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Attitudes and perception of Medical and Dental Preclinical Undergraduates in a Nigerian Medical School towards Cadaveric Dissection

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Summary

Human Anatomy is a foundation course in Medicine and Dentistry with one of its components being gross, of which Cadaveric Dissection (CD) is an important part. Recently there has been a wide spread debate as to the relevance or otherwise of CD in the learning of anatomy by the students. A feedback from the beneficiaries i.e. medical and dental students in terms of perception and evaluation is necessary for informed decision to be made on curriculum review. The objective of this study was to asses medical and dental students' attitude and perception of CD. In achieving this, a structured questionnaire, containing 29 stems was administered to 152 medical and dental students, who were about completing the preclinical phase of the medical and dental programmes respectively. The response rate was 77.6% and the responses were analyzed using absolute numbers, percentages and frequencies. Between 76.3-96.4 % were involved in actual dissection of at least one of the regions of the body. About 90.1% had twice to thrice weekly attendance at the dissections. About 96.4% were of the opinion that CD is essential to learning anatomy; while 55.6% found it interesting and 80.1% believed that it has significant contribution to future professional carrier. Results from this study show that the students appreciate the relevance of CD to learning anatomy and in view of limitations of viable alternatives, CD still has a prominent place in the teaching of gross anatomy.

Keywords: *cadaveric dissection, attitude, perception, evaluation*

Résumé

Anatomie humaine est une matière fondamentale en médicine et médecine dentaire avec l'une des composantes étant la macro anatomie, ou la dissection des cadavres est une importante partie. Récemment il y a eu plusieurs débats sur l'importance ou pas des dissections dans l'apprentissage de l'anatomie par les étudiants. Le feedback des bénéficiaires e.x. étudiants en médecine et soins dentaires en termes de la perception et évaluation est nécessaire pour une décision informée sur la revue du curriculum. L'objectif de cette étude était d'évaluer l'attitude et la perception des étudiants en médecine et dentistes sur la dissection des cadavres. Un questionnaire structuré, contenant 29 questions était administré a 152 étudiants, qui étaient entrain de compléter la phase préclinique des programmes en médicine et soins dentaires respectivement. Le taux de réponse était de 77.6% et les réponses étaient analysées utilisant les nombres absolus, pourcentages et fréquences. Entre 76.3-96.4 % étaient impliqués dans la dissection réelle au moins d'une région du corps humain. De façon hebdomadaire, environ 90.1% participaient a deux ou trois dissections. Environ 96.4% avaient pour opinion que la dissection des cadavres est essentielle pour l'apprentissage de l'anatomie ; Bien que 55.6% trouvaient cela intéressante, 80.1% croyaient que cela a une contribution significative sur la carrière future. Les résultats de cette étude démontrait les étudiants apprécient l'importance des dissections des cadavres dans leurs apprentissage de l'anatomie et en vue des limitations des alternatives. L'usage des cadavres a encore une place proéminente dans l'enseignement de la macroanatomie.

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Introduction

The earliest descriptions of anatomy were written on papyruses (paper reed) between 3000 and 2500 BC. Much later, human anatomy was taught in Greece by Hippocrates (460-377 BC), who is regarded as the father of Medicine and a founder of the science of Anatomy. Aristotle (384-322 BC) was the first person to use the Greek word "anatome" which means cutting up or taking apart [1].

The University of Ibadan was established in 1948 and one of the courses offered at inception was human Medicine. Thus teaching of human anatomy to

medical students started at the inception of the University. It has been subdivided into Gross anatomy, Embryology (Developmental anatomy), Histology (Microscopic anatomy) and Neuroanatomy. These sub divisions are taught to each set of medical and dental students over a period of three semesters. The instructional modes over the years have included core lectures, human cadaveric dissection classes (Gross and Neuroanatomy); Histology practicals, use of museum specimens, group tutorials and use of visual aids.

For human cadaveric dissection classes, the students are allotted in groups of sixteen or eighteen to tables, with one cadaver per table. Students on each table are subdivided into two with each half responsible for the dissection of a side of the cadaver.
A student has three sessions of three hours of dissections per week.

