

## **Students' opinion regarding application of Epidemiology, Biostatistics and Survey Methodology Courses in medical research**

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### **Abstract**

**Objective:** To assess students' opinion regarding the application of Epidemiology, Biostatistics and Survey Methodology courses in medical research.

**Methods:** A cross-sectional study was conducted to assess the opinion of the third and fourth year students regarding the relevance of Epidemiology, Biostatistics and Survey Methodology courses, which are taught in the first two years, to medical research through a pre-tested, self administered questionnaire. The questionnaire was filled by 126 students of third and fourth year MBBS through convenience sampling.

**Results:** The majority (76%) of the students agreed that the Epidemiology, Biostatistics and Survey Methodology courses were relevant in the first two years of MBBS curriculum. Epidemiology and Survey Methodology were termed as most useful courses for critical reading sessions, literature review and medical writing. No significant difference was observed in the opinion of third and fourth year medical students ( $p > 0.05$ )

**Conclusion:** Research methods courses conducted in the first two years of MBBS are considered relevant and useful by the medical students. The application of these courses should be encouraged by involving the students in research projects during their undergraduate years (JPMA 59:307; 2009).

### **Introduction**

Evidence based scientific knowledge and research is an integral part of medicine.<sup>1</sup> The evolving medical sciences necessitates that research methodology should be made fundamental in undergraduate medical curriculum. Research in the early years of medical school not only enables the students to develop critical appraisal skills,<sup>2</sup> also encourages them to pursue their career in Basic medical sciences or clinical research.<sup>3</sup>

Research activities in Pakistan are still in their preliminary stages and the field of Medicine is no exception. The students are not oriented with medical research writing in their undergraduate years, although it is made compulsory for post-graduation studies. This has resulted in a serious dearth of physician scientists in Pakistan<sup>4</sup> and one of the major reasons cited is the insufficient teaching of scientific research methodology during undergraduate training.<sup>5</sup> Encouraging and motivating students' research activity has been recommended to benefit developing countries for achieving self-reliance in health care and research.<sup>1</sup>

Throughout history, physicians are considered as scientists with a critical mind. Advances in the field of Medicine are very rapid and the information technology boost has made it more readily available. It is high time that research methodology should be included in the undergraduate medical curriculum to facilitate the doctors understanding of published medical literature.<sup>6,7</sup> The critical appraisal of research articles

and medical writing require knowledge of Epidemiology, Biostatistics and Survey Methodology.<sup>8</sup> The principles of scientific research are rarely taught at medical schools in a comprehensive way<sup>9</sup> and the opinion of students regarding science and research is seldom assessed.<sup>10</sup>

### **Methodology**

Since the inception of the Medical College in 1996 at Ziauddin University, the Community Health Sciences Department has been conducting Epidemiology, Biostatistics and Survey Methodology courses in the first two years of the MBBS curriculum. The next two years involve exposure to the community in the form of field visits and family assignments, accompanied by critical reading of medical literature. From the academic year 2006-07 a module on Research Methodology has been formally introduced in the curriculum of third year medical students. The students are required to submit their synopsis for their research project by the end of the third year and the final report will be completed at the end of fourth year. The current fourth year students have undergone the same courses during their curriculum but were not required to submit a research project as part of their final evaluation. In the year 2007, survey was conducted to assess the opinion of students studying in third year and fourth year regarding the relevance and application of Epidemiology, Biostatistics and Survey Methodology courses to medical research.

There are a total of 139 students in the two classes, 65 in third year and 74 in fourth year. A pre-tested self-administered

questionnaire was used for data collection to assess the opinion of students regarding the different courses related to medical research. The students were asked to give their opinion about the usefulness and relevance of these courses with regards to the reading and writing of articles. Informed verbal consent was obtained from all participating students.

The survey was conducted through group administration for the two classes in separate sessions. The students were briefed about the purpose of study and after completing the questionnaire they were required to submit it in a box to ensure confidentiality and validity of their responses.

