Do Taught Courses on Community Medicine Change Knowledge Status Regarding Clinical Epidemiology and Biostatistics in Medical Students?

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This study aimed to explore the changes in medical student's knowledge and attitudes regarding clinical epidemiology and biostatistics (CEB) after community medicine (CM) taught courses. All the 3rd (before CM-taught courses) and 4th year (after CM-taught courses) undergraduate students of Dhaka Medical College, Bangladesh, were given a questionnaire concerning some introductory level problems on CEB and attitudes towards them. Mean knowledge scores were not statistically different between these two groups: 3.70 and 3.85 (out of 9) on clinical epidemiology; 0.20 and 0.18 (out of 4) on biostatistics; and 3.91 and 4.04 as a total (out of 13) among them, respectively. Most of the 3rd and 4th year students agreed that CEB is essential for smooth understanding of clinical medicine and journals, and asserted to include it in CM-taught courses. Since the current CM-curriculum does not offer any improvement of knowledge among them, well-planned taught courses on it should be included as a component of CM. J Epidemiol, 2000; 10: 188-190

INTRODUCTION

A background on clinical epidemiology and biostatistics (CEB) is most essential to medical students to help them understand and interpret the quantitative data which they frequently meet. CEB is widely used in patient's diagnosis and prognosis, effectiveness of treatment, development of new drugs, diagnostic procedures, medical research, and for uncovering the causative factors of diseases. Thus, it has become an essential component of undergraduate and postgraduate medical education in many developed and developing countries. Neither clinical nor preventive medicine is understood well without it. In Bangladesh, however, there is no formal course on CEB in the undergraduate curriculum. At present it is being taught at a substantially very introductory level within community medicine (CM) courses. This study was conducted to assess the changes in knowledge and attitudes on CEB among the medical students after CM-taught courses.

THE SURVEY

During June, 1998, a questionnaire was delivered to the 3rd and 4th year medical students of Dhaka Medical College, Bangladesh, in their respective lecture classes without any prior information. Since CM-taught courses begin in 3rd year and end-up in 4th year of undergraduate course, the former group was selected to assess baseline knowledge on CEB and the latter group to find any change of knowledge after taught courses. During this survey, courses on CM have just been started for 3rd year students and almost have been finished for 4th year students. The response rates were 94.6% and 89.9% for 3rd and 4th year students who were present in lecture classes, respectively. In addition to demographic features, 13 introductory level multiple-choice and open questions regarding knowledge on CEB, and 2 questions about attitudes towards CEB, were included in the questionnaire. Among 13 CEB items in the questionnaire, 9 questions were related to clinical epidemiology (calculation of incidence/prevalence/survival/case-
fatality/relative risk rates, calculation of false-positive, true-positive, sensitivity, and specificity from 2x2 table) and 4 questions related to biostatistics (p value, t-test, chi-square test, and type of data). A summary score was elicited from these 13 questions, assigning 1 point to each correct response and 0 to each incorrect response.

Mann Whitney U test and chi-square test were used to compare continuous and categorical variables, respectively. A two-sided p value of 0.05 was used as the criterion for statistical significance. All tests were conducted using statistical software SPSS 9.0 for the Windows.

RESULTS

Demographic features of medical students are summarized in Table 1. Distribution of male and female students was not statistically different between 3rd and 4th year students. Mean knowledge scores among the 3rd and 4th year students were not significantly different after CM taught courses: 3.70 vs 3.85 (out of 9) (p=0.72) on clinical epidemiology; 0.20 vs 0.18 (out of 4) (p=0.82) on biostatistics; and 3.91 vs 4.04 as a total (out of 13) (p=0.57), respectively (Table 2). Knowledge scores were not statistically different between males and females in either 3rd or 4th year students.

In regard to attitudes, 85.3% of 3rd year students and 87.0% of the 4th year students mentioned that CEB is essential for smooth understanding of clinical medicine and journals, while 69.3% and 71.8% of them asserted to include it as taught courses. No difference in attitude was observed between males and females in either 3rd or 4th year students.

