Background: In medical education, with the emerging technology-assisted equipment, anatomy had developed as one of innovative approach for medical education teaching and learning tool for better understanding of basic sciences. The aim of this study was to explore the practicality of the virtual body dissection table and inclusive gratification among medical students in the teaching and learning of gross human anatomy.

Methods: A cross-sectional survey was conducted during 2019 academic calendar among second-year medical students at the University of Gondar, Ethiopia. Questionnaires modified to the local context designed to explore the practicality of the virtual body dissection table and inclusive gratification among medical students in the teaching and learning of gross human anatomy. Eighty-nine study participants (51 males and 38 females) were participated.

Results: The majority, 80.89% of medical students study participants were satisfied that the anatomage had a helpful starring role and it was a supplementary tool for their learning and learning human anatomy and also gives well-known numerous benefits of using the anatomage table in the medical teaching and learning activities.

Conclusion: As a major basic medical science, learning human anatomy could be expressively wedged with real visual anatomy. Therefore, the use of virtual body dissection technology gives the impression to have an auspicious role in upcoming educational training programs.

Key Words: Anatomage table; Anatomy education; Dissection; Medical students

INTRODUCTION

Anatomy is one of the furthermost imperative basis life sciences and keynotes in medical education. The label of knowledge in anatomy makes students for forthcoming in clinical practice [1]. Nowadays, medical undergraduate and human anatomy post graduate students could study the human body parts by using diverse approaches based on current innovative technology. The blast of new technologies in the period of the latter few decades has fetched anatomical education into a new domain [2,3]. The progression and the advances use of interactive modern technology in medical education is repetitively developing and growing. Currently, students are strengthened inversely from the students of previous cohorts that use electronic access like table, smart phone for educational purpose. Companies with virtual anatomy products offer detailed, interactive anatomical images to complement textbooks and traditional cadaveric studies. Medical education curriculum for human anatomy teaching and learning process could focus on the virtual anatomy products to raise the understanding of the efficacy of using this technology in the classroom, the use of virtual dissection technology seems to have a promising role in future educational training. In this regard, a study conducted by scholars concluded that students appreciate learning with this technology and believe that it is a beneficial and effective tool in preparing them to meet a standard health care professional level [4].

Anatomage table assisted education has been proven to be effective as it is showed by numerous publications, more efficient classroom, lab sessions, and student acceptance. The accurate details and annoying content draw students' interest and attention, leading to more effective educational outcomes [7]. The incorporation of cadaver CT scans and lifesize virtual dissection tables significantly improved the performance of medical students [8,9].

Anatomage gifts some striking advantages over the use of cadavers such as no contact with embalming chemicals, no need of special place for the anatomical table; there are no restrictions and permits to use it. The anatomical accuracy in the reconstruction of the human body is very high since it is based on real human bodies. It is also possible to cut and make sections of the body in any direction. The anatomage table offers a high quality lab experience without any chemicals. There are no possibilities of leaks, no environmental contamination and no gas emissions, no radiation effects on students and staff. The anatomage table is highly portable therefore it can be used for educational training in different locations. Thus, the anatomage table is a superior medical and education tool that can be used for training programs.

Anatomage table is a visualization of computerized system for anatomy education which is being implemented by many medical schools and institutions globally with highly advanced technology product that draws attention from visitors, students as well as faculty members. The product will quickly become the technological flagship at institutions that set apart the standard of medical education by supplying novel and groundbreaking tool for sightseeing the human body parts. The table can be a supplement to any human anatomy teaching methods [4,5].

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Anatomage table also offers the option to combine scanning planes to get a better understanding of the location and relationships of the different human body inner structures. It is possible to combine the view at one level with the view of structures in sagittal, parasagittal, coronal and transverse planes, and to move up and down to check the structures at different levels of cross section. This allows the user to watch a complete and perfect 3-D view of the size, position and relationships of organs, vessels, nerves, muscles and spaces. It is not only for anatomical education but also it can be used for radiology, surgery case review, patient consultation, and research purposes [11-16].

METHODS

This study was conducted on second year medical students in a real practical lesson setting and under actual learning conditions of the anatomy department who have undergone the process of anatomage table as a part of anatomy course in their second year of medical education of the college of medicine and health sciences, University of Gondar, Gondar, Ethiopia.

The data was collection through a 10-item questionnaire. The study was done in the period of July 2019 to August 2019. Total 304 respondents completed the questionnaire. They were asked the questions pertaining to five major issues. At the end of each laboratory practical session, the lecturer, as a facilitator undergoes a discussion session with the students. It enables students to increasing their knowledge and success on the human anatomy study process (Figure 1).

RESULT

A total of 89 medical students were included in this study. Of these, 51 (55.83%) were males; 74 (83.14%) were Christians. The mean age of male and female medical students was 19.9 ± 0.6, 18.9 ± 0.7 years (Table 1).

