Context

Adequate knowledge of anatomy, with strong emphasis on ‘understanding’ rather than ‘knowing’, and the acquisition of essential anatomical skills such as the power of observation, identification and interpretational abilities, are considered crucial for effective and safe clinical practice (Abu-Hijleh et al 1995; Boon et al 2002; Heylings 2002). The recent review paper by Louw et al. (2009) addressed these important features in teaching anatomy through the principles governing modern medical education. We present here one example of how such principles could be practically applied.

The College of Medicine and Medical Sciences (CMMS) at the Arabian Gulf University (AGU) has followed a problem-based, student-centered, community-oriented curriculum since its inception in 1982. The six-year curriculum is organised into three phases: premedical (one year), pre-clerkship (three years), and clerkship (two years). While the subject of anatomy is covered sequentially during all three phases of the curriculum, the bulk of it is taught in the pre-clerkship as an integrated component of problem-based, organ-system units involving basic medical and clinical sciences (Abu-Hijleh et al 2004).

Until 2002, the Department of Anatomy at AGU carried out its teaching-learning activities mostly through needs-based interactive sessions, where students scheduled appointments in small groups or individually with two designated faculty members, enabling them to focus on difficulties encountered in learning. An appointment lasted for 30-45 minutes and students could decide the topic or demonstration needed to discuss or see in relation to the learning objectives that emerged during small group (PBL) tutorials. The visual nature of anatomy instruction created a continuous demand on faculty for demonstrations in gross anatomy and histology. While these activities took place during each unit, the manner in which they were presented was somewhat random and often lacked order or standardisation. This fact, compounded by a steady increase in the number of medical students admitted over the years, led to the realisation that a different strategy of supporting anatomy learning was necessary. A standardised learning activity called ‘Structured Problem-Related Anatomy Demonstrations’ (SPRAD) was proposed and implemented for the first time in 2002, to replace the previous system of individualized teaching activities (Abu-Hijleh et al 2005).

Activity

‘SPRAD’ consist of a regularly scheduled, compulsory, weekly sessions pre-conceived for students in years 2, 3 & 4 of the medical program. Students in each year, currently ranging from 115-140 per year, are divided into two groups (A & B) and each group is allocated a 2-hour session per week, conducted in the Anatomy Museum/Dissecting Room.
and adjoining Histology Laboratory. Students within a group in any session are further distributed into five smaller sub-groups of 10-14 and rotate sequentially through a series of 5 stations. One faculty member from the department facilitates each station throughout the session. Each student subgroup spends 20 minutes at a given station. Depending on the nature of the weekly problem and the related identified learning needs, a wide range of anatomical material is available to select from, to deal with a specific aspect within the discipline (Gross, Radiological, Microscopic, Developmental or Living Anatomy). Thus, the material used at a station may include: skeletal parts, plastic models, prosected wet cadaveric and plastinated specimens, histological slides, and imaging films (radiographs, CT scans, ultrasound, MRIs). Very often, one of the stations is designated to assess related surface anatomy on a living subject. In some health problems, stations are devoted to clinical correlation and application. Technical personnel are available to provide necessary assistance, maintain time and ensure smooth transition of student subgroups.

Evaluation

A prototype questionnaire was developed and pilot-tested before it was administered to third-year (n=98) and fourth-year (n=78) medical students at end of the academic year 2002/2003 to determine their perceptions of the new system of SPRAD. The surveys were administered after students had completed all the three PBL units for that respective year. These two student cohorts were selected because they had prior experience with both the old and the new systems of demonstration. Thus they could make objective comparisons between the two systems. The questionnaire consisted of two parts: Part I included eleven closed–ended items, grouped according to their relevance into seven main categories related to learning anatomy through SPRAD namely: organization, knowledge, integration, skills, self-directed learning, self-confidence and overall judgment. Students were asked to select one of five choices (five-point Likert scale) for each item of the questionnaire on which a score of five (5) represents the positive end and a score of one (1) the negative end of the scale. Data were analysed using the statistical package SPSS version 11.5. Part II consisted of three open-ended questions requesting comments on the strengths, suggestions for improvement, and other free comments about the new system. The potential impact of SPRAD on students' performance in the summative end-of-unit examinations in general, and their performance in Anatomy in particular was also measured and compared.

140 of 176 (82%) students completed the questionnaire. In general, the students were positive about their new learning experience. The vast majority of students expressed their ‘overall support’ for continuing the new system (4.54±0.58). The mean scores and standard deviations (±SD) of students’ responses to items related to ‘organisation’ was (3.61±0.55), for ‘knowledge’ was (4.29±0.73), for ‘integration’ was (3.91±0.73), for ‘skills’ was (3.84±0.83), for ‘self-directed learning’ was (3.71±0.78), and for ‘self-confidence’ was (3.81±0.75). The impact of the new method of instruction on students' performance in summative examinations was not found to be statistically significant.

Ninety-three (93) of 140 students provided written comments on Part II of the questionnaire. The strengths or advantages of the new method identified by the students were as follows: (a) well organized (80%), (b) more focused and related to health problems (52%), (c) equity, because all students have equal access to information and resource materials (49%), (d) better time management (43%), (e) better interaction with faculty using wide range of anatomical specimens (40%), and (f) improved understanding of basic and applied anatomy especially with respect to relatively difficult topics such as imaging and developmental anatomy (20%). Suggestions for improvement of the new system included: (a) introduction of special review sessions before each end-unit exams (73%), (b) weighted time allocations for stations (33%), and (c) assurance that students are punctual and adhere to the assigned groups (20%).
Conclusion

The new SPRAD model for teaching and learning of anatomy within a PBL medical program turned out to be feasible, practical, well accepted (by both students and faculty) and effective (fit for purpose). Although performance on summative examinations was not improved significantly, the majority of students found the new approach superior to the previous one with individualised appointments, and expressed their support for continuing the new system. The new method of instruction has several advantages, based on the students’ perceptions and faculty feedback.

A ‘SPRAD’ teaching approach is an effective and efficient way of utilising faculty time and resources, while providing students with a standardised and satisfying learning experience. The sessions are more focused and applicable to weekly problem that further the learning process in terms of practicality and diversity of learning requirements. The scheduling of these structured sessions reflects predictability and convenience to both faculty and students. To faculty, the sessions offer opportunities to plan other academic activities and research. To students, the sessions provide them with opportunities to conveniently plan and undertake further independent learning/studying. The sessions also provide students quality interaction with faculty, creating in the students’ minds a more equitable access to faculty with variable skills, while simultaneously addressing concerns of faculty-student ratio, to some extent. The fixed timing for each station in a session has helped both students and faculty to focus more on the required core concepts and their clinical application.

After seven years from its first introduction in 2002, and through continuous and regular monitoring and feedback, the SPRAD teaching strategy today is still regarded by both students and faculty as a very effective and useful method and continues to represent the principal teaching method of practical anatomy at AGU. Based upon a suggestion by 73% of students to introduce a review demonstration session prior to the end-of-unit examination, a Case-based session has since been introduced. The whole class is organised into ten small groups and each group is given a clinical case scenario with specific questions to discuss among themselves. Each group then presents their interpretation of anatomical facts as applied to the clinical case followed by a general discussion facilitated by faculty from the department of anatomy. A satisfaction questionnaire in response to this activity is currently being analysed and results of preliminarily data are very promising.

As the number of students admitted to medical schools increase worldwide and demand for faculty time increases, a ‘SPRAD’ approach to teaching may prove beneficial for students and faculty, particularly in a PBL setting.

References


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