INTRODUCTION

At present, medical education is undergoing a series of changes to meet up the needs of modern medical practices. Anatomy is one of the most important subjects for the foundation of good clinical excellence. It is very difficult and challenging to teach and learn the subject for both faculties as well as students in spite of having different modalities in medical education. Even senior faculties believe students’ present anatomy knowledge is short of what is required for safe medical practice. 

Anatomy is one of the most important subjects studied by the medical students when they begin their medical career. The course contents of anatomy with their learning objectives are spread throughout the first four semesters of Kathmandu University School of Medical Sciences (KUSMS) medical curriculum. A number of teaching learning methods including didactic lectures, practical oriented lectures and PBL (Problem Based Learning) have been implemented. Cadaveric dissection, microscopic study and osteology tools are used for practical classes. Anatomy knowledge, skills and its applications are evaluated by various modes of assessments like MCQ (Multiple Choice Question), SAQ (Short Answer Question), PBQ (Problem Based Question) for theory examination; and practical and viva-voce.

Hands-on cadaveric dissection has played a fundamental role in learning anatomy as it facilitates the link between structure and function of human body. There has been an increasing trend of teaching and learning anatomy by using innovative PBL that encourages self-directed learning. Teaching and learning anatomy becoming easier and interesting day by day due to availability of new technologies. Student’s perception is a useful tool which may help to find out the areas of strength and weakness of teaching methodology. Therefore, the present study was aimed to determine the perception of the students about teaching and learning anatomy.

METHODS

This was a cross-sectional questionnaire based study conducted among all the students of MBBS from first to final year under Kathmandu University School of Medical Sciences (KUSMS).
This study was conducted in the Department of Anatomy, KUSMS, Dhulikhel, Kavre, Nepal during the period from 1st April to 30th May 2023. Ethical clearance was taken from IRC-KUSMS (Ref. No. 52/23) prior to the study.

The participation in the study was voluntary. All the participants were counseled and explained about the objective of the study; and verbal consent was taken from individual participants. The medical students of KUSMS were included in this study whereas the students who were unwilling to respond were excluded from this study.

A Google Form Questionnaire was developed after comprehensive literature review and provided to the students in order to acquire their perception about teaching and learning anatomy. A pilot study was done and the questionnaire was pre-tested among 10% of the students. Cronbach’s alpha was used to test the reliability of the test items and the value of alpha was obtained as 0.9 which indicate the high level of internal consistency of the scale. The questions in the questionnaire were based on knowledge of anatomy, coverage of learning outcomes, quality of teaching, tools and methods of teaching, mode of assessment and sources of teaching materials. The students’ perceptions were collected on Likert scale questionnaire. Data was collected and statistical analysis was done using SPSS 16.0.

RESULTS
A total of 350 medical students participated in the study, out of which 181 (52.2%) were female and 166 (47.8%) were male students. Responses of the students were collected and statistical analysis was done; and presented in Table 1.

Knowledge of Anatomy
On the basis of student’s responses, it was concluded that almost all students believed that anatomy is an important part of the medical curriculum and should be taught to all medical students. Moreover, most of them opined that knowledge of anatomy is the most essential for good clinicians. Similarly, they very much benefited from knowledge of anatomy during their clinical posting which was agreed by 76.9% of the participants as shown in Table 1.

Coverage of learning outcomes
In anatomy classes, there was a good coverage of learning outcomes which was opined by 67.7% of the students. Similarly, most of the students were satisfied with the clinical applications of anatomy wherever relevant in lectures as illustrated in Table 1.

Quality of teaching
Most of them agreed that faculties clearly explained subject matters which helped them understand the topic very well. However, 38% of the students opined as neutral when a question was asked about the faculties always try to finish their topic rather than explanation and interaction. Likewise 44.8% students disagreed that faculties do not clarify the contents up to understandable level of students. However, majority of the students viewed that students should learn anatomy superficially rather than in depth as shown in Table 1.

Tools of teaching
The power point presentation was the most favourable tool for theory classes as reported by majority of the students. This was followed by models, white board and marker and cadaveric dissection being favoured the least. Likewise, most of the students favoured cadaveric dissection which was the most important tool for practical classes. This was followed by specimens, models and power point presentation being favoured the least as shown in Table 1.

Methods of teaching
Practical class was the most favourable method as suggested by most of the students to understand anatomy clearly. This was followed by self study, PBL session and theory classes being preferred the least. However, most of the participants agreed that theory classes followed by dissection were very effective in learning anatomy (Table 1).

