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Full Length Research paper

Traditional method of teaching anatomy with the new PBL method in Nigeria

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The introduction of the problem-based learning (PBL) may be a very uncomfortable problem for the students originally exposed to the didactic methods of teaching and learning. Our medical and pharmaceutical curriculum is yet to adopt this new method of learning and as such this study looks forward to exposing some aspects of the traditional style as well as introducing to the students the new method using PBL. It is envisaged that in the five-year Pharmacy program, the students would be exposed to and monitored and their academic performance vis-à-vis their professional competencies adjudged using this two styles of teaching anatomy. A total of one hundred and fifty 200 level Pharmacy students were randomly divided into fifteen groups of ten per group during their 2 semester course in Anatomy in the academic year 2007/2008 session. The students were exposed to both the PBL and traditional methods of teaching anatomy alternately. At the end of the period, 150 structured questionnaires were administered to the students and analyzed statistically. Results from this preliminary study does show that the PBL method of teaching Anatomy to Pharmacy students has strong positive impact in the general perception and knowledge build of the students in their 200 level studies despite the obvious challenges of the environment.

Key words: Pharmacy students, traditional method.

INTRODUCTION

Human anatomy is a fundamental element of modern medical and pharmaceutical curriculum in many medical colleges across the world (Wang et al., 2010). The teaching of medical anatomy is changing since the Anatomy curriculum plays an integral role in the pharmaceutical education. Effective pharmaceutical education should therefore be seen as a continuum. Anatomy is one of the first year subjects which are common for all the basic health science courses in the Faculty of Pharmacy of the University of Lagos, Nigeria.

It has its origin from 'anatomia' a Greek word meaning to 'cut up' or 'cut open. It is a branch of Biology which deals with the structure of living things. From a science which was taught using sacrificial victims to the sophisticated analyses of the body performed by scientist, anatomy has come a long way (Vishnumaya and Ramnarayan, 2009).

Anatomy teaching as practiced by most traditional medical schools has limitation in meeting the educational needs of students. Researchers in medical and pharmaceutical education are therefore becoming increasingly aware that using a variety of teaching methods may ultimately improve retention of material, as well as enhance students' adaptability in problem-solving situations (Vaughn and Baker, 2001).

Hence, problem-based learning (PBL) was introduced into pharmacy school curricula as an adjunct and/or alternative to the traditional didactic, classroom-based model of teaching (Haworth et al., 1998; Borrego et al., 2000).

This teaching method, first developed at McMaster University in the 1960s, uses problems or cases to stimulate the students to construct the most appropriate solution. The method has several major characteristics (Wilkerson and Gijselaers, 1996).

PBL is student-centered educational approaches which

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encourages students to explore, inquire, explain, analyze, exchange, debate and manage information using relevant content-related scenarios as triggers for learning in a small group environment (Savery and Duffy, 1995). The PBL method of learning helps to gain new knowledge with the attendant spin-off benefit of the acquisition of problem-solving skills (Schmidt, 1983). PBL facilitates not only the acquisition and organization of knowledge but also the development of several other desirable attributes, such as communication skills, team work, problem-solving skill, self-directed learning, sharing information and identification of personal strengths and weaknesses (Neville, 1999).

Learning is student-centered and occurs in small groups which are led by facilitators. The organizing focus of learning is the problem, which is selected to enhance the overall curricula and ultimately becomes the stimulus for the learning process (Suzanne et al., 2006). The anatomical sciences have traditionally been taught as three separate courses that is, Gross anatomy, Histology and Embryology in medical schools. Here it is done by utilizing primarily a lecture and laboratory format. Gross anatomy starts immediately at the beginning of the first semester with a unique concept. A topic is dealt with in lectures in one week, followed by dissecting this region the next week and a seminar in living anatomy dealing with the same area, whereby the students identify the structures on each other partly.

