

Knowledge and Use of Biostatistics among Resident and Junior Doctors at the University of Port Harcourt Teaching Hospital, Port Harcourt

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ABSTRACT

Background: The place of research in the generation of facts and evidence on which contemporary medicine can be based cannot be overemphasized. Medical and surgical research is now more crucial than ever before for advancement of clinical practice and career progression for medical professionals. This requires good understanding and application of biostatistics among clinicians. **Aim:** To assess the knowledge and use of biostatistics among resident doctors at the University of Port Harcourt Teaching Hospital, Port Harcourt. **Subjects and Methods:** This was a questionnaire-based study carried out in the University of Port Harcourt Teaching Hospital. Completed questionnaires were retrieved immediately after completion. The data were entered into an Excel spreadsheet, cleaned, and subjected to statistical analysis. **Results:** There were a total of 109 respondents. Sixty-nine (63.3%) respondents were included in the study. Fifty-five (79.7%) respondents indicated that they understood the basic concepts of biostatistics, and only 16 (23.2%) respondents can apply their knowledge practically in research. **Conclusion:** The level of appreciation and use of biostatistics among resident doctors in the University of Port Harcourt Teaching Hospital is inadequate. This may be a reflection of the situation with resident doctors in other institutions in the country. There is a need for a curriculum review both at the undergraduate and postgraduate levels to prepare medical professionals for the task of high-quality research and advancement of knowledge.

KEYWORDS: Biomedical research, biostatistics, knowledge, resident doctors

INTRODUCTION

Biostatistics is a branch of applied statistics, which is essential in biomedical research, clinical decision-making, and health management.^[1-3] Clinical research, on the other hand, is an important aspect of the professional development of all medical personnel including the resident doctor.^[2] Biostatistics is the bedrock of modern biomedical research, especially with more sophisticated statistical tools being deployed in data analysis in medical journals, as well as development of statistical software with ease of application.^[1,3]

Therefore, inadequate basic statistical knowledge adversely affects research quality, just as inappropriate statistical methods or techniques, and analysis could lead to wrong conclusions, and ultimately harmful to science and humanity.^[3-5] The inadequacy of knowledge

of biostatistics among academic medical doctors became more evident when findings of a survey showed that almost 50% of medical articles have statistical errors.^[3,4] These errors are traceable to heavy reliance on results churned out by the computer without necessarily understanding the concepts, thereby leading to wrong application and interpretation of results. There are indicators that most of the published work on medical statistics in biomedical journals are by statisticians rather than practicing doctors.^[3] Studies have been conducted in other regions to evaluate the proficiency

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of resident doctors in biostatistics.^[4] The results of such studies give direction to policymakers and curriculum planners. However, what is the extent of this problem in our region? At present, surveys on the knowledge of academic medical doctors of biostatistics are virtually nonexistent.^[5,6] There is an obvious need for the planners of the medical curriculum and residency training programs in our region to rise to the occasion. The most effective way to commence is to evaluate the status quo and take a direction from the results to aim at improvement.

Aims/objectives

To assess the knowledge and use of biostatistics among resident doctors at the University of Port Harcourt Teaching Hospital, Port Harcourt.

SUBJECTS AND METHODS

This was a cross-sectional analytical study conducted among resident doctors at the University of Port Harcourt Teaching Hospital in May 2017. The data were collected using a pretested structured questionnaire, which comprised three sections. Section A was to elicit information on biodata and professional status. Sections B and C were to elicit information on knowledge and use of basic statistical tools in research. The first of every two resident doctors who arrived the departmental grand round venue was recruited. We aimed to recruit, at least, 33% of residents in each of the specialist departments. Verbal consent was obtained from each respondent at the point of administration of the questionnaire. The questionnaires were personally administered by the researchers to respondents in the departments of surgery, obstetrics/gynecology, pediatrics, internal medicine, anesthesia, laboratory medicine, ENT surgery, and ophthalmology. Completed questionnaires were subsequently collated and the data were subjected to simple statistical analysis on the Excel spreadsheet.

