Students' Interests on a Particular Area (Specialty) in the Profession of Medical Laboratory Science, Faculty of Medical Laboratory Sciences, UDU, Sokoto, North-Western Nigeria

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Authors' contributions

This work was carried out in collaboration between all authors. Author ASM designed the study. Author KKI wrote the protocol and author MKD interpreted the data. Authors MRG, AI, IMS, AY and AM anchored the field study, gathered the initial data from the classes (100l to 500l respectively) and authors HMA and NHH performed preliminary data analysis. While authors MHY, AG, BYZ and RTI managed the literature searches and produced the initial draft. All authors read and approved the final manuscript.

Original Research Article

ABSTRACT

Objective: The objective of this survey was to ascertain a better understanding on the students' interest on a particular area (specialty) in the profession of Medical Laboratory Sciences (Bachelor of Medical Laboratory Science), Faculty of Medical Laboratory Sciences, Usmanu Danfodiyo University (UDU), Sokoto, North-Western Nigeria.
Materials and Methods: A structured self-administered questionnaire was designed and distributed for this purpose. This study was carried out between January to March 2016. Five

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hundred and Six (506) questionnaires were distributed to the students (from 100 level to 500 level), but only Four hundred and Eighty-Three (483) were returned completed.

Results: Of the 53 Brilliant students participated in this study; 41(77.4%) male and 12(22.6%) female, the majority of the students have interest to work in Medical Microbiology; 16(30.2%) followed by Haematology and Blood Transfusion Science; 14(26.5%) Chemical Pathology; 13(24.5%) while Immunology; 5(9.4%), and Histopathology; 5(9.4%) have the least number of students.

Conclusion: This finding indicated that the most favorite laboratory discipline for training was Haematology/Blood Transfusion Science followed by Medical Microbiology, Chemical Pathology, Immunology and lastly Histopathology. It emerged after many discussions with the students of Medical Laboratory Science that they preferred Haematology/Blood Transfusion Science because it allowed them to use their theoretical knowledge to work with their hands and sometimes with automation than the other laboratories.

1. INTRODUCTION

In a typical medical laboratory, a team of pathologists, scientists, technologists, technicians, assistants and attendances work together to determine the presence or absence of disease. The role of the medical laboratory scientists in medicine is always changing and it is even more obvious in today's world of considerable scientific and technical advances. Hence, in the years ahead, the medical community will require greater numbers of better trained medical scientists to meet these emerging challenges in health care. Medical Laboratory Science, otherwise known as Biomedical Science in the United Kingdom or Clinical Laboratory Science in the United States of America and Canada, is the practice which involves the analysis of human and animal tissues, body fluids, and excretions there-from. It also involves the production of biological such as human and animal vaccines and diagnostic reagents. It now includes the design and fabrication of equipment for the purpose of laboratory diagnosis. A vital component of Medical Laboratory Science Practice is Biomedical Research, which is a necessary tool for clinical diagnosis and treatment of patient. The Medical Laboratory Scientist is professional who has undergone a prescribed training in accredited Institution(s) with approved curriculum, inducted into the profession, possesses a code of conduct, goes through a mandatory internship, and ensures conformity of standards and adherence to the ethics of Medical Laboratory Profession. The practice of this very important profession had a noble beginning. It started from the developed world, specifically from the United Kingdom and the United States of America almost concurrently. Early Nigerian Medical Laboratory Trainees, especially those who qualified before 1960 invariably had their training in the United Kingdom. In order for readers to understand how the profession started in Nigeria, it is important to take a look at how the practice commenced in the United Kingdom where over 99% of the pioneer Medical Laboratory Scientists trained between the late 1940s and 1950s. It started in Nigeria from the informal "errand boys" of the 1920s, through semi-organized evening classes leading to Intermediate and Final Diplomas of the Institute of Medical Laboratory Technology of UK and the post independent IMLS of Nigeria in the 60s, and metamorphosed to the current professional Bachelor of Medical Laboratory Science degree programme of the 1980s and beyond. The above exercise commenced almost simultaneously, from three Institutions in Nigeria, namely, the General Hospital in Broad Street, Lagos, the National Veterinary Research Institute in Vom-near Jos and the Adeoyo General Hospital, Ibadan, which was later transformed to the University College Hospital, Ibadan [1].

