

## Evaluation of the research writing skills of Medical Laboratory Scientists in Nigeria

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### Abstract

**Background:** Medical laboratory scientists (MLS) are known for analysis and documentation of findings from various laboratory requests. Writing up findings from such work could serve in educating health care providers and the management and eradication of causative agents of diseases. They generate a lot of data from the analysis of human and animal samples, but it has been observed that many of them are unable to translate this to research publications. This study was designed to assess the level of awareness of MLS to research paper writing with a view to ascertain difficulties encountered in paper writing.

**Methods:** The study was questionnaire based cross sectional survey of Medical Laboratory Scientists in Nigeria attending a conference.

**Results:** Of the 206 questionnaires administered to MLS, 190 (92.2%) were returned completed. Thus 140 (68%) males and 50 (24.3%) females were studied. Most were between the age range of 31-35(25.2%) while the least were >50 years(9.7%). Majority of the respondents experienced difficulty in statistical analysis(41.3%) while the bench work aspect of research was easier(41.7%). Statistical analysis was mainly done by manual calculation 79(38.3%) while 5(2.5%) analysis was done by combinations of different statistical methods. 15.4% of the male respondents had >5 publications while 5.3% of females had >5 publications ( $P>0.05$ ) The age group >40 years had written more scientific papers when compared with the age group <40 years ( $P<0.05$ ). Respondents who had worked for >10 years had 20.6% publications when compared to those who had worked <10 years ( $P<0.05$ )

**Conclusion:** This work reveals that MLS in Nigeria lack the ability of writing research papers. It also highlights deficiency in training programme and a need for change of orientation of MLS from mere service delivery to value added to data generated from

services. There is need in focused training in the art of scholarly writing.

**Keywords:** Manuscript Writing, Medical Laboratory Scientists, Research, Statistical Analysis

### Introduction

Medical Laboratory Scientists (MLS) play a vital role in the diagnosis, treatment and control of diseases. They are known to be involved with delivering quality enhancement services, which would aid in the achievement of the Millennium Development Goals (MDGs). In the area of research which is geared towards current updates on new trends, applications and procedures for management of various diseases the MLS are key players.<sup>1</sup>

A current development in 21<sup>st</sup> century healthcare is the growing involvement of laboratory science in every day medical practice<sup>2</sup>. Prior to commencing treatment, it is necessary that physicians know the cause of an ailment since management of illnesses without precise diagnosis can be risky<sup>3</sup>. This leaves the medical laboratory scientists with the role of routine investigation of body fluids for possible identification of cause of illness.

Medical research can largely, be divided into two categories the first being evaluation of new treatments for both safety and efficiency also known as clinical research while the preclinical research contributes to the development of new treatments<sup>4</sup>. The Medical Laboratory Scientists in Nigeria are involved with preclinical research, which involves basic sciences. In Europe most preclinical research is pursued by biomedical scientists also known as scientists in African/Nigeria<sup>5</sup>.

Available data in Nigeria indicates that over 8,000 Medical Laboratory Scientists were able to meet the needs of the Nigerian Healthcare sector in 1980 in the area of laboratory diagnosis<sup>6</sup>. With the increasing number of medical laboratory scientists and the emergence of new diseases/infections, it is vital to have well groomed Scientists who will contribute to the eradication of diseases through sustainable research and paper writing based on outcome of assays.

This study was therefore aimed at determining

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the level of awareness of Medical Laboratory Scientists in research paper writing and challenges encountered in writing scientific papers.

**Materials and Methods**

This was a questionnaire based cross-sectional survey on the awareness of Medical Laboratory Scientists in research writing. Self administered questionnaires were distributed to Medical Laboratory Scientists attending the 2011 National Association of Medical Laboratory Scientists Conference held in Makurdi the Benue State capital in September 2012. The questionnaire, in addition to obtaining biometric information, consisted of questions aimed at identifying major obstacles encountered by respondents in their drive towards research paper writing. The administered questionnaire sought to obtain information about sex, age, place of work and work experience of respondents. In addition, questions geared towards obtaining information on statistical method were also included. Different cadres of MLS were enrolled such as MLS on national service and newly graduated MLS with 2 years and 1 year work experience respectively. Other category enrolled were paramount officers who work mainly in ministry of health and are involved with regulation of MLS practice in Nigeria. The senior cadres of MLS are engaged in supervision and performing routine laboratory analysis and collation of results for physicians. Results were expressed as mean values with standard deviation for continuous variables and proportions for categorical variables. Comparison of data was by the student's t-test and chi square analysis as appropriate. Significance level was set at P <0.05.

