ABSTRACT

Purpose: To assess the efficacy of 16 weeks, intensive, full-time medical communication and clinical skills educational program 'Medical Genetic Course (LAB 496)' at the college of Applied Medical Science, Prince Sattam bin Abdulaziz University for improving quality of medical education, and professionalism of medical laboratory graduates. Method: In the study 120 participants including (level 3= 22, level 5= 6, level 9= 13, Internes= 43, graduate genetic specialist= 36), Data collected by homemade survey evaluating 3 major factors namely are social condition and life style, infrastructure, method of teaching and learning. Correlation and multiple factors association study. Results: The outcome results show that the participants agree that the marital status, language, and institutional and program infrastructure have high significant impact on the quality of education and learning. Conclusions: This research study can be considered as a simulation project, to evaluate the quality and the power of this research, which expresses many significantly, out-comes such as lack of appreciation and understanding the power and the significant impacts of these types of studies, which reflects here on some factors lack transparency and the Credibility of their opinion.

Keywords: Medical education, modules, intensive course, quality

1. INTRODUCTION

Many Saudi specialists seek for postgraduate training positions (Demonstrators, or MSc and PhD study) or permanent jobs most of them face difficulties in attaining these positions, and those that who do face challenges they fail to succeed on their carriers in the medical practice(1,2). These challenges may include inadequacy of medical knowledge and skills as well as deficiencies in personal professionalism and language proficiency(3). There are many weaknesses in our current standard and systematic educational programs, which fail to improve the clinical skills, interpersonal aspects of health care practitioners, and professionalism of immigrant allied health specialist that are seeking postgraduate positions in western countries(4,5). The major purpose of the present study is to assess the efficacy of an academic and clinically relevant educational program to enhance the knowledge and skills proficiency and professionalism of Saudi allied health specialist. We used the Medical Genetic course as a model study.
Many western counties have attempts to provide some educational experiences for Saudi students to smooth and facilitate their integration with the academic system. This might concern on to focused on the effectiveness of cultural life style, language and religions. They concluded that cultural life style improving programs are necessary in order for the Saudi students to improve their professionalism and clinical skills; this to enable them to integrate successfully in their academic system and cultural life style of the host countries.

In addition, some local Saudi academic and health institutes have indicated that the many allied health graduates face a lot of difficulties and challenges to pass an interviews and written exam for their seeks job application. These facts have encouraged our local Saudi academic and health institutes to go through local and international accreditation programs to enable them to develop and enhance the quality of their education system and training methodology, to reduce the factors and number of program failures. And to insure that their graduates are will be capable to work successfully in all different challenged and success in their medical practice and future carriers development training programs.

Academic affair agency at Salman bin Abdulaziz University, have encouraged all colleges and departments within the institute to participate and develop their own strategic plan, which might improve the quality of education and outcome. This strategic planning is important because its help to develop its scientific outputs to serve all sectors of the society. In addition, the National Commission for Academic Accreditation and Assessment (NCAA) oversee this project for accreditation purposes. The College of Applied Medical Sciences has adopted these goals to top its priority list for achieving these goals and to draw a clear strategy to develop them. The importance of strategic planning for college particularly lie in the following aspects; Teaching and learning, college infrastructure, cultural aspect and life style.

Referential comparison process with excellent local institute and their graduate, who they either working in academia or hospital services as a specialist. This comparison includes content of medical genetic course as model of study to identify the characteristics and skills that students have accomplish throughout their academia life. This activity is in order to benefit from their experience in setting plans so as to improve the performance in the college in general and the medical genetic course in focus. Also these referential comparisons help our college to enter the competition with leading universities through the continuous improvement and development.

Based on the recommendations of the NCAAA, adopted some methodology for determining a number of main variables as basis for the comparison process between the University and leading universities, and successively colleges and various programs and then identify lessons learned to improve our education practices and develop them. List of a number of universities and medical services was nominated, as shown in Figure (1).