The number of Medical Laboratory Scientists in Hospitals in the northwest geopolitical zone-is far below the minimum requirement as outlined by the Medical Laboratory Science Council of Nigeria. The same sad situation obtains in almost all the public and private health delivery centers in Sokoto, Niger, Kebbi, Zamfara and Katsina States. This glaring imbalance necessitated contacts with relevant institutions and organs with a view to addressing the imbalance in the hospitals and the other health and allied institutions in the north-western geopolitical zone. The result of these is the establishment of the

School by the authorities of the Usmanu Danfodiyo University Sokoto in 2002/2003 academic session with a total of twenty (20) pioneer students enrolled for the programme. Precisely, the instrument given birth to the School was the 225th Senate meeting of Wednesday, 30th July, 2003. NUC granted full accreditation in 2005 while the MLSCN granted its accreditation in 2006. The school graduated its first batch of pioneer 11 graduands in 2008. Currently, the School has graduated 262 graduands comprising of 176 males and 86 females and have about 511 undergraduate students [2]. The school was upgraded to the status of a Faculty upon approval by Senate at its 275th meeting held on Wednesday, 9th January, 2013. Upon approval by Senate, the Faculty enrolled its 27 pioneer M. Sc students cutting the across the five departmental specialties (i.e. Chemical Pathology, Haematology & Blood Transfusion Sciences, Histopathology, Medical Microbiology and Immunology). This is part of Faculty's long-term internal manpower and human capacity development drive. It is also to compliment the state of the art teaching and research equipment procured for the newly furnished specialty laboratories and the new multipurpose *Centre for Advanced Medical Research and Training built* by the University within reach to the Faculty's permanent building. The Faculty now has five academic Departments namely: Chemical Pathology, Haematology, Histopathology Medical Microbiology and Immunology. These departments are serviced by very senior permanent academic staff across the university faculties, visiting academic staff, and adjunct staff from within and outside the University and the Teaching Hospital. The Faculty has since its inception graduated 6-sets with a total of 133 medical laboratory scientists [3].

2. MATERIALS AND METHODS

2.1 Study Area

This study was carried out in the Faculty of Medical Laboratory Science, Usmanu Danfodiyo University, Sokoto, North-Western of Nigeria. Sokoto state is located in the extreme North-West of Nigeria, near to the confluence of the Sokoto River and the Rima River. The state is located between longitude 11'30°, 13'50° east and latitude 4'to 6'0° north, bordered to the north by Niger Republic, Zamfara state to the east while Kebbi state borders most of the south and western parts [4]. The state falls within the Savannah vegetation zone. Rainfall starts late and ends early with mean annual rainfall ranging from 500 to 1,300 mm, and annual average temperature of 28.3°C (82.9°F). It has a land area of about 28,232.37sq kilometres and stands at altitudes of 900 m above the sea level. The state has three peculiar seasons; the cold dry (December-February), hot dry (October-April) and wet. The wet season begins in most part of the state in May and lasts up to September. The vast Fadama land of the Sokoto Rima River system dissects the plain and provides rich alluvial soil and extensive grassland fit for a variety of crop cultivation, hence farming and livestock rearing are the principal activities in the state. Other commercial activities are cement and leather production. The major indigenous tribes in the state are the Hausa and Fulani and other groups such as Gobirawa, Zabarmawa, Kabawa, Adarawa, Arawa, Nupes, Yorubas, Ibos and others. Occupation of city inhabitants include trading, commerce, with a reasonable proportion of the population working in private and public sectors [5]. Majority of the Hausas' are farmers while Fulanis are nomadic and are engaged in animal rearing [6]. Based on 2006 population census, Sokoto state had a population of 3,696,999, with an average estimate of 4,806,098 in 2015 based on the population annual growth rate of 3% [7].

2.2 Study Population

The study population in this prospective cross-sectional study included 483 students comprising male and female. The Participants were recruited from the Faculty Medical Laboratory Sciences of Usmanu Danfodiyo University, Sokoto, North-Western of Nigeria.