Data entry and analysis was done using computer software "SPSS" version 10. Frequencies / percentages have been presented for categorical variables. Chi-square test was used to compare the opinion given by students of the two years regarding relevance of various statistical modules to research methodology. A p-value <0.05 was considered statistically significant.

## Results

A total of 126 (90.6%) students, out of 139, filled the questionnaire. The respondents comprised of 49 (39%) males and 77 (61%) females in the two classes. Almost all the students have attended the Descriptive Epidemiology and Basic Biostatistics modules. Analytical Epidemiology module was attended by 123 (97%) students while 118 (94%) attended the Inferential Biostatistics and Survey Methodology modules. Only 50 students from third year MBBS attended the SPSS module as it was introduced recently.

Regarding the relevance of different statistical courses taught in first two years of MBBS as shown in the Table, 123 (58%) students considered Analytical Epidemiology as the most relevant, followed by Survey Methodology by 119 (56%) students. Descriptive Epidemiology and Basic Biostatistics courses were graded relevant by 125 (54%) and 126 (53%) students respectively. Inferential Biostatistics was deemed relevant by only 118 (48%) students. Fifty (81%) medical students from third year considered SPSS relevant to the curriculum.

Majority of the surveyed medical students strongly agreed (n=96, 76%) to teaching of Biostatistics and Epidemiology in the first two years of MBBS curriculum. The utility of these courses in the students' opinion was most for passing the exams (n=83, 66%) and least for critical reading (n=28, 22%), while 18 (14%) students were indecisive about how to make use of these courses.

Critical reading sessions were attended by 93 (74%) students, out of which 63 (68%) were from fourth year. Regarding the relevance of these courses to critical reading, 48% students regarded Descriptive Epidemiology and Basic

**Table: Opinion of medical students regarding Relevance and Usefulness of the Statistical courses in Research.**

Relevance of Courses to Critical Reading						
	Relevant		Neutral		Not Relevant	
	n	%	n	%	n	%
Descriptive Epidemiology n = 93	45	48.3	28	30.1	20	21.5
Analytical Epidemiology n = 92	43	46.7	32	34.7	17	18.4
Basic Biostatistics n = 93	45	48.4	30	32.2	18	19.4
Inferential Biostatistics n = 86	40	46.5	27	31.4	19	22.1
Survey Methodology n = 89	40	45	26	29	23	26
Usefulness of Courses in Reading Research Articles						
	Useful		Neutral		Not Useful	
	n	%	n	%	n	%
Descriptive Epidemiology n = 99	47	47.4	35	35.3	17	17.3
Analytical Epidemiology n = 99	46	47	33	33	20	20
Basic Biostatistics n = 99	46	47	36	36	17	17
Inferential Biostatistics n = 94	37	39.4	36	38.2	21	22.3
Survey Methodology n = 98	49	50	31	32	18	18
Usefulness of Courses in Writing Research Articles						
	Useful		Neutral		Not Useful	
	n	%	n	%	n	%
Descriptive Epidemiology n = 59	34	58	12	20	13	22
Analytical Epidemiology n = 59	30	51	17	29	12	20
Basic Biostatistics n = 59	26	44	19	32	14	24
Inferential Biostatistics n = 56	27	48	20	36	9	16
Survey Methodology n = 58	45	78	10	17	3	5
SPSS n = 48	29	60	10	21	9	19

Biostatistics most relevant (Table). This was followed by 47% relevance for analytical Epidemiology and Inferential Biostatistics, 45% students found Survey Methodology relevant to critical reading sessions.

Eighty eight students (70%) read medical journals only once in three months, while 27 (21%) said that they have never read an article in a medical journal, and only 11 (9%) students read research articles at least once in a month. Of the 99 students who ever read medical journals, Survey Methodology course was regarded as the most useful by 49 (50%) students. This was followed by Descriptive Epidemiology by 47 (48%) and analytical Epidemiology and