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**Figure 1: Referential local college and medical centers**

To Cite This Article: Saleh A.S AL-Abdlhadi. Improve and Develop Quality Ways of Teaching and Learning in Medical Education. International Annals of Medicine. 2017;1(11). [https://doi.org/10.24087/IAM.2017.1.11.371](https://doi.org/10.24087/IAM.2017.1.11.371)
Few studies, however, have employed systematic empirical research to assess the efficacy of the educational programs, but not in Saudi community, these studies have been small scale, not well-designed, with dependent measures of unclear relevance, and poor internal and external validity\(^{18}\). Accordingly, the major purpose of the present project was to report the results of questioners that investigating all factors, that might be relevant for clinical training and education system for improving medical genetic knowledge and clinical skills. Compared to previous research, in this study we to improve the design, measures and analyses of the effectiveness of the educational program in Saudi community.

2. METHOD

The instrument
Homemade survey was designed according to the NCAAA and strategic plan key indicators (Appendix 1). The Five pages survey including 3 major factures as: social life, educational infrastructure and environments, and method of teaching and learning. It also includes data for Internship students, and specific focus on medical genetic course as model of the study. All 120 participants admitted to survey internally and externally between November 2012 and December though direct meeting in person interview before and after they admitting there answer to the survey.

Participants and Procedures
This study was conducted from November 2012 to December 2012 (n=120 males Saudis). The candidate who participated in this study was collected internally and externally from the local community in the kingdom. We enrolled 120 candidates from central and eastern regions, and they were all identified from a local network of academic institute and medical centers (Table 1). In these 120 candidates 65% were born and live in Alkharj city, 35% were from other regions. The participants reported age 18-24y [median 21y], and all had completed a required medical examination, admission exam and preparatory year. Some they had demonstrated some English language proficiency.

Data analysis and statistics
The data were analyzed with Excel statistics function using correlation analysis. We calculated the probability and 95% credibility intervals of each factors and sup-factors of the study program, as well as the probability of students in each level. With the help of samples, population data sets, we will find Percentage (% of Yes or No), frequency tables, Means: \(\bar{x} = \frac{1}{N} \sum_{i=1}^{n} f_i x_i\), where \(\sum_{i=1}^{n} f_i\), \(f_i\) is frequency of \(i\)th element and \(N\) is sample size.

Standard Deviation: \(\sigma = \sqrt{\frac{1}{N} \sum_{i=1}^{n} (x_i - \bar{x})^2}\), \(\bar{x}\) and \(N\) are mean and sample size respectively for ungrouped data. (The square root of the mean squared deviation from the arithmetic mean is called standard deviation). Variances: \(\sigma^2 = \frac{1}{n} \sum_{i=1}^{n} (x_i - \bar{x})^2\), it is the mean square deviation about the arithmetic mean. Bar charts will be used on different factors.

3. RESULTS
Of the 120 participants (age 18-28y [median 23y]) all had complete data (Table 1).

<table>
<thead>
<tr>
<th>Participants</th>
<th>Affiliated institutes and medical centers</th>
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<tbody>
<tr>
<td></td>
<td>College of applied medical science (Salman bin Abdulaziz university)</td>
</tr>
<tr>
<td>Level 3</td>
<td>22 (37.2%)</td>
</tr>
<tr>
<td>Level 5</td>
<td>6 (10.1%)</td>
</tr>
<tr>
<td>Level 9</td>
<td>13(22.0%)</td>
</tr>
<tr>
<td>Internship (n= 43)</td>
<td>14 (23.7%)</td>
</tr>
<tr>
<td>Demonstrators &amp; Specialists (n= 36)</td>
<td>4 (6.7%)</td>
</tr>
<tr>
<td>Total (n=120)</td>
<td>59 (49.3%)</td>
</tr>
</tbody>
</table>
In house Academic students level 3= 22 students, level 5= 6 students, level 9= 13 students, in-house and external Interns= 43 students, external graduate genetic specialist from different local Institutes = 36 specialist.