2.3 Study Design

This is a prospective cross-sectional study designed to address the knowledge, attitudes and students' interest on a particular area of the profession of medical laboratory science. The purpose of this survey was to gain a better understanding of Bachelor of Medical Laboratory Science (BMLS) students' interest towards the profession of Medical Laboratory Science program before and after admission.

2.4 Methods

A convenience sampling method was used to recruit 483 BMLS students who had participated in this survey. After explaining to the students the

research objectives, the questionnaire's different components and questions; a self-administered 15-item questionnaire was designed and distributed for completion. Five hundred and Six questionnaires were distributed and Four Hundred and Eighty-Three were returned with complete data, so sample reduction was due to missing data. There were fill-in the blanks, yes/no questions and multiple-choice responses. Data was collected under the supervision of the chief investigator.

2.5 Statistical Analysis

The data obtained were analyzed using Statistical Package for Social Science (SPSS) version 20. The results were expressed as the mean ± S.D simple percentage or proportion. Comparisons were made using X^2-test and $p \leq 0.05$ were considered statistically significant.

3. RESULTS

Of the 506 questionnaires distributed, only 483 were returned completed. This study comprises of 331(68.5%) male and 152(31.5%) female as shown in the Table 1 below.

Table 1. Demographic characteristics of the study population

Gender	Frequency	Percent (%)
Male	331	68.5
Female	152	31.5
Total	483	100

The study population has the mean age and standard deviation of 22.36±3.02 and 233.04±19.95 as shown below.

Table 2. Mean and standard deviation of some variables

Variables	Mean ±Standard deviation
Age	22.36±3.02
Score	233.04±19.95

Shows the distribution of the study population based on classes (levels) with three hundred levels (300l) having the highest number.

This table described the interests of students towards the profession of medical laboratory from the courses they applied, the initial courses given by the university, to the final courses given to them by the University.

Table 3. Class (levels) distribution of the study population

Levels (Classes)	Frequency	Percent (%)
100	83	17.2
200	108	22.4
300	162	33.5
400	70	14.5
500	60	12.4
Total	**483**	**100**

Table 4. Students attitudes towards medical laboratory profession

A. Courses Applied to the University

Course applied	Frequency	Percent (%)
Med. Lab. Sci.	218	45.1
M.B.B.S	210	43.5
Phar. Sci.	24	5.0
Comp. Sci.	9	1.9
Biochem.	7	1.5
Nursing Sci.	4	0.8
Others	11	2.2
Total	483	100

B. Courses Initially Given by the University

Course initially given by University	Frequency	Percent (%)
Med. Lab. Sci.	339	70.1
M. B. B. S	13	2.5
Vet. Med.	10	2.1
Chempur/App	27	6.0
Comp. Sci.	15	3.1
Biochem	14	3.0
Pharm. Sci.	9	1.7
Nursing Sci.	2	0.4
Others	54	11.1
Total	**483**	**100**

C. Change of Course to Med. Lab. Sciences

Change of course	Frequency	Percent (%)
Change To Med. Lab. Sci.	144	29.8
Accepting Med. Lab. Sci.	339	70.2
Finally	483	100
Total	**483**	**100**

MED. LAB. SCI. = Medical Laboratory Science, M. B. B. S. = Medicine and Surgery, PHARM SCI. = Pharmaceutical Sciences, BIOCHEM. = Biochemistry, NURSING SCI. = Nursing Science, CHEMPUR/APP. = Chemistry Pure and Applied, COMP SCI. = Computer Science, VET MED. = Veterinary Medicine.

The most interested laboratory in ranking order: Hematology/Blood Transfusion Science followed by Medical Microbiology, Chemical Pathology, Immunology and finally Histopathology.

Table 5. Student's interest on the areas (Specialty) of medical laboratory sciences

Specialty	Frequency	Percent (%)
Haematology/BTS	167	34.6
Medical Microbiology	101	20.9
Chemical Pathology	88	18.2
Immunology	66	13.7
Histopathology	61	12.6
Total	**483**	**100**

BTS. = Blood Transfusion Science

This table revealed that almost half of 300L have interest on Haematology followed by 200L, 100L, 400L while 500L shows the least interest on Haematology.