**Results**

Out of the two hundred and six Medical Laboratory Scientists sampled, only 190 (140 males and 50 females) returned completed questionnaire giving a response rate of 92.2%. The senior cadres of MLS were the most respondents 156 (75.7%) while the least were the paramount officers 13 (6.3%). The characteristics of the respondents are shown in Table 1. The majority of the respondents were between the ages of 31 to 35 years (25.2%).

Most respondents experienced difficulty in the area of statistical analysis (41.3%), while experimentation was an area of most competence (41.7%) as shown in Table 2. When carrying out statistical analyses from data generated from research, 79 (38.3%) would prefer to use manual calculations for analysis while five (0.5%) would utilize combinations that is use of more than one statistical method for generating results (Table 3).

Our work shows that the majority of males (88) had less than five publications and 16 (15.4%) had more than five publications when compared to their female counterparts with 36 (94.7%) having less than five publication and only two having more than five publications (p > 0.05). The age group greater than

40 years had more publications when compared to the age group less than 40 years (Table 4). Also respondents who had worked for more than ten years had more publications when compared with their counterparts who had worked for 10 years (p < 0.05).

Table1: Characteristics of Medical Laboratory Scientists attending a conference

Characte ristics	Number of Respondents	(%)	
Sex	Male	140	68.0
	Female	50	24.3
	No response	16	7.8
	Total	206	100.0
Age group (years)	≤ 30	34	16.5
	31-35	52	25.2
	36-40	38	18.4
	41-45	39	18.9
	46-50	23	11.2
	>50	20	9.7
	Total	206	100.0
Cadre	Assistantship	17	8.3
	Senior	156	75.7
	Paramount officer	13	6.3
	Intern/corper	20	9.7
	Total	206	100.0
Work Place	University	26	12.6
	Teaching hosp.	104	50.5
	Research Institute	24	11.7
	Private sector	33	16
	Ministry of health	14	6.8
	No response	5	2.4
	Total	206	100.0
Work experience (years)	≤ 5	77	37.4
	6-10	41	19.9
	11-15	34	16.5
	16-20	18	8.7
	>20	30	14.6
	No response	6	2.9
	Total	206	100.0

There were a lot of difficulties encountered in the area of statistical analysis by respondents as shown in Table 5. Male and female scientists had 47.1% and 63.7% difficulty in performing statistical analysis respectively. It was also observed that statistical analysis was a major challenge irrespective of the respondents' age.

Table 2: Research areas of competence and difficulty of Medical Laboratory Scientists attending a conference

Area of Research	Area of difficulty N (%)	Area of comfort N (%)
Abstract writing	20(9.7%)	8(3.9%)
Literature review	25(12%)	41(19.9%)
Experimentation	30(14.6%)	86(41.7%)
Results/conclusion/discussion	13(6.3%)	28(13.6%)
Statistical analysis	85(41.3%)	18(8.7%)
Combinations	9(4.4%)	8(3.9%)
No response	24(11.7%)	17(8.3%)
Total	206	206

On the other hand most of the respondents were more confident in the area of bench work as shown in Table 6. There was no difference in areas of comfort with bench work when the sex, age group and work experience were compared ( $P = 0.64, 0.67$  and  $0.74$  respectively). The method of statistical analysis utilized by respondents was mainly manual calculation with few respondents using the Epi Info statistical software package as shown in table 7. There was no association between sex, age group and work experience of respondents and use of statistical software packages ( $p$  values of  $0.49, 0.80$  and  $0.69$  respectively).

Table 3. Methods of statistical analysis utilized by Medical Laboratory Scientists attending a conference

Areas of research	Num.of response	Percentage
Manual calculation	79	38.3
Epi info software	12	5.8
SPSS	36	17.5
Microsoft Excel	35	17.0
Microcal origin 5.0	1	0.5
Stata	1	0.5
Combinations	5	2.5
No response	37	18.0
Total	206	100.0

Table 4. Association between demographic characteristics and number of publications among Medical Laboratory Scientists attending a conference

Characteristics	Number of publication		Total	$X^2$	df	P	
	$\leq 5$	$> 5$					
Sex	Male	88(84.6)	16(15.4)	104(100)	2.576	1	0.109
	Female	36(94.7)	2(5.3)	38(100)			
Age group	$\leq 40$	89(98.9)	1(1.1)	90(100.0)	24.793	1	$< 0.0001$
	$> 40$	44(72.1)	17(27.9)	61(100.0)			
Work experience	$\leq 10$	81(97.6)	2(2.4)	83(100.0)	13.039	1	$< 0.0001$
	$> 10$	54(79.4)	14(20.6)	68(100.0)			

