Teaching conceptual vs theoretical statistics to medical students

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1. Introduction

The success of the current medical statistics courses is questionable since medical practitioners are, after being taught at least a one semester course in statistics, still totally intimidated by the idea of statistics. This is not only a South African phenomena, but was already investigated by Wakeford (1980) in the UK.

In order to find reasons for this lack of statistical knowledge, we need to address questions regarding the timing, content, teachers and quality of lecturing of the course.

2. Timing

Undergraduate medical students all get statistical teaching when few of them want it (Peters 1990). Most teachers agree that the statistics course should be taught in the clinical years, but due to time constraints this is not possible and has to be taken as a constraint.

3. Content

Appleton (1990) suggests that the teaching should be targeted at the majority, namely those students who will end up not doing research. He also thinks the traditional teaching of statistical tests should be abandoned and a basic introduction to quantitative thought should be provided. Students should be taught the new language of statistics for the understanding of literature and communication with statistical consultants. They must learn to ask the right type of questions, rather than to apply recipes of mathematical methods.

Students cannot learn in a six months course to analyse a data set eight years later on completion of their studies. Healy (1985) insists and Newcombe (1990) agrees that a few important concepts should be taught rather than a multitude of analytical methods. Clayden (1990) stated that theoretical courses risk losing contact with medical students who came to medical school to become doctors, not statisticians.

Data used in examples should be relevant to the students' frame of reference and current medical journal articles should be used to illustrate appropriate and inappropriate use of statistics. The way of examining should be adjusted to test insight and not knowledge.

Since medical decision making depends on statistical considerations, course content should be aimed at making students better clinicians. Doctors need to understand and critically assess medical literature and not necessarily perform statistical tests.

4. Teachers and quality of lecturing

Since the student in the first semester of medical studies is in a "vacuum of medical knowledge", the teacher should be able to provide the student with a frame of reference, therefore the teacher should have knowledge of the medical literature. Using this knowledge the teacher's first task

must be to give the student vision for the usefulness of statistics in his future profession.

Unfortunately the lecturing of service courses is often left in the hands of junior lecturers, while the more challenging mathematical courses are taught by the experienced lecturers. This often results in a disinterested teacher in a "medical vacuum" teaching students who are also in a "medical vacuum" trying to pass a course they see no purpose for in the profession.

5. Conclusion

In order to interest medical students in statistics, substantial change in the method of teaching is needed. Moore (1998) argues that statistics is a liberal art. I would strongly advocate that statistics should be taught to medical students as such.

Rather than teaching formal definitions, define methods from relevant journal articles and assess the appropriateness of the statistical tests that were performed. Text books as well as traditional teaching work from theory to example. For a service course, where the students' primary interest is the application, I suggest working the other way round. First get them interested in the application, then work to the theory (if necessary).

Consensus was established that the main aim is to instil concepts rather than numerical skills (Newcombe 1990). This is not done. The only reasons I can find for this phenomena are that teachers either do not understand which knowledge doctors need or it is too much trouble to adjust our style of teaching to the medical student's needs.

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L'ENSEIGNEMENT DE LA STATISTIQUE CONCEPTUELLE VS THÉORIQUE AUX ÉTUDIANTS EN MÉDECINE

C'est proposé que la façon d'aborder l'enseignement de la statistique aux étudiants en médecine preclinique a été généralement faux. Cet cours de service doit concentrer sur aider les médecins à l'interprétation des mesuraet à faire l'évaluation critique de la littérature médicale. On est en faveur de l'enseignement de la statistique conceptuelle plutôt que théorique.