The levels of awareness between the students in the classes were compared and the junior classes (100 and 300l) were shown to be more enlighten about the profession of Medical Laboratory Sciences as shown in Table 6.

The results of this table indicated that there was no significance different ($p > 0.05$) between the gender in the consideration of medical laboratory sciences profession.

4. DISCUSSION

The main objective of Medical Laboratory Sciences program is to train competent clinical laboratory personnel to meet present and future needs of the health care services. The demand for allied health professionals; laboratory technologists, physiotherapists, and respiratory therapists is increasing globally. In order to meet these demands and challenges, institutions must do their best to structure curricula and design new training programs to meet the health needs of hospitals and clinical services in the country. It is useful to study the attitudes of students towards the profession of Medical Laboratory Sciences programs and educational needs to help in the implementation of changes for the best possible improvements [8].

Four hundred and Eighty-three students (100L – 500L) comprising 331(68.5%) male and 152(31.5%) female in the Faculty of Medical Laboratory Sciences of Usmanu Danfodiyo University, Sokoto were recruited for this study as shown in the Table 1 above. Of the 483 students participated in this study, only 218(45.1%) initially shown interest on Medical Laboratory as their future career, 210(34.5%) of the students have interest initially on Medicine and Surgery (MBBS) while the remaining 55(11.4%) have interest on other courses as indicated in Table 4 above. This study attempted to explore some possible explanations for the

Table 6. Class and specialty comparison of the students among the study population

Specialty (Areas)

Class	HAEM	MEDM	CHEMP	IMMU	HISTO	Total	Percent (%)	X^2	P-value
500L	9	20	19	9	3	60	12.4	2.5	0.073
400L	20	28	9	11	2	70	14.5		
300L	75	29	25	17	16	162	33.5		
200L	34	14	21	16	23	108	22.4		
100L	29	10	14	13	17	83	17.2		
Total	167	101	88	66	61	483	100		

Table 7. Comparison of the level of awareness among the Students based on the levels/class of study

	Awareness		Total	X^2	p-value
	Yes	No			
Levels: 100	59	14	73	6.7	0.151
200	90	18	108		
300	131	31	162		
400	58	25	83		
500	42	15	57		
Total	380	103	483		

Table 8. Gender specific comparison of students interest's in the profession of medical laboratory sciences

		Courses						Others	Total	p-value
		BCH	Comp	MBBS	Medlab	Pharm	Nurse			
Gender	Male	3	5	131	163	17	3	9	331	0.319
	Female	4	4	79	55	7	1	2	152	
	Total	7	9	210	218	24	4	11	483	

BCH = Biochemistry, MBBS = Medicine and Surgery, Medlab = Medical Laboratory Science, Comp = Computer Science, Pharm = Pharmaceutical Science, Nurse = Nursing Science, df = degree of freedom (2), X^2 = chi-Square value = 2.3

discrepancy between having the qualifications for a Medical Laboratory profession and choosing not to pursue employment in the clinical laboratory. This present study agreed with the study done in Saudi Arabia [9], which indicated that a large majority of students surveyed considered careers in medicine as physicians. The potential explanation for the lack of interest in the careers in clinical Medical Laboratory Science could be the mindset that this occupation (Medicine and surgery) is the ultimate or only career that affects patient care, and this may contribute to the small proportion of qualified candidates seeking career in Medical Laboratory sciences. Although, less than half of the students indicated that they would consider a career in Medical Laboratory sciences, most of the students surveyed will not pursue jobs in Medical Laboratory profession [10]. Lack of interest in Medical Laboratory Sciences as a career is also linked to being unfamiliar with the career as shown in Table 7. Simply stated, "How can you be interested in something you know nothing about"? Certainly, the low visibility of the Medical Laboratory Science professionals has contributed to the public's ignorance of the profession, but it is surprising that science students at the college level are unaware of the field of Medical Laboratory Sciences [11]. It stands to reason that students with a strong interest in being involved with patient care may consider a career in Medical Laboratory Science, if they were exposed to the technical skills required of this profession [12].

