Students' perception towards the usefulness and satisfaction of practical biochemistry skills in a public university versus private university in Khartoum, Sudan (2019)

Abstract

Practical biochemistry skills (PBS) teaching sessions employ experiential learning techniques to promote medical students' understanding and recall of essential concepts and basic clinical tests. Biochemistry Practical skill sessions constitute about 45% of the contact teaching hours and between 10 % - 20 % of the final assessment grades, in addition the students are unacquainted about the method of assessment used. This cross sectional institutional based study aimed to assess medical students' perception towards the practical biochemistry skills (PBS). Medical students in one public (Al-Neelain) and one private (Al-Moughtarbeen) universities, in Khartoum State were involved. After ethical approval, the questionnaire was approved after using it in a pilot study. Data collected by a questionnaire were analyzed using (SPSS version 22).Private university students have more satisfaction (58% versus 18%, $p<0.001$), more positive perception with PBS (49.5% versus 15.1%, $p<0.001$) and are more convinced that it helps to retain knowledge (68.3% versus 12.9%, $p<0.001$). They are more satisfied with laboratory environment ($p<0.001$), PBS relation to theory ($p<0.001$) and more aware of PBS assessment and scores allocation ($p\leq0.002$).Medical student satisfaction and engagement with Practical biochemistry skills is likely to be driven by the students' awareness of the relevance of these sessions to other aspects of the curriculum, to their end-of-year assessment, and to their future clinical practice rather than the laboratory environment. In conclusion, we recommend updating Practical biochemistry skills contents and assessment methods and raising students' awareness of its importance

Key words: Biochemistry. Practical skills, Perception, Teaching and Assessment.

Introduction

Biochemistry is one of the important basic science subjects that are taught in the pre-clinical phase of the undergraduate medical curriculum. However, many medical students and practicing physicians consider learning biochemistry an unnecessary

burden and that biochemistry has very little relevance to their daily practice of medicine [1]. Practical biochemistry curriculum plays a very essential role in inculcating the basics of clinical medicine in the students. The main purpose of the biochemistry and molecular biology practical curriculum is to justify the selection of appropriate biochemical investigations for common clinical cases and explain the fundamental principles underlying such investigative techniques [2]. Hence the medical schools should organize laboratories in terms of the standard international specifications regarding the environment, equipment, trained staff and curriculum contents.

Minor development has been made in the contents and the assessment methods used in the faculty of Medicine of the public and private universities since their establishment without any further monitoring or evaluation processes.

Biochemistry Practical skill sessions constitute about 45% of the contact teaching hours, and is included in more than one objective in the core competencies of graduating physician included in the Medical schools' curriculum. On the other hand, Biochemistry Practical skills comprise between 10 % to 20 % of the final assessment grades. In addition, the students are unacquainted about the method of assessment as it usually depends on the number of students in each batch and the available resources.

The result of a pilot study showed a growing dissatisfaction among medical students regarding the time allocated for practical biochemistry skills, its efficacy as a teaching tool, and the method of assessment used. Therefore, our study aimed to assess students' perception of the environment, satisfaction and usefulness of practical biochemistry skills as a teaching method and determine their awareness about the assessment method used and the allocated scores in the final exam.

Materials and Methods:

This cross sectional institutional based study aimed to assess medical students' perception towards the practical biochemistry skills (PBS), among public (Al-Neelain) vs. private (Almougtaribeen) medical students using structure-process-outcome model. The study was conducted from January to June in the academic year 2019-2020.

The faculty of medicine of the public university was established in March 1993. The medical curriculum is a traditional one covered in eleven semesters distributed over five phases. The students do not see any patients until they started phase IV and Pre-clerkship. The faculty of medicine and health sciences in the private university started in 2010. It adopted an integrated outcome-based curriculum employing the prescriptive model of curriculum design.The curriculum has four phases covered in 10 semesters. Each phase deals with the scientific foundation of medicine, pathophysiology & the mechanism of disease, pre-clerkship and clerkship respectively.

The same biochemistry curriculum was used in the two institutions.

Different instructors worked to deliver similar courses, both are expertise and well trained.

Study population: Our study intended total coverage of level 2 (semester 4) students, but the response rate was 82% (205 students) and 79.5% (152 students) in Al-Neelain and Almougtaribeen University, respectively, missing questioners were excluded. Therefore, the whole study population was 241 medical students. A questionnaire consisted of 15 closed and one open

question was given to each participant and asked to complete it within 15 minutes. The questionnaire and time required to complete it was approved after performing a pilot study among 15 students from each university.

Ethical approval from the Institutional Review Board of Al-Neelain University was obtained. The students were informed about objectives, method and benefits of the research and their consent to participate was taken.