The dissection classes are supervised by lecturers assisted by demonstrators who are 1st year clinical students that have passed the Part 1 professional Bachelor of Medicine, Bachelor of Surgery/ Bachelor of Dental Surgery (MBBS/ BDS) examination in Anatomy in the top 10 percentile of their class. The inclusion of these clinical students serves as a means of peer education thus encouraging the preclinical students. From the foregoing, teaching of anatomy as part of medical and dental education has come of age at the University of Ibadan. Therefore, there is the need to evaluate human cadaveric dissection component of gross anatomy, thus forming the basis for the present study.

Materials and method

The method of study was by a structured questionnaire consisting of twenty nine stems, which was designed primarily for the purpose of this study. The study population was the 300 Level medical and dental students, of the University of Ibadan College of Medicine, Nigeria,; who were in the 3rd semester of their respective program and who had also completed dissection of all the regions of the body. These students were about to sit for the part 1 professional MBBS/ BDS examinations. The rationale behind the study was explained to them and verbal consent was obtained .The questionnaire was administered to all of them at the same time and venue (see appendix1 for details of the questionnaire).

Results

The total number of registered students at 300 level was 152 (MBBS-132; BDS 20). A total of 121 questionnaires were filled, out of which 3 were not analyzed due to significant incomplete responses. Thus 118 were analyzed giving a response rate of 77.6% (103[78%] MBBS and 15[75%] BDS).

Fig 1: Age Distribution of Respondents

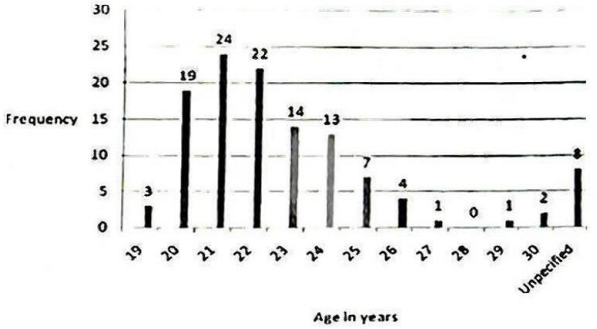

Fig. 1: The age distribution of all respondents. About 78% of the respondents were between 20-24 years of age; with 67.8% (80) being male and 38 female (32.2%)

Twice weekly attendance of cadaveric dissection classes had the highest number of participants of 48.6% (52/107). Other frequencies of attendance of once, thrice and four times weekly had 2.8% (3/107), 42% (45/107) and 6.5% (7/107) participants respectively.

Table 1: Summary of regions dissected by the respondents

Region	%(n) of Respondents involved	
Lower limb	96.6	(114)
Abdomen, pelvis and perineum	85.6	(101)
Thorax	90.7	(107)
Upper limb	78.8	(93)
Head and neck	76.3	(90)

Table 1 shows the distribution of regions dissected by the respondents. The region dissected most is the lower limb, whilst the least dissected region was the upper limb.

Pertaining to extent of participation if cadaveric dissection classes were made optional, 26.1%(31/117) of the respondents said they would have participated on very regular basis, while 60.7% (71/117) would have participated on fairly regular basis and 10.3% (12/117)

Table 2: Extent of involvement in various activities during cadaveric dissection classes

Activity	Level of involvement			
	Very Regularly % (n)	Fairly Regularly %(n)	Seldomly %(n)	Never %(n)
Actual Dissection (N=117)	23.1(27)	44.4(52)	25.6 (30)	6.8(8)
Reading the C.D manual (N=117)	11.1(13)	37.6 (44)	40.2(47)	11(13)
Checking the Dissection Atlas (N=115)	40.9(47)	46.1(53)	9.6(11)	3.5(4)
Anatomy Discussion (N=115)	42.6(49)	46.1(53)	8.7(10)	2.6(3)
Discussion of other preclinical courses (N=116)	50.9(59)	33.6(39)	11.2(13)	4.3(5)
Discussion of extracurricular activities (N=117)	29.2(32)	43.4(49)	23(26)	4.4(5)

indicated they would have done so seldomly. Those that would have never participated accounted for 2.7% (3/117) of the study population

This table 2 illustrates the pattern of participation in all the activities that occur during a cadaveric dissection class. The requirements for active student participation during CD and the actual extent of their involvement during these sessions is as shown in table 2. Only 23.1% participated very regularly in actual dissection, whist 6.8% never took part.