Student's awareness about a program plays an important role in the choice of their future careers [13], in this study, 380 (78.7%) of the students have ideas on the profession of Medical Laboratory while the remaining 103 (21.3%) have no ideas about the profession. Our study is in variance with the study done in Saudi Arabia [14], which revealed that many students were unaware of the profession of Medical Laboratory Sciences. This could also be linked to the facts that many students considered MBBS as the ultimate or only career that affects patient care.

This study also compared the level of awareness between the students based on classes, and the junior classes were shown to be more enlighten about the profession of Medical Laboratory Sciences as also shown in Table 7 but there was no significance difference as p>0.05. This indicated that the level of awareness is increasing day by day from the local to the national levels, from the secondary school science students to the University post graduate students. Gender comparison between the student's interest in considering the career in Medical Laboratory Profession does not show any significance difference (p>0.05) as indicated in Table 8 above. The comparison of students between the initial course applied based on classes does not indicate any significance difference as p>0.05.

This finding study indicated that the most favorite laboratory discipline for training was Haematology/Blood Transfusion Science followed by Medical Microbiology, Chemical Pathology, Immunology and lastly Histopathology. It emerged after many discussions with the students of Medical Laboratory Science that they preferred Haematology/Blood Transfusion Science because it allowed them to use their theoretical knowledge to work with their hands and sometimes with automation than the other laboratories. Almost half of the students in 300L have interest in haematology department as shown in Table 6 above. Their responses to questions revealed that they understood that automated technology gave them the opportunity to use their skills in new and challenging ways in order to eliminate mundane tasks. Successful automation and new technologies are very important in the career of Medical Laboratory Sciences [15].

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5. CONCLUSION

This study indicates the majority of Medical Laboratory Science students surveyed in the Faculty of Medical Laboratory Sciences of Usmanu Danfodiyo University wanted to be involved in patient care, specifically Medicine and Surgery. Most of the students considered Medicine and Surgery (MBBS) as their future career. Many Nigerian Universities are now offering careers in Medical Laboratory Sciences; it stands to reason that academia has strong support networks for science students who plan to continue with professional Medical Laboratory Sciences. There are many Professors who are competent in these areas because they themselves have taken this same career path, they should providing mentoring, encourage, support and give guidance to science students to consider Medical Laboratory as their future careers. Offering Medical Laboratory Science courses with an occupational focus does not dilute the science but rather enhances the material through practical application. This will heighten awareness of career opportunity in laboratory sciences and enhance academic and career planning.

CONSENT

All authors declare that 'written informed consent was obtained from the patient (or other approved parties) for publication of this paper and accompanying images.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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QUESTIONNAIRE

Research Questionnaire

Study Title: Students' interest on a particular area (specialty) in the the Profession of Medical Laboratory Sciences in the Faculty of Medical Laboratory Sciences of Usmanu Danfodiyo University, Sokoto, North-Western Nigeria.

Mainasara, Abdullahi, S. currently a Reader in the Department of Chemical Pathology, Faculty of Medical Laboratory Sciences, Usmanu Danfodiyo University, Sokoto. This is a survey study developed to address the knowledge, attitudes and behaviors of students towards the profession of medical laboratory science. You are kindly requested to complete this questionnaire. It is entirely voluntary, and in no way will it have any effect on your grade. This survey is anonymous so I am asking that you do not write your name or any other identifying marks anywhere on this questionnaire. If you should have any question, please feel free to ask.

Please fill or circle or tick your answers to the questions or check boxes provided.

1. Age   ....
2. Sex: Male [ ]   Female [ ]
3. Level/Class……………………..
4. What was your score? ....
5. Course applied for (e.g zoology) ………………………………………..
6. Initial Course given by the University ……………………………………..
7. Any change of course? Yes [ ]   No [ ]
8. If yes, to question 7 above which course?   ……………………………………………
9. Awareness about Medical Laboratory Science before admission: Yes [ ]   No [ ]
10. Is it your choice to study Medical Laboratory Science (MLS): Yes [ ] No [ ]
11. Which of the following area of Medical Laboratory sciences interest you most?

A. Medical Microbiology/Parasitology
B. Haematology/Blood Transfusion Science
C. Histopathology
D. Immunology
E. Chemical pathology