Data obtained were analyzed using (SPSS version 22). Quantitative data were expressed as mean ± SD, while qualitative variables were expressed as number and percentage. Unpaired T- test, ANOVA test and Pearson's X^2 were used and, p value of ≤ 0.005 was considered significant.

Results:

Private university students perceive Biochemistry Practical Skills as a good method to teach biochemistry in general (49.5% versus 15.1%, $p<0.001$),

including when the knowledge is complex and difficult to retain (68.3% versus 12.9%, *p<0.001*). They were more likely to perceive PBS as "useful'' (*p<0.001*) and related to lecture content (*p<0.00.* The best method for assessment emphasized by public and private university students were spotter and practical respectively p<0.001), Table 1

Private students were more likely to be satisfied with PBS (58% versus 18%, p<0.001) students

and to perceive PBS as "useful'' (89% versus 47%) (p<0.001), Table 1, Figure I

Table 1: Students Perception to teaching and assessment of Biochemistry Practical Skills among Public versus Private) university medical students.

Students' perceptions	Public N=139	Private N=101	P value
The best teaching method %:			
• Lecture	36.3 %	38.6%	
• Tutorials	44.6 %	5.9%	0.000
• Practical	15.1 %	49.5%	
• None	4 %	5.9 %	
Knowledge is difficult to forget and easily recalled			
• Lecture	16%	17.3%	
• Tutorials	54.9%	6.1%	0.000
• Practical	12.9%	68.3%	
• All of them	16 %	8.1%	
Practical session is_related to lecture content	36.2 %	68.4 %	0.000
Students learned useful lab skills	37.6%	76.2	0.000

		%	
Practical provide a visual way of learning	43.7 %	59.5%	0.017
The best method for assessment			
• On paper	36.7 %	30.3%	
• Practical	8.8 %	41.4%	0.000
• OSCAPE	15.4%	18.1%	
• SPOTTER	38.9%	10.2%	
Practical help to practice as a doctor in requesting and interpretation of results	49.2%	83 %	0.000

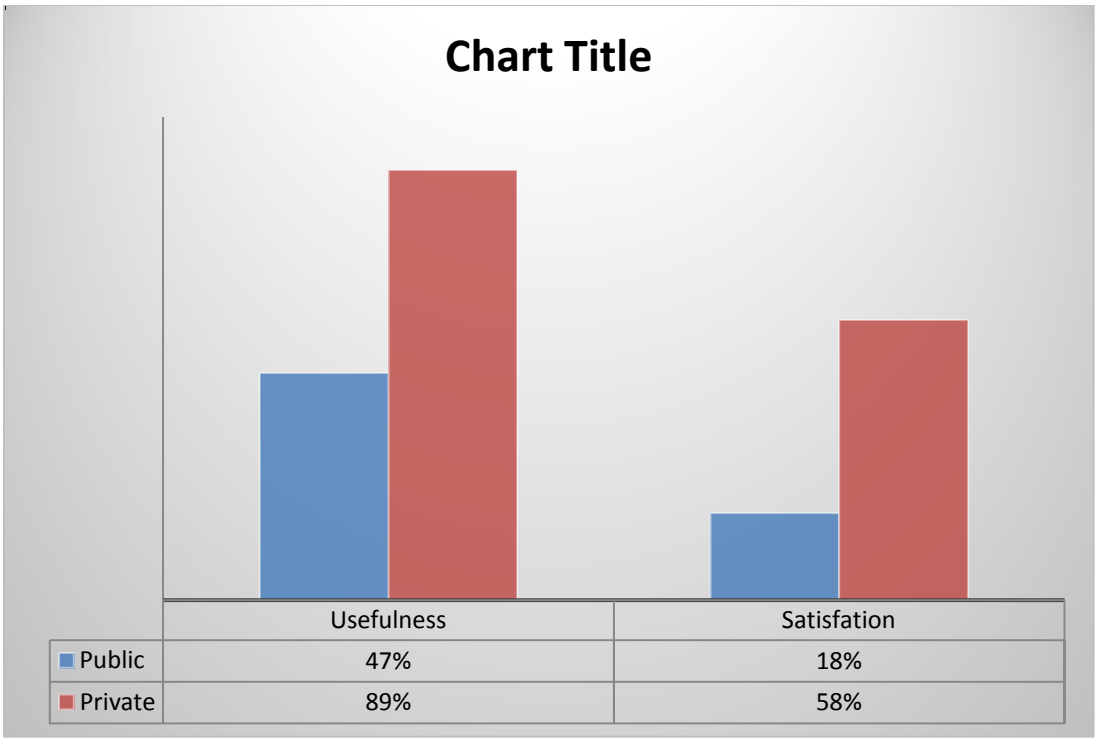

Figure I. Usefulness and Satisfaction of Biochemistry Practical Skills- Public -V- Private Medical School.