DISCUSSION

Mean knowledge score was 3.91 among the baseline group (3rd year students). Most of the correct answers, however, were to such simple questions, as calculation of incidence and prevalence rate, survival rate, meaning of false positive test, which could be compiled with high school level mathematics knowledge. Other questions on sensitivity, specificity, p value, t-test, chi-square test, were not replied correctly by most of the students of 3rd and 4th year. Thus, mean score (4.04) remained almost unchanged among the 4th year students even after CM-taught courses. Although the data were taken from one medical school, the results are generalizable for other medical schools since the same courses are being taught in those schools.

Many topics dealt in CEB, for example, description of test performance (sensitivity, specificity, predictive values), choice of diagnostic test, choice of treatment, normal range of clinical values, and relative risk, are clinically relevant. Therefore, CEB training is essential for patient care, too.

CM-curriculum with 130 hours taught courses seems to have many components which are unnecessarily overemphasized (entomology, sanitation, health administration, etc.) and includes very little epidemiology and biostatistics. Students tend to consider it as a burden. Teaching CM is also fragmented, unforesed, and conducted in a didactic way through long lectures with less chance for discussions. The teachers of CM are medical doctors and are trained as CM specialist from a postgraduate institution in Bangladesh. Their number is adequate, but they are not trained well to teach CEB. Actually both undergraduate and postgraduate curriculum of CM are not designed either to learn or to teach CEB.

What remedial measures should be adopted without increasing further the burden of teaching hours on the students? First, thorough evaluation of CM-curriculum is essential to put less emphasis on some components which need not so careful read-

| Table 1. Features of medical students. |
|----------------------------------------|
| Categories                             | 3rd Year Students | 4th Year Students |
| Total number of students               | 151               | 150               |
| Number of participants                | 112               | 99                |
| Number of responses                   | 106               | 89                |
| Response rate                         | 94.6%             | 89.9%             |
| Average age (yr)                      | 21.9              | 23.0              |
| Sex                                    |                   |                   |
| Male                                   | 61.7%             | 59.0%             |
| Female                                 | 38.3%             | 40.9%             |

| Table 2. Knowledge and attitudes on clinical epidemiology and biostatistics in 3rd and 4th year medical students. |
|------------------------------------------------------------------------------------------------------------------|
| Categories                                                         | 3rd Year Students | 4th Year Students |
| Knowledge scores:                                                  |                   |                   |
| Clinical epidemiology *1                                            | 3.70              | 3.85              |
| Biostatistics *                                                     | 0.20              | 0.18              |
| Total *                                                            | 3.91              | 4.04              |
| Attitudes:                                                         |                   |                   |
| (1) Is CEB required for learning clinical medicine                  | Yes               | 85.3%             | 87.0%             |
| and reading medical journals?                                       | No                | 12.7%             | 10.6%             |
| (2) Should it be included in taught courses?                       | Not sure          | 2.0%              | 2.4%              |
| Yes                                                                | 69.3%             | 71.8%             |
| No                                                                 | 25.2%             | 22.3%             |
| Not sure                                                           | 4.9%              | 5.9%              |

*1 out of 9
* out of 4
* A out of 13
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And these topics should not be evaluated in official examination. Present evaluation procedures which compel students to memorize long definitions and essay-type topics, should be replaced by multiple-choice-questions. To enhance students' problem-solving skill which is a prerequisite to learn CEB, passive form of learning through long lectures should be replaced by small group sessions leaving enough opportunities for questions, discussions, and problem-solving exercise.

Second, CEB should be blended with CM along with showing the ways to bridge clinical medicine and CEB. Third, research methodology should be integrated with CM-curriculum, as suggested. Fourth, already appointed faculty members of CM should be oriented to CEB and research methodology through short courses. Fifth, postgraduate course on CM should also be redesigned to produce well-trained teachers in the future. All these measures, if implemented, would foster a research mind among medical students, which in turn would contribute to better clinical and preventive care.

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