helpful:		
Highly agree	27 (42.2)	19 (38.8)
Agree	23 (35.9)	20 (40.8)
Neutral	11 (17.2)	10 (20.4)
Disagree	3 (4.7)	0 (0)
Highly disagree	0 (0)	0 (0)
My SSM supervisor was impressive as role model:		
Highly agree	25 (39.1)	14 (28.6)
Agree	22 (34.4)	22 (44.9)
Neutral	11 (17.2)	11 (22.4)
Disagree	6 (9.4)	2 (4.1)
Highly disagree	0 (0)	0 (0)

Table 4: Factors influencing the level of interest

Rank	Fifth year medical students	Alumni
1	Mentor guidance	Personal interest
2	Personal interest	Mentor guidance
3	Prior research experience	Prior research experience
4	Prior research skill training	Prior research skill training
5	Opportunity to present research paper	Opportunity to present research paper
6	Grant	Grant

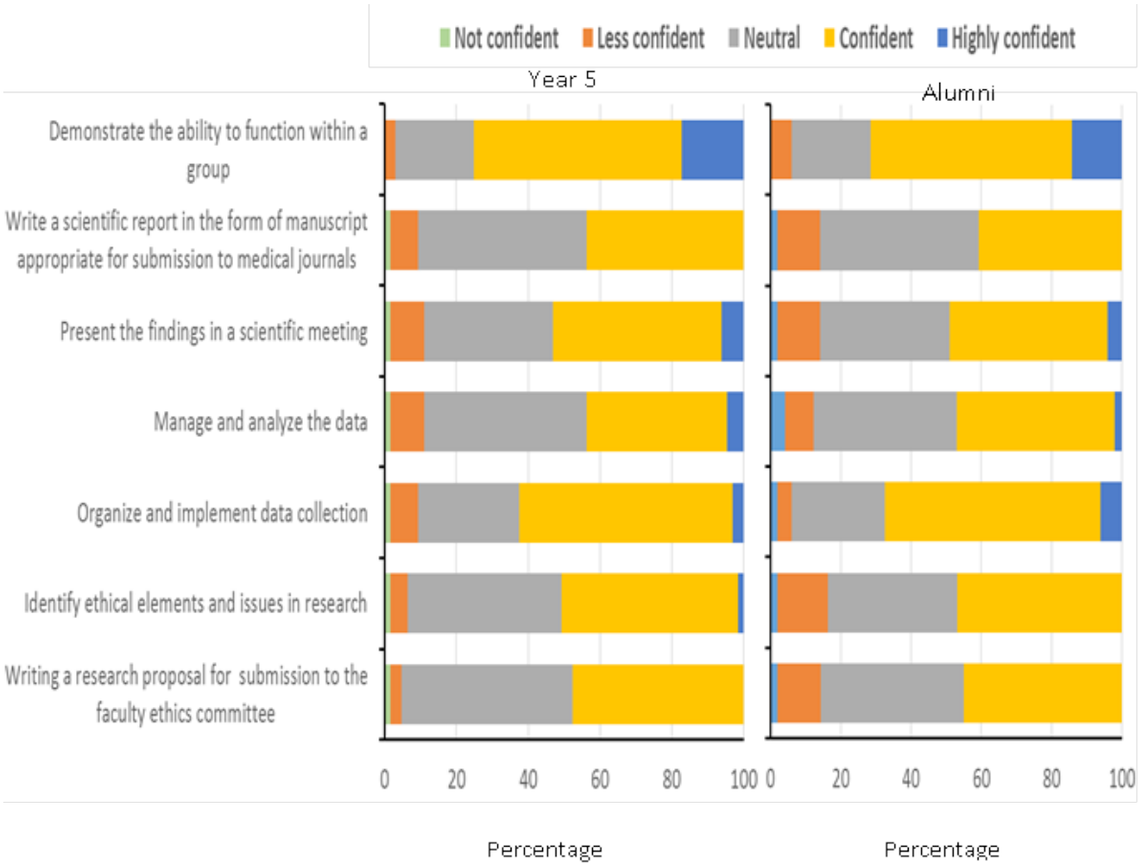

Figure 1: Distribution of confidence level in particular research skills.