RESULTS

A total of 109 questionnaires were distributed, but 69 respondents completed them correctly and were included in the study, giving a response rate of 63.3%. The professional status of the respondents is shown in Table 1. They comprised 22 (31.9%) females and 42 (60.9%) males and 5 (7.2%) nondisclosed. The age range of respondents was 20–50 years, and the years of practice ranged from 3 to 20. The specialties of the respondents are shown in Table 2.

Fifty-five (79.7%) respondents indicated that they understood the basic concepts of biostatistics. Twenty-two (31.9%) respondents just knew the definitions. Of these, 26 (37.7%) respondents have

Table 1: Professional status of respondents

Status	Frequency (%)
Registrar	45 (65.2)
Senior registrar	16 (23.2)
Senior house officer	18 (11.6)

Table 2: The specialties of the respondents

Specialty	Frequency (%)
Medicine	15 (21.7)
Obstetrics/gynecology	11 (15.9)
Surgery	14 (20.3)
Anesthesia	10 (14.5)
Ophthalmology	3 (4.4)
ENT surgery	3 (4.4)
Anatomic pathology	5 (7.2)
Chemical pathology	3 (4.4)
Hematology	2 (2.9)
Medical microbiology	1 (1.4)
Oral and maxillofacial	2 (2.9)
Total	69 (100)

ENT: Ear, nose, and throat

a grasp of the concepts, but are unable to apply them practically in research, while 16 (23.2%) can apply their knowledge practically in research.

Thirteen (18.8%) respondents can analyze their research data by themselves, 25 (36.2%) would engage the services of a statistician, and 38 (55.1%) would involve a colleague who has better knowledge of statistics. Nineteen (27.5%) respondents would use manual calculation for their data analysis, 18 (26.1%) Microsoft Excel, 5 (7.2%) Epi Info, 27 (39.1%) SPSS version 20.0 (IBM corp, Armonk, NY, USA) and 4 (5.8%) were not sure of the method they will use.

Sixty-five (94.2%) respondents believed that their knowledge of biostatistics was inadequate; only 4 (5.8%) respondents believed that they had adequate knowledge. Thirty-five (50.7%) respondents indicated that their inadequate biostatistics knowledge was due to insufficient undergraduate exposure, 43 (62.3%) due to inadequate postgraduate exposure to biostatistics, 15 (21.7%) due to lack of resources and funds to encourage research work, and 2 (2.9%) believed that their inadequate knowledge of biostatistics is because they just do not see its value in their practice of medicine.

Solutions suggested by respondents were as follows: 33 (47.8%) more emphasis to be placed on biostatistics in the undergraduate medical curriculum and 50 (72.5%) opined that more workshops, seminars, and conferences be included in the postgraduate training program. Twenty-two (31.9%) respondents suggested that more research fund will encourage medical research.

Two (2.9%) respondents suggested that biostatistics should be left for statisticians.

DISCUSSION

The knowledge of biostatistics among the resident doctors and junior doctors in our centre is inadequate. Though the majority of the respondents understand the definitions of the basic concepts, only a few can apply these concepts practically in research. In terms of data analysis, the majority of the respondents cannot analyze their data independently and would either ask for assistance of another colleague or engage a statistician. This picture brought to light in this study is worrisome, particularly in our region of the world where there is a lot of work to do in terms of research. At present, most of what is known in medical literature in Sub-Saharan Africa derive mainly from data generated by researchers from outside the region. As highlighted in this study, the respondents recognize their lack of proficiency in this field and mostly attributed it to lack of adequate exposure during training both as undergraduates and as postgraduate trainees. This scenario among the young doctors in our center most likely approximates what the situation is with young doctors in other parts of our region. It may also largely explain the quality of scientific research work from our region being considered as mostly poor.