**Key indicators 1: Social condition and life style**
Factor 1 till factor 4 is all about marital status and family life (Table 2). The study shows that 108 of the participant are married, 90.8% agreed that being married have improved their quality of education and learning, 92.5% agreed that being married did not reduce their quality of education. Only having part time job reduce their quality of education (84.2%). Living fare from their family shows no major effects on their quality of education (60%:40%) (Graph 1)

<table>
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<tr>
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<td>63</td>
<td>65</td>
<td>73</td>
<td>38</td>
<td>72</td>
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</table>

**Table 2: Social conditions and life style**

**Key indicator 2: learning environment and infrastructure**
In this indicator the hypothesis is if the facilities and the infrastructure of the institute correlated to the quality of teaching and learning of the participants and if effects on their overall outcome knowledge and skills (Table 3). The results shows that 68% agree that the environment and the infrastructure is not suitable for good quality of education and skills, 77.5% agrees that the educational lab did not have all needed teaching materials, 62.5% agrees that size of the class rooms are not suitable to equipped the new strategies and growth of service and increase numbers of students (Graph 2).

<table>
<thead>
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**Table 3: learning environment and infrastructure**

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Key indicator 3: Method of teaching and learning

In this indicator the hypothesis is if the method of teaching and learning used in this organization are correlated to the quality of teaching and learning of the participants and if effects on their overall outcome knowledge and skills (Table 4). The results shows that 70% agree that there are overloads on the daily-day schedule, 83.3% agrees that the examination week should be free of any academic lectures and activates, 71.6% agrees that there are weeks or lack of good training in instrumentation and medical practice, 70.8% indicated the weakness in English language effects on the daily-day routine (Graph 2).

Table 4: Method of teaching and learning

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Internship students
We asked the 26 internist about their experience during the clinical training and their opinion regards the practical skills and the clinical experience pre and post years of academia. The results show that 76.9% agrees that they had the benefit of knowledge and skills pre-internship training. 84.6% agreed that time frame of clinical practice was adequate pre-internship training program.

Table 5: Internship students

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<tr>
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</tbody>
</table>

Fig. 4: Internship students

Assessment of Medical genetic and Molecular biology course
Medical genetic course started as one course in BSc old curriculum of the medical laboratory science. Student who graduated from this program been evaluated for best performance and interested and understand fundamental and performance of medical genetic in clinical services or clinical research. We compared the course description between the two curriculum for prince Salman university, college of applied medical science (CAMS) and King Saud university, CAMS (Table 6).

We found that 71.4% of the student agreed that the instrumentation and practical training skills not matching to the fundamental theories of the course. 75% agreed that a one course module is satisfactorily to get the knowledge and experience skills in this subject. In addition 64.3% suggested that field visit to service genetic diagnosis laboratory will add to the quality of knowledge and experience.

Table 6: comparison between Prince Saman University, CAMS and King Saud University, CAMS, for the Medial Genetic Course

<table>
<thead>
<tr>
<th>Topic (Prince Sattam bin Abdulaziz university, CAMS)</th>
<th>Topic (king Saud university, CAMS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Introduction to medical genetic and molecular biology</td>
<td>History of Genetics</td>
</tr>
<tr>
<td>2. Chromosome structure and Cytogenetic</td>
<td>The Cell</td>
</tr>
<tr>
<td>3. DNA structure and gene expression</td>
<td>Cytogenetics</td>
</tr>
<tr>
<td>4. Population genetic</td>
<td>DNA structure and function</td>
</tr>
<tr>
<td>5. Genetic patterns of inheritance</td>
<td>Mutation</td>
</tr>
<tr>
<td>6. Genetic variations</td>
<td>Mutation detection techniques</td>
</tr>
</tbody>
</table>
7. Molecular diagnosis in medicine  
8. Hemoglobin pathic diseases  
9. Infection diseases and neurological disorders  
10. Cancer genetics  
11. Metabolic disorders and complex disease  
12. Congenital malformations  
13. Genetic counseling

<table>
<thead>
<tr>
<th>Parameters</th>
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<th>factor4</th>
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<td>14</td>
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Table 7: Assessment of Medical genetic and Molecular biology course