Discussion

The results of the present study revealed that private university students were more likely to be satisfied and feel usefulness of practical biochemistry skills (58% versus 18%, $p<0.001$) than public university students. They considered that practical sessions were helpful for learning more theoretical aspects and for imparting skills. This may be attributed to several factors. First: good laboratory environment represented by ventilation/air conditioning and hygiene. Second, the well-equipped laboratory with almost all tools required for running experiments. Third: the presence of adequate number of well-trained staff intended for imparting skills and making practical sessions more interesting and clinically oriented. Satisfaction of the private university medical students regarding biochemistry practical skills matches previous studies [3, 4]. The vast majority of these students agreed that more time is needed to acquire more lab skills and asked for addition of modern experiments commonly in use in biochemistry laboratories and its clinical applications. Sixty eight percent of the private medical university agreed that applied biochemistry practical sessions were taught along with the corresponding theoretical fraction. This may help to stabilize information in a better way.

In contrast to the private university, the public university medical students were not satisfied with the BPS, as the laboratory is not equipped to perform all the scheduled experiments. The teaching staff members were indifferent, not committed to the scheduled timetable and their number is insufficient for the increasing number of students. The majority of private university medical students (83%) agreed that Practical biochemistry skills are useful and assist to practice as a doctor in requesting and interpretation of laboratory results. In agreement with another study, there are certain aspects currently taught in the curriculum, which have no clinical relevance and are obsolete [5]. There should be an obvious link between observed common clinical problems and the knowledge base acquired by the medical

students during undergraduate teaching [6]. It was found that most of the biochemical tests requested by junior doctors were inappropriate. In addition, the results of the tests are often misinterpreted due to their limited awareness of clinical biochemistry [6]. The majority of our study group, whether public 63.7% or private 61.4% were against the traditional lecture as a teaching method. This finding agrees with reports that students learn more in active learning environments [7, 8]. It offers potential benefit above traditional learning methods. Small group teaching has been well documented not only to increase retention of knowledge through improvement in both students' interest and self-directed learning, but also enhances transfer of concepts to solve new problems [9]. The student-favored mode of learning in public and private universities is tutorials (54.9%) and Practical sessions (68.3%), respectively. In both sessions, non-classical modified problem based learning, data interpretation and case presentations are applied that help them to relate clinical conditions to the basic mechanisms. In problem solving learning, students learn to use various sources of information successfully and are trained in rapid retrieval of related information. These skills are important for medical professionals, as they improve their social skills and their ability to discuss, express thoughts and ideas, summarize a discussion and information, argue and listen [10]. Results of our study revealed 36.7 % of public university and 30.3% of private university medical students ($p>0.05$) favored written examination for assessment of biochemistry practical skills. Written examination cannot assess practical skills as it assess knowledge only [11], and one of the main aims of assessment is to ensure that students reach a specified standard to be allowed to be called competent in that subject [12]. Our results showed that 38.9% of the public university medical students agreed that the PowerPoint spotter examination is the best method of assessment with some reservations. In concurrency to all faculties, the public university agreed that this method overcomes most of the needs required in conventional spotter examinations like laboratory infrastructure, student rotations between stations, reagents, preparation time, staff-

technician coordination, etc. So, PowerPoint based spotter examination can be an efficient high quality, reliable, valid and feasible tool for conducting such educationally assessment methods for large number of students [13, 14]. Our study results are compatible with another study, which think PowerPoint spotter can also be used to test higher level of cognition than pure recall as well as in clinical simulations based questions it is easy to show or create such questions on slides, which may further improve the validity of such examinations [15]. Students' perceptions about assessment significantly influence their approaches to learning and studying [16]. Even though practical sessions constitute an essential component of biochemistry courses, their assessment has been relatively ignored regarding the method used and the percentage given in the final score. Therefore, the selection of assessment method for the examination should depend on its validity and reliability.

In conclusion medical student satisfaction and engagement with practical biochemistry skills is likely to be driven by the students' awareness of the relevance of these sessions to other aspects of the curriculum, teaching method their end-of-year assessment, and to their future clinical practice rather than the laboratory environment.

Recommendations

We recommend, updating of the biochemistry practical skills, regarding the time allocated,curriculum, and assessment method used according to the needs of tomorrow's doctors and patients' benefit, making in consideration the students' views and feedback. Ensure good and safe learning environment.

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