Table 3: Students evaluation of cadaveric dissection classes

Parameter	Response	
	Yes % (n)	No % (n)
Essentiality of CD to gross Anatomy (N=117)	96.4(113)	3.6(4)
Existence of viable alternatives to CD (N=106)	51.9(55)	48.1(51)
If CDC is interesting (N=117)	55.6(65)	44.4(52)
If CDC should be cancelled (N=113)	6.2(7)	93.8(106)
If CDC should be retained (N=113)	97.3(110)	2.7(3)
If CDC is a source of health hazard (N=106)	91.5(97)	8.5(9)
Desire for Postgraduate training (N=113)	90.3(102)	9.7(11)
If CDC has significant contribution to future Medical/Dental carrier (N=111)	80.1(89)	19.8(22)

Table 3 shows the student's evaluation of the relevance of CD to their present professional training and their future career development. 96.4% considered it essential to the teaching of gross anatomy whilst 6.8% would like to see it cancelled. However, about 50% felt alternative forms of teaching such as prossected specimens, museum models and computerized three-dimensional images should be used instead. Ninety one percent of the respondents felt that CD may be a source of transmission of diseases such as tuberculosis, hepatitis and human immunodeficiency virus. About 80.0% of responders felt that CD may have a significant contribution to their future career.

Table 4: Knowledge of areas of Postgraduate training (A)Medical Students (N= 92)

Area of interest	% (n)
Surgery	33.7(31)
Internal Medicine	8.7(8)
Preventive and Social Medicine (Community Medicine)	7.6 (6)
Obstetrics and Gynaecology	6.5 (6)
Peadiatrics	5.4 (5)
Ophthalmology	2.2 (2)
Oto-Rhino-Laryngology	2.2 (2)
General Medical Practice (Family Health)	1.1(1)
Radiotherapy	1.1(1)
Anatomy	2.2 (2)
Biochemistry	1.1(1)
Doctor of Medicine (M D)	1.1 (1)
Undecided	28.3 (26)
(B) Dental Students (N=15)	
Oral and Maxillofacial Surgery	40 (6)
Oral Pathology	13.4 (2)
Public Health	13.4 (2)
Peadodontics	6.7(1)
Virology	6.7(1)
Undecided	20.1(3)

Discussion

This study is centred on perception, attitude, evaluation and contemporary issues on human cadaveric dissection. Attitude towards any human endeavour is largely affected by the way it is perceived.

The response rates of 78.6% for MBBS and 75.0% for BDS students in this study are comparable with those obtained in similar studies which ranged between 54.0-89.0 % [2,3,4,5]

The study revealed that the dissection of the lower limb recorded the highest level of participation (96.6%) while the head and neck region had the least participation (76.3%) by the preclinical medical and dental students. This observation is due to the fact that the lower limb is the first region to be taught and the students are enthusiastic and eager to acquire knowledge. The reason for the reduced participation in the dissection of the head and neck may be due to considerable heavy workload and the proximity of the Part 1 MBBS & BDS Professional examinations at the time of dissection of this region. There may be the need to rearrange the sequence of dissection considering the very detailed and complex gross anatomy of the head and neck region.

It is mandatory for all the students to attend all the four dissection sessions in a week. The result obtained for attendance showed that the students contravened this rule (about 90 % of the students had an average weekly attendance of 2-3 times). This contravention may be due to high students: cadaver ratio (which was 16:1 for MBBS and 18:1 for BDS). Thus there is the need to significantly reduce the ratio by providing more cadavers for dissection.

Sixty seven percent of the students were involved in actual dissection on regular basis; this could be improved upon by reducing the students: cadaver ratio. Over 90% of the respondents were involved in actual dissection in the course of the training; this may be inferred to mean acceptability of CD as being crucial to acquisition of human anatomical knowledge. During a dissection class, a group member reads the dissection manual (instructional guide) while the dissector carries out the instruction. Only 48.9% of the students took part in the reading exercise on regular basis. About 87% make reference to Gross Anatomy Atlas on regular basis during dissection. This is a good attitude as it enhances better appreciation of the structures. A good learning process is group discussion; about 89 % were involved in informal anatomy discussion during dissection classes.

