ORIGINAL RESEARCH ARTICLE

ASSESSING UNDERGRADUATE STUDENTS' KNOWLEDGE REGARDING APPLICATION OF BIOSTATISTICS IN RESEARCH AT MEDICAL COLLEGE

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ABSTRACT

Background: Biostatistics is necessary in every stage of research, beginning from planning to till publication. It helps to gain importance scientifically as well as reliable results, while inappropriate use of statistical method and analysis cause harm to science and humanity. This study was aimed to assess the knowledge regarding biostatistics among different undergraduate students at medical college.

Methods: A descriptive cross-sectional study was conducted in Chitwan Medical College among 117 final year students from different stream. Data was collected from 11th May, 2022 to 20st May, 2022. Standardized valid and reliable questionnaire was administered to assess the knowledge regarding application of biostatistics in research. Data was analysed by using software Statistical Package for social Sciences version 25.0. Descriptive statistics was used to calculate frequency, percentage, measure of average, measure of variation and cross tab. Chi-square test and fishers' exact test was used to test the association between level of knowledge and selected variables.

Results: This study included 117 undergraduate students of different health stream aged between 20 to 34 years with average students of Md (Q_3-Q_1)=23 (25-22) years being the most common age. Majority of the students were female 102 (87.2%). Only few 19 (16.2%) had good knowledge and remaining had fair knowledge regarding application of biostatistics in research. There was strongly evidence of statistically significant difference between level of knowledge and age of the students (p=0.001).

Conclusions: This study concluded that only few numbers of undergraduate students had good knowledge and majority had fair knowledge regarding application of biostatistics in research.

INTRODUCTION

Biostatistics is a field of study which deals with collection, organization, analysis and interpretation of data as well as drawing inferences from the collected data. Researcher should be knowledgeable to interpret and communicate the results of the study to the readers. The main purpose of biostatistics is to examine and evaluate nature as well as meaning of the information.[1]

Biostatistics is necessary in every stage of research, beginning from planning to till the end. Biostatistics helps to gain importance scientifically as well as reliable results. In terms of scientific ethics, inappropriate use of statistical methods and analysis cause harm to science and humanity. Misleading results might be received as a result of inappropriate use of statistical methods even though the study is planned carefully. The results are further taken as reference which may to unethical practices.[2]

Good knowledge of biostatistics helps to decide test validity, design research and draw inferences. Without proper knowledge of biostatistics, a health professional may portray catastrophic conclusions from their clinical experience as they lack the concept of appropriate scientific method. At times, health professionals develop anxiety towards biostatistics because of their fear of difficult mathematical formulae. However, these days, biostatistics courses can be conducted without high level of maths.[3]

A growing need of researchers and medical students in the field of biostatistics in unavoidable with the scientific and policy perspectives of future. Problem of medical students in understanding concept of statistics is reported in many studies. A study conducted among dental residents reported that only 29% of the respondents have adequate knowledge of biostatistics.[4]

A study conducted to assess knowledge regarding biostatistics among medicine residents revealed that 41.4% had adequate knowledge. Most of the residents had lack of knowledge in biostatistics.[5]

A study was conducted to assess pharmacy residents'

knowledge regarding biostatistics. Study revealed that biostatistics knowledge score was 47.3%. Overall perception and understanding of biostatistics were poor among pharmacy residents.[6]

The importance of biostatistics in health care is only acknowledged and admired once the users are fully trained in it. In the context of undergraduate students, there is a vast difference concerning the organization of teaching and time assigned for biostatistics instruction in medical colleges around the globe. There are many biostatistical procedures and methodologies that are proved to be useful in medical field.[7]

Biostatistics is being taught as a part of medical curriculum globally. Many studies have revealed low level of knowledge regarding biostatistics among health care students. As students of health care, they need to be equipped with ample knowledge about biostatistics because the error in use and interpretation of the subject may lead to fallacy results. Hence, this study aimed to assess the knowledge regarding biostatistics among different undergraduate medical students.

METHODS

A descriptive cross-sectional research design was used to find out the knowledge regarding application of biostatistics. Total 129 undergraduate students from different stream of health sciences (27 students from BPH, 40 from BSc Nursing, 36 from BNS, 8 from BSc MLT and 18 from B Pharmacy) were included in the study. This Study was conducted in Chitwan Medical College among final year students. Total number of students 117 (23 from BPH, 39 from BSc Nursing, 35 from BNS, 8 from BSc MLT and 12 from B. Pharmacy) were included in this study. All students who were present in data collection period and willing to participate were included in the study. The duration of data collection was from 11th May, 2022 to 20st May, 2022. The ethical clearance was obtained from the institutional review committee of Chitwan medical college (CMC-IRC/078/079-224). Informed consent was obtained, and the study adhered to the tenets of the Declaration of Helsinki. Non-probability, total enumerative sampling technique was used in the study. Standardized valid and reliable questionnaire was administered to the undergraduate students to assess the knowledge regarding application of biostatistics in research.

The obtained data was checked, verified and organized for accuracy, completeness and consistency. Data was analysed by using SPSS version 25.0. Descriptive statistics was used to calculate frequency, percentage, measure of average, measure of variation and Cross tab. Chi-square test and fishers' exact test was used to test the association between level of knowledge and selected variables.