The first objective of this study was to compare the traditional method of teaching anatomy with the new PBL method in 200 level Pharmacy students of the University of Lagos. This objective was set, in part, to determine the appropriateness of this teaching method for the cohort of students who were tested, and to anticipate possible adjustments to teaching styles/methods that might be required based on the student' preference of teaching style (as indicated by their learning-style scores). The second objective was to determine whether students' learning styles differed before and after exposure to a PBL course. This objective was based on the suggestion that students may prefer certain styles of learning, but these preferences may change according to how a class is structured, demands of teachers, assignments, or evaluations (Grasha, 1996). This objective was also set to determine whether changes in learning-style scores occurred secondary to changes in social interactive variables that occurred over the semester. The third objective was to set a baseline for developing the practice of PBL in our environment.

MATERIALS AND METHODS

A total of one hundred and fifty 200 level Pharmacy students were randomly divided into fifteen groups of ten per group during their 2 semester course in Anatomy in the academic year 2007/2008 session. The students were exposed to both the PBL and traditional methods of teaching anatomy alternately. The process in PBL sessions included initial brainstorming to formulate questions and setting objectives and subsequent searches for resources such as textbooks, journals and medical websites for relevant information. Students returned in the following session to discuss the information, making possible diagnosis (when applicable) or interpretation and developing a plan for further evaluation or action. The tutors communicated the rules and goals of the course to the students and played the role of facilitators or coordinators, instructing to mediate students' learning processes instead of to impart factual knowledge during tutorial sessions (Wilkerson, 1998). At the end of the session, the students were asked to fill out questionnaires that were administered to them to assess their overall perception of the PBL method with the traditional method. One hundred and thirty three returned the questionnaires which were analyzed statistically.

RESULTS

The student demographic data are listed in Table 1. Majority of the students were females between ages 15-20 years old. The majority of our students in the 200 level Pharmacy program typically have completed only their first-year undergraduate general sciences prior to proceeding into full programs of the Faculty. In addition, most of the students do not have any higher education or experience in retail or hospital pharmacy.

The students were predominantly single (81.2%) with over 70% entering the program with the Senior School Certificate (Table 1).

More than half of the students (58.1%) scored over 200 in their universities matriculation examination (UME) and 48.1% had distinction (Table 2). Forty seven percent of these students said they have been taught Anatomy by both the PBL and traditional methods combined while 22.6% said only the traditional method and 21.1% by the PBL method only. On their preference of both methods of teaching, 43.6% preferred the PBL, 23.3% traditional and 22.6% both methods. A greater number of the students (69.2%) felt that the PBL method would better prepare them for the Pharmacy profession as against 9% for the traditional method. A sharp contrast was observed when students were asked which method better prepare them for examination, 63.2% said the traditional, and 14.3% said PBL while 11.3% agreed both methods equally prepare them for examinations.

A survey of the students' opinion about some possible advantages of the PBL over the traditional method of teaching Anatomy showed that though an overwhelming majority supports a combination of both methods (Table 4), 87.2% agreed that PBL method has helped them in other areas outside academics (Table 3). Some of the identified strengths of the PBL includes that skills are length in order to solve problems (93.2%), the problems motivate the learning (98.5%) of students, integrated learning not limited to a rigid curriculum (71.5%), there is 'ownership' of the problem which allows the students to give their own meaning to a problem (82.7%) and collaborative work utilizing group-based work that encourages a stimulating environment for learning (91.0%).

Table 1. Demographic distribution of the surveyed students.

Variable		n (%)
Gender	Female	80(60.2)
	Male	52(39.1)
	None	1(0.8)
Age	15-20	77(57.9)
	21-25	42(31.6)
	26-30	4(3.0)
	31-35	1(0.8)
	None	9(6.8)
Marital status	Single	108 (81.2)
	Married	3(2.3)
	Divorced	20(15.0)
	None	2(1.5)
Previous academic results	SSCE	94(70.7)
	GCE	24(18.0)
	NECO	10 (7.5)
	Others	2(1.5)
	No response	3(2.3)

Legend: SSCE-senior secondary certificate examination; GCE-general certificate of education; NECO-national examination council of Nigeria.