About ninety six percent of the students believe that CD is crucial to the learning of Gross Anatomy and this may explain the very high involvement in positive activities during dissection classes. Older, [6] critically examined the gradual replacement of dissection in teaching anatomy to both undergraduates and medical graduates in the United Kingdom and Ireland and he came to a conclusion that the dissected cadaver remains the most powerful means of presenting and learning anatomy as a dynamic basis for solving problems ; consequently, the cadaver must not be dismissed as obsolete. Findings from a similar study conducted amongst Spanish anatomy teachers revealed that dissection is considered an essential instrument in medical training [7]. The 'traditionalist' and 'modernist' professional anatomists in Europe agreed that the use of human cadaveric dissection in the teaching of anatomy was more superior to other tools [8]. However; opinion is equally divided as to the existence of viable alternatives to CD. Suggested viable alternatives are video tapes and compact discs (audio and visual), prosected specimens and demonstration by Lecturers. This response highlights the importance of exposure of the students to viable alternatives to CD. Such exposures will enable them to appreciate the advantages and or disadvantages that the alternatives may have over cadaveric dissection.

The results discussed so far clearly demonstrate that the respondents (medical and dental students) exhibit the right attitude towards CD. The next segment of discussion is on evaluation of cadaveric dissection by the medical and dental students. Methods of evaluation in this study include responses to (i) relevance, (ii) retention, (iii) cancellation, (iv) hazardous exposure and (v) impact on future professional carrier. There is a marginal difference of 11% between those that find CD interesting and those that did not. Similar studies [4,9,10] reported that 66.4-80% found CD interesting

Reasons adduced by those that found CD uninteresting were (i) non-optimal preservation of the cadavers, (ii) not too conducive working environment, (iii) irregularity of demonstrators and (iv) one respondent was of the opinion that CD is inhuman. The observation that CD is inhuman though a minority view, should not be disregarded because it could be a source of anxiety [11], psychosomatic symptoms [5] amongst the students hence the need for appropriate psychological counselling before commencement of human cadaveric anatomy. In fact Abu-Hijleh *et al* [5] in a study conducted in an

Arabian medical school noted that a third of their students claimed to have experienced recurring visual images of cadavers and such images were even transferred to dreams about the illness of loved ones, indicating that the CD experience may change the focus of death anxieties from abstract and impersonal to intimate and personal.

Embalming solutions beside being able to preserve tissues, must be bactericidal, viricidal and fungicidal [12,13]. Formalin, the chemical in use for embalming is very volatile and irritating to mucocutaneous tissues [13]. Thus by using lower concentrations of it and with modern extraction systems in the dissection room and not neglecting barrier precautions and clean up procedures, CD could be made more student friendly. Use of plastination which makes specimens to be completely odourless without compromising safety in the processing of cadaver may be a better alternative to the use of formalin.

The students who found CD interesting said that it helped to clarify what they would have previously read in the textbooks and what they visualized in Atlas of Anatomy consequently increasing their depth of knowledge of anatomy. This response emphasizes the benefit of prelecture and or practical preparation by the trainee.

Attitude towards any human activity that is optional is a very reliable gauge of its acceptability or otherwise. Thus a positive response of 87.2% expressing their willingness and readiness to participate actively, had CD been made optional in the course of their preclinical training is highly suggestive of its acceptability as a mode of acquisition of anatomical knowledge.

About 93% of the students objected to cancellation of CDC. Reasons adduced for the objection included enhancement of better appreciation and understanding of theoretical knowledge, assisting memory recall and exposure to surgical procedures. About ninety seven percent supported retention of CD. However the less than 5% that opposed its retention advanced the following reasons; the gains do not justify the time spent, inadequate number of demonstrators and inability to visualize all the structures.

With regards to health hazards, 91.5% of the respondents believe that they are at risk of exposure to bacterial and viral infections, hepatitis, respiratory tract infection, formalin induced post dissection drowsiness, tetanus, tuberculosis, human immunodeficiency virus, mycoses, allergies and cuts. This fear was also expressed by 62 % of the medical students in the Abu-Hijleh study [5]. More worrisome is the report of postmortem recovery of human immunodeficiency virus by Marks [14]. There are existing measures in place that minimize these risks. Such measures include proper preservation of the cadavers, adequate illumination and ventilation of the dissection laboratory, provision of sanitary facilities, use of hand gloves and face masks, proper and prompt disposal of dissected muscles, viscera and connective tissues.

Ways of making CD student friendly as suggested by respondents are a more conducive environment (better sanitation, air conditioning), improved cadaver preservation, use of prosected specimens, increased supervision by lecturers and demonstrators and reduction of frequency of dissection classes.