RESULTS

This study included 117 undergraduate students of different health stream aged between 20 to 34 years with average students of Md (Q_3-Q_1)=23 (25-22) years being the most common age. More than two-third 69.2% of the respondents belonged to age group more or equals to 23 years. Majority

of the students were female 102 (87.2%). Majority of students were from nursing stream 74(63.2%) (Table1).

Table 1: Respondents' socio-demographic characteristics n=117

Variables	No.(%)
Age (in Year)	
< 23	36(30.8)
$\geq$ 23	81(69.2)
Median age=23, IQR= (Q_3-Q_1)=(25-22), minimum age =20, maximum age =34	
Gender	
Male	15(12.8)
Female	102(87.2)
Academic Program	
BPH	23(19.7)
BSc Nursing	39(33.3)
BNS	35(29.9)
BSc MLT	8(6.8)
B Pharmacy	12(10.3)
Course hours	
120 hrs.	23(19.7)
60 hrs.	8(6.8)
25 hrs.	86(73.5)

Table 2: Respondents' level of knowledge regarding biostatistics   n=117

Level of knowledge	No.(%)
Good knowledge	19(16.2)
Fair knowledge	65(55.6)
Poor knowledge	33(28.2)

N.B: Cut-off value for level of knowledge: Good knowledge $\geq$ 60%, Average knowledge = 40%-60% & Poor knowledge < 40% of the total score

Table 2 showed that among 117 respondents, only few (16.2%) had good knowledge and remaining had fair knowledge regarding application of biostatistics in research.

Table 3 revealed that the level of knowledge according to the stream involved by the undergraduate students. In cross tabulation, Majority (68.4%) of the respondents from BSc nursing had good knowledge regarding application of biostatistics in research than others.

Table 3: Cross tabulation of respondents' knowledge level and stream   n=117

Variable	Level of Knowledge		
Stream	**Good No.(%)**	**Average No. (%)**	**Poor No.(%)**
BPH	4(21.1)	16(24.6)	3(9.1)
BSc Nursing	13(68.4)	26(40.0)	0(0.0)
BNS	0(0.0)	11(16.9)	24(72.7)
BSc MLT	2(10.5)	4(6.2)	2(6.1)
B. Pharm	0(0.0)	8(12.3)	4(12.1)
Total	**19(100)**	**65(100)**	**33(100)**

Table 4: Association between level of knowledge and selected variables n=117

Variables	Level of knowledge			χ²	p-value
	Good No.(%)	Average No.(%)	Poor No.(%)		
Age (in Year)					
< 23	9(25.0)	25(69.4)	2(5.6)	13.721	**0.001**
≥ 23	10(12.3)	40(49.4)	31(38.3)		
Gender					
Male	2(13.3)	8(53.3)	5(33.3)	0.324	0.929#
Female	17(16.7)	57(55.9)	28(27.5)		
Course hours					
120 Hrs	4(17.4)	16(69.6)	3(13.0)	4.334	0.346#
60 Hrs	2(25.0)	4(40.0)	2(25.0)		
25 Hrs	13(15.1)	45(52.3)	28(32.6)		

Level of significance at α = 0.05, # = Fishers' exact test

Table 4 showed the association between level of knowledge regarding application of biostatistics and selected variables. There was strongly evidence of statistical significant difference between level of knowledge and age of the students (p=0.001)

DISCUSSION

This descriptive cross sectional study was conducted in Chitwan Medical College among 117 final year students of BPH, BSc Nursing, BNS, BSc MLT and B Pharmacy. Present study shows that more than half (69.2%) of the respondents belonged to age group more or equals to 23 years. Majority (87.2%) of the respondents were female. One third (33.3%) of the respondents were from BSc Nursing program. Almost three fourth (73.5%) of the respondents appeared partial exam (no separate paper exam) for biostatistics.

In the present study, more than half (55.6%) of the respondent had fair knowledge, 16.2% had good knowledge and 28.2% had poor knowledge regarding application of biostatistics. This finding is supported by the study conducted by Windish DM, Huot SJ & Green ML where overall correct percentage on statistical knowledge and interpretation of results was 41.4%.[5] Another study conducted by Bookstaver PB et al. also showed knowledge score 47.3%.[6] In this study, overall knowledge regarding biostatistics among undergraduates is not adequate. This might be due to inadequate learning hour allocated in curriculum, perceived biostatistics as difficult subject, lack of application of subject knowledge in to practice, lack of evidence based practice, insufficient human resources in particular field etc.

All the students of selected programs study application of biostatistics in their syllabus and are involved in individual research work. However, In comparison to other programs, BSc Nursing students had more knowledge on application of biostatistics because they had received sufficient guidance and support from nursing research teachers, research supervisors, nursing research department and nursing thesis committee in a structured way.

In this study, Good knowledge was seen more in age group less than 23 years and level of knowledge was significantly associated with age among undergraduate students. Young people had more knowledge regarding the application of biostatistics in research.

CONCLUSION

Study concluded that majority of the respondents had fair knowledge regarding the application of biostatistics in research. Among five different programs, BSc Nursing students had more knowledge of application of biostatistics. Statistically significant relationship was seen between knowledge regarding the application of biostatistics and age of the respondents. Further, multicentre studies should be conducted in large scale to generalize the findings.

CONFLICT OF INTEREST: None

FINANCIAL DISCLOSURE: None

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