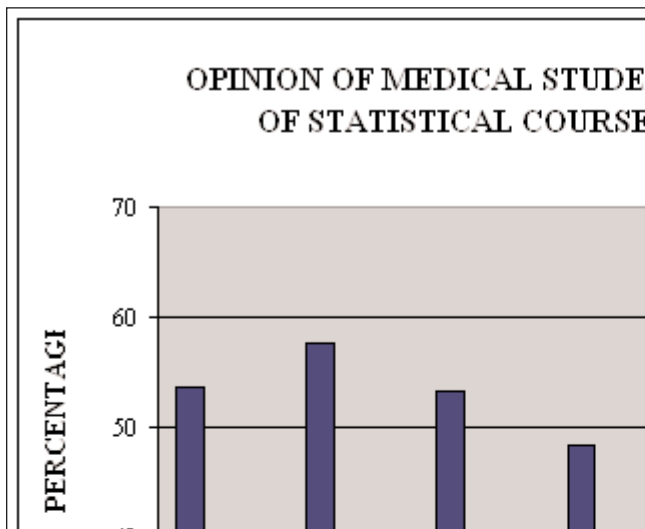


Figure: Opinion of medical students regarding Relevance of the following courses in the MBBS curriculum.

Descriptive Biostatistics by 46 (47%) respectively. Inferential Biostatistics was found to be useful by only 37 (40%) as shown in Table.

There were 59 (47%) students currently involved in research writing, of these 51 were from third year. When asked about the utility of these courses in research writing, on a scale of 1 to 5, 45 (78%) deemed Survey Methodology course as most useful, followed by SPSS (n=29, 60%) and Descriptive Epidemiology (n=34, 58%). Basic Biostatistics with 26 students (44%) was rated as the least useful while analytical Epidemiology (n=30, 51%) and Inferential Biostatistics (n=27, 48%) rated as neutral on the given Likert scale.

In response to ever attending any workshop in research methodology, only 16 (13%) had attended one outside Ziauddin University.

## Discussion

Majority of the students showed a positive response regarding relevance of different modules to the MBBS curriculum with Epidemiology being the most relevant. The reason might be that Epidemiology is related to disease and its occurrence in a defined population. This was followed by Survey Methodology and Biostatistics. The students strongly agreed towards teaching of these courses in the first two years of MBBS. The results of a study conducted in United Kingdom in 2001, regarding medical students' perspective on the teaching of medical statistics in the undergraduate medical curriculum emphasized that Biostatistics should be taught early in the curriculum, but there is a need to reinforce such skills throughout the graduating years.<sup>11</sup>

In another study from Faisalabad, the majority of the

medical students consented that the medical research can influence the way medicine is progressing.<sup>12</sup> A study conducted in Zagreb University, Croatia also showed a positive attitude about science and scientific research in medicine among students.<sup>2</sup>

The students took these courses as a mandatory requirement, yet majority concluded that the courses were useful for reading and writing research articles. This reflected a positive attitude towards the application of these courses in medical research.

Critical appraising skills of students were enhanced by regular critical reading sessions in third and fourth year MBBS course. Majority of the students participated in these sessions, as they were interactive and graded. The students viewed Epidemiology and Biostatistics courses as most useful for critical appraisal. These sessions have been advocated as a bridge between research and practice, hence facilitating better evidence based medicine.<sup>13,14</sup>

When enquired about reading research articles, a small number of students were regular readers. This finding was similar to the Faisalabad study where majority rated highly the importance of reading current literature, while only a few actually read journals.<sup>12</sup>

Students involved in research activities were mainly those who were doing it as part of their project in Research Methodology. Similar results were found in a study at the Aga Khan University, where students took part in research activities in fourth and final year after studying Epidemiology, Biostatistics and research methodology in the first two years of MBBS.<sup>15</sup> In addition, an international study has also shown that mandatory participation in research activity improves students' knowledge and attitudes towards research.<sup>16</sup>

Since the study was conducted on the students of a single institute, therefore the results could not be generalized. One major limitation of this study was the comparison group, which should also have involved the final year students and internists in order to assess their views regarding lack of formal training in research methods.

## Conclusion

This study concluded that courses pertaining to research conducted in the first two years of MBBS were relevant and useful for the graduating medical students. The application of MCSC courses should be encouraged by involving the students in research projects during their undergraduate years.

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