Of the 66 medical students that stated areas of desired postgraduate training, 58 chose specialties that require strong anatomy background such as surgery, obstetrics and gynaecology, Internal medicine, ophthalmology, othorhinolaryngology, while 8 out of the 10 dental students gave similar responses. These students were yet to have formal contact with the specialties so listed, thus it will not be out of place to conclude that this observation gives a positive perception of the relevance of dissection in the learning of human anatomy. Credence is also lent to this assertion by the response of 80.1% that CD has a significant contribution to their future medical carrier.

The final segment of the discussion dwells on contemporary issues and opinions on human CD by medical students. In the literature there are diverse opinion as to the desirability or otherwise of CD by medical students. Dissection has been described by the duo of Dyer and Thorndike [15] as the most universal and universally recognisable step in becoming a doctor. It is a widely held and correctly placed perception that dissection affords the medical student the unique three dimensional view of human anatomy and elaborates the knowledge that is acquired in lectures and tutorials [16-21]. Cadaveric dissection offers the unique opportunity to appreciate the variability's in human anatomy as opposed to what was described in textbooks and plastic materials.[22]. Working in the dissection room is a good introduction to self directed learning and team work [23]. Also it offers the opportunity of introducing the students to death in a controlled manner especially in conjunction with education on death and dying [17,24,25]. The encounter with the cadaver unequivocally establishes

the following in the trainee's mind: (1) the palpable reality of individual life, (2) the value conferred upon it by morbidity and mortality, and, therefore,(3) the awesome responsibility with which the living patient is to be approached by the physician [26-28].

Points raised against use of CD in teaching anatomy include ;(i) that information gathered from dissection does not readily translate to the cross-sectional views presented by the various imaging techniques [29]. this point may be faulted considering the fact that dissection offers the unique opportunity of appreciating surface anatomy and relations of a viscus and the relationship between the body organs which are crucial to appreciation of cross sectional anatomy. (ii) Alteration of colour and texture of human tissues by the embalming process. (iii) Some researchers have been able to demonstrate that use of prosections is at least as effective as use of dissection in teaching anatomy [30-33].

Such schools of thought have suggested the use of alternatives such as prosected specimens, computer soft wares and models; Life Sciences resource centre by the Peninsula medical school [29], this will rather amplify the basic knowledge and not likely to be a substitute. Also cadaveric plastination and computer based imaging are being used as substitutes to dissection in teaching anatomy in some medical schools [34,35]. It should be noted that though, plastinated prosections permit realistic visualization of anatomical concepts that are simply too difficult to describe; they should rather be adjuncts to CD for full appreciation of the interactions between body systems and the understanding of the body as one entity. [36].

Kramer *et al*[37] did a survey of modes of teaching anatomy in 19 Departments of anatomy located in seven African countries and observed that about 90 % (17/19) of the departments showed preference for dissection as the mode of instruction.

Major determinants of attitude towards a set goal include; the benefits accruing from such goal, consequences of not achieving such goal and the end point of such goal. End points of learning anatomy by medical and dental students include (i) knowledge acquisition, (ii) laying foundation for other areas of medicine such as pathology, radiology, surgery, obstetrics and gynaecology, paediatrics (iii) passing the MBBS/BDS examination in anatomy. These three goals collectively result in the production of excellent and highly proficient Medical and Dental Practioners capable of rendering quality health service .

The results from this study showed that the students realized the relevance of CDC to learning anatomy based on their responses to (i) level of participation in optional CDC, (ii) involvement in activities during CDC, (iii) desire to retain CDC and (iv) the hazardous effect of CD.

The aforementioned observations become very pertinent when agitations that gross anatomy is being given an exaggerated importance in the training of Doctors [38] appear to be on the increase and there is need to scientifically justify or dismiss such agitations.

Conclusion

This study was conducted amongst medical and dental students about to exit from the course as opposed to similar studies that involved students who had just been introduced to Anatomy [5,39,40]. Thus the respondents were in a better position to give an objective assessment of relevance of CD to the learning of Anatomy. Though, a small percentage opposed the retention of CD, if the reasons adduced by them are addressed, the picture will change.

In closing, working with cadavers be it by dissection or examination of prosected specimens though beneficial and acceptable to the study population constitutes a potential stressor [40- 42] in medical education. If the issues raised in this study by the respondents are seriously considered and appropriate measures taken, medical and dental students will be more receptive to human CD as an important component of learning human anatomy.

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