Table 2. Students aptitude and perception of the PBL method.

Variable		n (%)
UME score	< 150	2 (1.5)
	150-200	9 (1.5)
	201-250	35 (26.5)
	> 250	42 (31.6)
Results	No response	52 (39.1)
	Distinction	64 (48.1)
	Average	42 (31.6)
	Below average	2 (1.5)
Previous knowledge of anatomy teaching	None	25 (18.8)
	Traditional method	30 (22.6)
	PBL only	28 (21.1)
	Both	62 (46.6)
	Others	3 (2.3)
Which method is preferred?	None	10 (7.5)
	Traditional	31 (23.3)
	PBL	58 (43.6)
	Both	30 (22.6)
	None	14 (10.5)
Which method better prepares students for profession?	Traditional	12 (9.0)
	PBL	92 (69.2)
	Both	12 (9.0)
	None	17 (12.8)
Which method prepares students for examination?	Traditional	84 (63.2)
	PBL	19 (14.3)
	Both	15 (11.3)
	None	14 (10.5)
	Group discussion	1 (0.8)

The students agreed that gender should not be considered in assigning groups during PBL sessions while a majority accepted a mixed group (96.2%) (Table 4). In coverage of Anatomy contents, 19.5 and 36.1% of the students strongly agreed and agreed respectively that the traditional method was better than the PBL method. The breadth of contents covered by the PBL method was adjudged to be narrow by the students and more than half (52.6%) of the students said PBL problems were ill-defined (Table 5).

DISCUSSION

Medical schools worldwide are moving away from didactic lectures to a more integrated course, where basic science and clinical skills are taught simultaneously. Emphasis on changing the Pharmacy curricula recognizing the importance of problem solving and critical thinking and self-directed learning as vital skills required to address the type of clinical presentations that occur in today's pharmaceutical practice environment have been rife over the past decades (Cisneros et al., 2002). As expert teachers in anatomy, we get to see the students not just for one course but repeatedly throughout the entire duration of their program. It becomes all too apparent how much information is forgotten and how little is retained. However, there has been growing concern among medical educators that convectional modes of teaching students (lecture-based curricula) neither encourage the right qualities in students nor impart a life-long respect for learning (Nandi et al., 2000). In the 21st century, undergraduate medical education, as with any other educational program, needs ongoing improvements to meet the changing demands. Although the complexities of medical and pharmaceutical care have increased dramatically over the last century, the methods of teaching have changed little.

In our university curricula, this is the first time the PBL method would be introduced and run concurrently with the traditional method of teaching Anatomy. We surveyed 200 level Pharmacy students in a two-semester course hence setting a baseline for further development/adaptation of the PBL practice in our curricula. Variables monitored in Tables 2 and 3 shows that the PBL component of the 200 level programs in Anatomy is a valuable part of the program. This is not only evident by their greatest positive acceptance of the role of PBL in preparing them for their profession but confirmed by the

Table 3. Some advantages of the PBL method over traditional.

Variable	Response	N (%)
PBL has helped student outside academics	Yes	116 (87.2)
	No	7 (5.3)
	None	14 (7.5)
Skills are learnt in order to solve problems	Strongly agree	68 (51.1)
	Agree	56 (42.1)
	Undecided	4 (3.0)
	Disagree	1 (0.8)
	None	4 (3.0)
Problems motivate the learning	Strongly agree	80 (60.2)
	Agree	51 (38.3)
	Undecided	1 (0.8)
	Disagree	1 (0.8)
Integrated learning not limited by rigid curriculum	Strongly agree	34 (25.6)
	Agree	61 (45.9)
	Undecided	17 (12.8)
	Strongly disagree	3 (2.3)
	Disagree	9 (6.8)
	None	9 (6.8)
Ownership' of the problem allows learners to give their own meaning to a problem	Strongly agree	39 (29.3)
	Agree	71 (53.4)
	Undecided	12 (9.0)
	Strongly disagree	2 (1.5)
	Disagree	3 (2.3)
	None	6 (4.5)
Collaborative work utilizing group-based work to encourage a stimulating environment for learning	Strongly agree	75 (56.4)
	Agree	46 (34.6)
	Undecided	4 (3.0)
	Strongly disagree	1 (0.8)
	Disagree	4 (3.0)
	None	3 (2.3)