Although this inadequacy of knowledge in biostatistics among residents can be said to have more dire implications in our region where the culture of scientific research is still in its infancy, it is important to note that poor residents' knowledge and use of biostatistics have a global dimension and have been reported in other parts of the globe. Studies in other regions have shown that clinicians including doctors on postgraduate training programs have unsatisfactory biostatistics knowledge and therefore lacked skills in interpreting medical literature.^[3,5-7] This is in keeping with studies done in Europe and the United States; a study at Yale University involving 277 residents in primary care specialties found that residents managed to get only 41% correct answers when tested on their knowledge of statistics and ability to interpret results.^[2,8] Another study conducted among internal medicine teaching faculty at the Mayo Clinic College to evaluate clinician's attitudes toward biostatistics also showed that only 20% of the respondents felt that their biostatistics coursework was adequate for their needs.^[9] Researchers in Greece corroborated the above findings and concluded that a large number of medical residents are unable to correctly interpret crucial statistical concepts that are commonly found in the medical literature and therefore

recommended a formalized systematic teaching of biostatistics during residency training. This is apt because majority of residents could not reinforce their undergraduate training in biostatistics and biostatistics knowledge scores tended to decline with progression through the residency training.^[7] The respondents' perception of the reasons for this situation was that it was related to their training. However, it is interesting to find that a few respondents did not blame their training, but just did not consider biostatistics as what they should know and preferred it being handled by statistician. This is part of the reason some critics think that doctors are usually not motivated to learn anything other than medicine.^[3] Such attitude to biostatistics may stem from the fact that, even at the undergraduate levels, students have not been given enough exposure to it for them to observe the inherent essence of biostatistics in the practice of medicine and development of medical and surgical body of knowledge, and that it is imperative for their career progression in medical practice.^[1,3]

In this study, the majority of the respondents suggested that further training in biostatistics at the postgraduate level was necessary, especially through organized workshops, seminars, and conferences, with demands for institutional or government sponsorship of research to boost proficiency in biostatistics.

We recognize the limitations of this study due to the poor respondent's rate. Only a little above 60% of the shared questionnaires were included in this study. Also being a questionnaire-based study, the element of recall bias may occur. This could contribute to inaccuracies in the data and subsequent conclusion. However, the findings are in sync with the reality we see on ground.

There is an obvious need to lay more emphasis in the area of biostatistics and research methodology generally in the curricula of both the undergraduate and postgraduate medical training in our region. Although the postgraduate training institutions have included such training in the update courses and thesis writing made a necessary requirement for the fellowship examinations in our region, more needs to be done. Individual training centers should have regular seminars and workshops where resource persons well-grounded in this field would take trainees through. Such center-based training for residents with a regular audit to assess the result of such training has been used in some centers in other climes to remarkably improve the proficiency of the resident doctors in biostatistics.^[10,11] As a follow-up on this study, our center will embark on such regular seminar for our trainees, at the end of which we will repeat the study to find out if there will be a positive difference. It is also important that more time is allocated to the training of

undergraduates in this area, not only to enhance their understanding of the basic concepts but also to enable them appreciate the essence and relevance of biostatistics to the practice of medicine.

CONCLUSION

The level of knowledge and use of biostatistics among resident doctors in our center is poor and inadequate. This is mostly related to the inadequacy of their training in this field both at the undergraduate and postgraduate levels as well as lack of funds and resources to encourage and support research work. There is a need for more concerted effort to correct this anomaly. A curriculum review both at the undergraduate and postgraduate levels to prepare medical professionals for the task of high-quality research and advancement of knowledge has become imperative. Individual training centers should have specific training programs in biostatistics for medical students and residents. These trainings should be followed by regular audits to evaluate the effectiveness of such training. The government and policymakers should allocate more resources to support medical research. This will enhance the training of resident doctors and ultimately lead to improved quality of research in our region.

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Conflicts of interest

There are no conflicts of interest.

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