Table 5. Association between demographic characteristics and areas of difficulty in paper writing among Medical Laboratory Scientists attending a conference

Characteristics	Abstract writing	Literature review	Bench work	Results/ conclusion	Statistical analysis	$X^2$	P	
Sex	Male	16(13.4)	13(10.9)	26(21.6)	8(6.7)	56(47.1)	10.09	0.039
	Female	3(7.3)	11(26.8)	3(7.3)	2(4.9)	22(53.7)		
Age group	40	15(13.9)	15(13.9)	16(14.8)	9(8.3)	53(49.1)	3.280	0.512
	$> 40$	5(7.9)	10(15.9)	14(22.2)	3(4.8)	31(49.2)		
Work experience	10	14(13.7)	18(17.6)	12(11.8)	9(8.8)	49(48.0)	9.429	0.045
	$> 10$	4(5.9)	7(10.3)	18(26.5)	4(5.9)	35(51.5)		

## Discussion

This work reveals that the majority of the respondents were between the ages of 31 and 35 years while ages greater than 50 were the fewest in number. Also, most

were of the senior cadre in civil service with 50.5% working in teaching hospitals within the country. According to the US department of labor, 330,600 scientists held different jobs in 2010, with 52% being employed in hospitals, while others worked in diagnostic laboratories and offices this is similar to our findings.<sup>7</sup>

Table 6. Association characteristics of Medical Laboratory Scientists attending a conference and areas of confidence in research paper writing

Variable	Abstract writing	Literature review	Bench work	Results/ conclusion	Statistical analysis	$X^2$	P	
Sex	Male	4(3.3)	31(25.2)	56(45.5)	20(16.3)	12(9.8)	2.506	0.644
	Female	2(4.5)	8(18.2)	24(54.5)	8(18.2)	2(4.5)		
Age group	40	5(4.5)	28(25.0)	49(43.8)	17(15.2)	13(11.6)	1.974	0.740
	$> 40$	3(4.5)	13(19.4)	35(52.2)	11(16.4)	5(7.5)		
Work experience	10	5(4.8)	28(26.7)	46(43.8)	15(14.3)	11(10.5)	2.340	0.674
	$> 10$	3(4.2)	13(18.3)	36(50.7)	13(18.3)	6(8.5)		

Table 7. Relationship between respondents characteristics and methods of statistical analysis

Characteristics	Manual calculation	Epi Info	SPSS	Microsoft Excel	$X^2$	P	
Sex	Male	54(47.8)	7(6.2)	26(23.0)	26(23.0)	2.399	0.494
	Female	16(45.7)	5(14.3)	7(20.0)	7(20.0)		
Age group	40	45(47.9)	8(8.5)	23(24.5)	18(19.1)	0.973	0.808
	$> 40$	33(50.8)	4(6.2)	13(20.0)	15(23.1)		
Work experience	10	43(48.3)	7(7.9)	22(24.7)	17(19.1)	1.444	0.695
	$> 10$	35(50.74)	4(5.8)	13(18.8)	17(24.6)		

The major source of difficulty in writing research paper from this study was statistical analysis using computer-based soft wares. Competence shown in the area of performing various bench work could be linked to their training and involvement with routine laboratory assays. The weakness observed with statistical analysis is not in line with the role of Medical Laboratory Scientists in the United States of America who are known to analyse data and prepare reports for physicians and other medical personnel<sup>8</sup>.

Recent studies by the Knowledge for (K4) Health/Nigeria Continuing Professional Development (CPD) showed that only about half of the Medical Laboratory Scientists in Nigeria have had a formal computer training course with only 10% being comfortable using computers<sup>9</sup>. Since the majority of our respondents used manual statistical analyses that do not require computer use, it therefore suggests that the respondents may not have been exposed to current statistical methods.

The main limitation of this work is the fact that this was a questionnaire based study which is prone to recall bias. In addition, not all MLS were present at

the conference so responses may not reflect the true picture of MLS in Nigeria. However results of this work points out areas where appropriate interventions can be implemented.

Findings from this work imply that MLS would not be competent in writing scientific papers for the international community which is a major setback in health care delivery. In addition, analysis of data generated will be burdensome and tedious for MLS when using the manual method.

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