4. DISCUSSION

The findings from this study shows that the participants have faced a lot of challenged with education style. These challenges are differentiated as key indicators and their sub-factors in the survey. Social condition and life style diagnose these indicators and the 12 sub-factors, which shows that staring from Factor 1 till factor 4 marital status might have some positive impact on the quality of education for some them, although the number of marred are high in this study (108) but the age and successful rate and GPA were not included. Meaning that even if they are marred, did they pass their courses on time each semester and what are their scores and general grade points (GPA). Some participants have financial difficulties and so they improve it working in part time job and this did reduce their quality of education as shown from this study (84.2%). But we did not indicate the type of works and working hours and whether if this work was daily or if it's related to their specialty. Living fare from their family shows no
major effects on their quality of education (60%;40%). But also we did not include other ways of communication or their frequent visit to their families or any geographical destination.

The facilities and the institutional infrastructure were also the other challenged for the participant as they claim. This been shows in many studies it has major impact and high correlation to the quality of teaching and learning. The results in this study show that 68% agree that the environment and the infrastructure is not suitable for good quality of education and skills. 77.5% agrees that the educational lab did not have all needed teaching materials, 62.5% agrees that size of the class rooms are not suitable to equipped the new strategies and growth of service and increase numbers of students. However, this result includes everyone including level 3 students, who just graduated from the probation year and have not yet started their academic professionalism, and their comment might be affected by other old colleagues and this might bias the outcome result.

In the method of teaching and learning we tried to evaluate their general out of knowledge and skills and whether it’s been affected by the method were used in this organization for teaching and learning. The results shows that 70% agree that there are overloads on the daily-day schedule, 83.3% agrees that the examination week should be free of any academic lectures and activates, 71.6% agrees that there are weeks or lack of good training in instrumentation and medical practice, 70.8% indicated the weakness in English language effects on the daily-day routine. Moreover, level 3 students were included, some of the participants are now working as specialist and they only commented in what they remembers from the past academic years. But language was the always the major challenged here and everywhere, especially in kingdom. May studies from Canada regarding overseas students even physicians(1,25) themselves face this challenge for postgraduate training, this lack include every aspic of language including speaking, reading, and writing(1,26).

Internship student were also included in this study because they can reflect the immediate action of response the quality of education and skills they gain, which it might be affect by the previous interactive factors and the key indicators in the study. The 26 internist share their opinion, and the results show that 76.9% agrees that they had the benefit of knowledge and skills pre-internship training. 84.6% agreed that time frame of clinical practice was adequate pre-

Internship training program. However, this result might not be transparent the cause by the excitement and the impression, which they want to express about themselves towards surveyors and in-service inspectors.

The module subject in this study is the Medical Genetic and Molecular biology. We wanted to evaluate the adequate of the course content in compare to other benchmark institutes who offer similar course, and evaluate their graduates if they have a better knowledge and skills in compare to our graduate’s students, who studied our course style. The study involved many benchmark specialists as displayed on figure 1. The general outcome shows that 71.4% of the student agreed that the instrumentation and practical training skills not matching to the fundamental theories of the course. 75% agreed that a one course module is satisfactory to get the knowledge and experience skills in this subject. In addition 64.3% suggested that field visit to service genetic diagnosis laboratory will add to the quality of knowledge and experience.

However, this result might be bias because most of participants are old graduates who they are now working as specialist for sometimes, this might confuse there opinion about the past academic training and educations.

Comparison study between our course syllabus and the same course offered at king Saud University, we offered better and more deep subjects in related to the medical genetic practice and gene diagnose technology that used in diagnoses services.

5. CONCLUSIONS

This research study can be considered as a simulation evaluation research, which significantly express many out-come that might enhance that quality of education and suggested some factors can improve the knowledge and skills of our graduates seeks future postgraduate study our good jobs in excellent medical services. However, population size could not achieve and power statistical analysis for immediate implementations. Lack of appreciation and understand the power of these type of studies reflect as lack of transparency and reality of their opinion. We aim to implement our study in a large samples ensuring to adjust all other factors which not included in this study such as age, level of experience.

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