Gross anatomy practical laboratory session is a main skill laboratory session that leads to know the human body parts easily within short period of time. Anatomage table is a three dimensional presentation of human body parts into different layers, which was essentially supportive for medical students. All structures were labeled and the students could effortlessly understand the relationship of all neighboring structures. The students can dissect human body parts from healthy organs to pathologic ones. The majority of the students found that gross anatomy practical session through anatomage was an interesting and effective learning tool to enhance the independent and collaborative learning, also develop students’ knowledge and skills (Table 2). The students who spent more time on the table had more positive perception as an excellent learning aid as compared to other teaching aids for teaching and learning of human anatomy. This is due to the fact that the table offered some advantage of answering the relationship among structures. Moreover, anatomage gives special preferences to increase the possibilities to imagine the rotation and positions of anatomical structures in different planes in different perspectives and it contribute to improve learning and understanding of students’ verbal and visual knowledge. At the end of practical session, majority of students can easily understand the topographical relationships between neighboring structures with a very simple view and description of all structures. One of the ways to increase students’ learning is changing the method of teaching and allows students to take active participation.

Discussion

Medical education had been intensely affected by the developing passion in technologies over the past few years. Also, teaching human anatomy had substantially fluctuated during the former decades. Even if there was continuous progression of computer-based technologies, there is much argument about the appropriate teaching methods to bring essential basic sciences knowledge. The anatomage table is an exclusive technology with software that leads anatomy viewing and modeling tools, materials with virtual body parts for anatomical education. Numerous research studies conducted showed that the anatomage table is an efficient method of active learning method [17].

The anatomage table brings anatomical images to life can let students to dissect the body and move through layers of tissue. The current study findings also showed that the potentials of the anatomage table offer students to view and manipulate full body over the cadavers. In practical laboratory sessions students can rotate and manipulate structures from various views to identify anatomical structures and relationships between them. As it is a touch screen, students can expand the size of a body students can expand the size of a body section to study its details and turn that body part in different direction and allows to undo any mistake [18,19].

The anatomage table does not replace the cadaver involvement, but rather broadens and deepens the information. Any innovation in technology must be integrated with innovation in pedagogy [20]. The use of technology to enhance medical education, but hope to see technology used not as a replacement for other learning tools, but actually as an additional tool to improve the educational process. Students can explore the detailed structures of the body that are difficult to view using other tools. The table uses LCDs and displays in the practical rooms, all students can view the image at the same time. Full body volume data of virtual anatomy can serve as a supplement to the existing cadaver based practical sessions of anatomy course.

Different scholars’ studies indicated that 3D anatomy has several shortcomings as compared to outdated teaching methods [21]. Even when computerized based education has established a new approach and offering medical students to simplify their tactic to structures, the advantage of direct

Table 1: Sociodemographic characteristics of the respondents, Gondar, Ethiopia, 2019.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (Years)</td>
<td>≤ 18</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>18-20</td>
<td>63</td>
</tr>
<tr>
<td></td>
<td>&gt; 20</td>
<td>22</td>
</tr>
<tr>
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<td></td>
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<td>38</td>
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<tr>
<td>Religion</td>
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</tr>
<tr>
<td></td>
<td>Muslim</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>protestant</td>
<td>3</td>
</tr>
</tbody>
</table>

Figure 1: Photograph of anatomage during usage at anatomy laboratory, department of human anatomy, University of Gondar, Ethiopia.
contact with human body parts could not yet be substituted. This study pronounced the learning and pleasure of students as to the anatomage table at university of Gondar. The anatomage table is becoming an additional component of teaching aid for medical students that offered a unique digital plateform for anatomy. This technology based teaching method will not only support medical students to learn anatomical particulars, but also afford the gratitude of 3D structure. The anatomage table advances understanding of complicated body parts and their distinct relationship.

CONCLUSION

Learning human anatomy could be expressively wedged with real visual anatomy. Therefore, the use of virtual body dissection technology gives the impression to have an auspicious role in upcoming educational training programs in collaboration with other methods.

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AUTHOR CONTRIBUTIONS

BT, solely Author, who developed the study design, conducted the interviews and analysis, ensured trustworthiness, and drafted the manuscript. The author read and approved the final manuscript.

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AVAILABILITY OF DATA AND MATERIALS

The datasets were freely obtainable from the corresponding author on reasonable request.

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

This study was approved by the Ethics Committee of, School of Medicine, University of Gondar. The participants were justified about the research aim and interviews. Informed consent for conducting and recording the interview was obtained. The confidentiality of the participants’ information was maintained throughout the study.

CONSENT FOR PUBLICATION

Participants gave printed informed consent for the use of passages for publication.

COMPETING INTERESTS

The author declares that no any competing interests.

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