Table 4. Students suggestions/attitude about PBL and traditional method.

Variable	Response	N (%)
Should PBL be combined with traditional method?	Yes	129 (97)
	No	4 (3.0)
	None	-
Do you prefer?	Female and male	128 (96.2)
	None	5 (3.8)
Should gender be considered in PBL?	Yes	34 (25.6)
	No	95 (71.4)
	None	4 (3.0)

Table 5. Some demerits of PBL system seen by students.

Variable	Response	N (%)
Ill-specified problem, i.e. there is not necessarily a single 'correct' answer to the problem	Strongly agree	26 (19.5)
	Agree	44 (33.1)
	Undecided	23 (17.3)
	Strongly disagree	9 (6.8)
	Disagree	21 (15.8)
	No response	10 (7.5)
Recognition of prior learning whereby students enter a course with variety of skills, experience and conceptions.	Strongly agree	34 (21.8)
	Agree	39 (29.3)
	Undecided	17 (12.8)
	Strongly disagree	14 (10.5)
	Disagree	31 (23.3)
	No response	3 (2.3)
Breadth of content covered is narrow because PBL centers' on specific problem	Strongly agree	29 (21.8)
	Agree	39 (29.3)
	Undecided	17 (12.8)
	Strongly disagree	14 (10.5)
	Disagree	31 (23.3)
	No response	3 (2.3)
Traditional method is adjudged better in coverage of Anatomy contents	Strongly agree	26 (19.5)
	Agree	48 (36.1)
	Undecided	26 (19.5)
	Strongly disagree	5 (3.8)
	Disagree	21 (15.8)
	No response	7 (5.3)

eventually practice. Therefore, there is the need for pharmacy educators to place more emphasis on preparing students for problem solving, critical thinking, ethics, communication and self-directed learning (Cisneros et al., 2002). Our result have shown that the PBL style of teaching Anatomy to Pharmacy students does stimulates the students' interest in learning Anatomy thus enhancing their future grasp for their practice in future. This observation is similar to what Wang et al. (2010) reported earlier.

While the work of Kassab et al. (2005) showed that students' overall productivity as a group was more effective in female compared with male student-led tutorial groups, our results have shown that gender was not considered as a significant contributor to group's performance. The students sampled preferred a mixed group in the various sessions.

The constraints of inadequate power supply, large size of class vis-à-vis the groups and other challenges of our environment have been some of the greatest limitations some protagonist of the PBL method have advocated why it should not be used in our environment.

Unfortunately, we cannot allude to this challenge as it would amount to 'throwing the baby out with the bath water' as evoked in the write-up of Bandaranayake (2010). However, we have demonstrated that despite the large class size which is one of the common denominator the various faculties and the inadequacy of research materials as well as power fluctuations, the PBL method of teaching Anatomy can be adapted for improvement in the learning curricula of our Pharmacy program.

This, by extension can be extrapolated to the other professional courses run in the College of Medicine of the University of Lagos, Nigeria.

Conclusion

In recent years, colleges of pharmacy have recognized the need to use alternative teaching methods to help students develop the abilities they require to practice pharmacy and provide pharmaceutical care. Our studies have shown that the PBL method can be effectively

combined with the traditional style of teaching Anatomy to the Pharmacy students for better and more effective learning and practice.

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