Discussion

This report serves UKM Medical Centre's undergraduate medical students experience and interest towards research. Majority of the alumni and fifth year students responding to this survey felt that the SSM research experience was enriching in terms of educational point of view and emotional point of view. A good research experience helps student to uphold their interest in academic medical careers as well as postgraduate research activity (4). Therefore, this study reveals SSM study is encouraging for the undergraduate students. This present study showed that alumni had higher level of interest (57%) in research compared to fifth year medical students (44%) and both groups (47%–50%) believe there is contribution of SSM experience towards high level of interest. Study in Brazil among 13 medical schools showed most of the students were interested; only 7% of the students were not interested for research (9). Previous study has shown that prior research experience has some positive influence on their decision to pursue a medical research (14). This present study has shown that the most influencing factor determined was mentor or supervisor guidance and personal interest. It was the same as the previous study on Queen's University medical student which also showed that mentor influence was the highest (14). Mentor or supervisor guidance played a major role in this medical undergraduate research module. Although the students did not choose their own supervisor and were assigned by the module coordinator, their supervisor had positive effect on their experience in conducting research. Majority of them agreed that their supervisors were academically stimulating, supportive and helpful and impressive as a role model.

Although mentor or supervisors role is great in student research, study reported that the time allocation was one of the barriers for mentoring the research activities. They also reported that 23% of teachers did not discuss their research in their teaching (9). Study by Siemens et al. showed that difficulty in attaining a research supervisor was one of the barriers in research with only 44% of respondents agreeing that it was relatively easy to find a research mentor (15). Lack of support by the clinical surgeon in the field of plastic surgery was also reported (16). Teachers need strong commitment to mentor the under graduate research with proper time allocation and also it is important to reduce their workload, so they can be able to concentrate on more undergraduate research.

Study on the confidence level of research skill showed that their highest confidence was on "organisation and data collection skill" and they demonstrate the ability to function within a group. Their manuscript writing skill was the lowest (41%–44%) although 45% and above reported to be confident in writing a research proposal for submission to the faculty ethics committee, to identify ethical elements and issues in research and present the findings in a scientific meeting. Final year students were less confident compared to the alumni. More workshops on research methodology for the students can improve this situation.

Medical student research programs are beneficial for both students and faculty. For students, this research experience makes them to choose careers as clinician-scientists as well as their ability to understand, critique, and apply research in practice helps them in their clinical diagnosis. Faculty also get benefit from students' enthusiastic participation and can make new ideas into existing research programs and strengthen their work (17). It was reported that students of Queen's University had the highest confidence level (68%) in manuscripts preparation (14). However, it contradicts with our study whereby UKM fifth year medical students and alumni were least confident in manuscript writing. This possibly due to the difference in background, whereby in Queen's University, the students submitted report individually while SSM students submitted report as a group.

From the previous study in Queen's University showed that mentor influence (40%), prior research experience (38%), research training (7%), personal interest (7%) and grant (2%) were factors influencing their decision to pursue a medical research career (14). Apart from that, it was found that participation of student in research presentation would increase their interest and productivity as it gave them opportunity to present the result of their studies. Through publishing their work, students understood how new knowledge were being disseminated and it taught them important skills (18). The SSM research project revealed a very potential prospect in establishing research and publication culture among students and faculties in UKM medical centre (19). This present study showed that the SSM enables sparkling students' interest and motivating them to continue engaging in scholar research activities. This study may provide a framework on how to increase student's motivation and interest in conducting a research. However, emphasis need to be given on manuscript writing skills as it was found least confident.

CONCLUSION

In summary, majority of the respondents had a pleasant and enriching experience in SSM. We can generally conclude that undergraduate SSM research module had positive impact in terms of level of interest in scholarly activities of which mentor or supervisor guidance and personal interest were the most influential factor. SSM had also impacted the confidence level in conducting research whereby the most confident skill was the ability to function within the group. More "in-depth analysis" or qualitative methods are recommended to have more unfavourable results in addition to manuscript writing.

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