Mode of assessment
Majority of the students preferred MCQ as the best mode to evaluate knowledge and concept of anatomy for theory assessment which was followed by SAQ and PBQ. Similarly, majority of the students preferred gross anatomy spotter as the best mode to assess knowledge, skill and concept of anatomy for practical assessment. This was followed by viva-voce and the least favoured was histology slides as shown in Table 1.

Sources of teaching material
Majority of the students viewed that the best source of teaching material for anatomy was text books. This was followed by Internet sources such as YouTube, PDF etc. and the least favoured was teacher’s note as shown in Table 1.

DISCUSSION
Globally, extensive changes are taking place to improve the quality of medical education. Teaching and assessment methodologies have been evolving to achieve the intended goal. Assessment is an essential part of the medical education. It gives the proof of how well the learning outcomes are being achieved and whether the teaching and learning standards are maintained. A medical curriculum should constantly revise in response to the need of students, institutions and communities. Student’s perceptions about teaching and learning methodology are useful tools to determine areas of weakness or strength of teaching and learning methodology used, hence the necessary steps can be taken to correct the deficiencies and to modify and enhance medical education.

Knowledge of Anatomy
Anatomy is the foundation science for the medical curriculum. Understanding anatomy is essential to understanding other subjects in the medical curriculum. Hence, anatomy has to be
Table 1: Views of the participants in Likert scale questionnaire

<table>
<thead>
<tr>
<th>SN</th>
<th>Questionnaire</th>
<th>Agree</th>
<th>Neutral</th>
<th>Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Knowledge of anatomy</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Anatomy is an essential part of the medical curriculum and should be taught to all medical students.</td>
<td>344(98.3%)</td>
<td>6 (1.7%)</td>
<td>0</td>
</tr>
<tr>
<td>2</td>
<td>In my opinion, knowledge of anatomy is the most essential for good clinicians.</td>
<td>332 (94.9%)</td>
<td>17 (4.9%)</td>
<td>0</td>
</tr>
<tr>
<td>3</td>
<td>I am very much benefited from knowledge of anatomy during my clinical posting/practices.</td>
<td>267 (76.9%)</td>
<td>76 (21.9%)</td>
<td>4 (1.2%)</td>
</tr>
<tr>
<td></td>
<td>Coverage of learning outcomes</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>In anatomy classes, there is a good coverage of learning outcomes.</td>
<td>235 (67.7%)</td>
<td>92 (26.5%)</td>
<td>20 (5.8%)</td>
</tr>
<tr>
<td></td>
<td>Quality of teaching</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Faculties clearly explained subject matters which help me to understand the topic very well.</td>
<td>206 (59%)</td>
<td>116 (33.1%)</td>
<td>27 (7.9%)</td>
</tr>
<tr>
<td>6</td>
<td>Faculties always try to finish their topic rather than explanation and interactive.</td>
<td>104 (29.7%)</td>
<td>133 (38%)</td>
<td>113 (32.3%)</td>
</tr>
<tr>
<td>7</td>
<td>Faculties do not clarify the contents up to understandable level of students.</td>
<td>63 (18.1%)</td>
<td>129 (37.1%)</td>
<td>156 (44.8%)</td>
</tr>
<tr>
<td>8</td>
<td>I think, students should learn anatomy superficially rather than in depth.</td>
<td>38 (10.9%)</td>
<td>79 (22.6%)</td>
<td>233 (66.6%)</td>
</tr>
<tr>
<td>9</td>
<td>The PowerPoint presentation of the teaching tools is readable and easy to follow concepts and facts.</td>
<td>228 (65.7%)</td>
<td>96 (27.7%)</td>
<td>23 (6.6%)</td>
</tr>
<tr>
<td>10</td>
<td>Effectiveness of displayed teaching material such as illustrations, video and photographs in relation to content of lectures.</td>
<td>288 (83.2%)</td>
<td>51 (14.7%)</td>
<td>7 (2.1%)</td>
</tr>
</tbody>
</table>

Table 2: Responses of the participants

<table>
<thead>
<tr>
<th>SN</th>
<th>Questionnaire</th>
<th>Power point Presentation 160 (51.4%)</th>
<th>Models 73 (23.5%)</th>
<th>White board and marker 45 (14.5%)</th>
<th>Dissection 33 (10.6%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Tools of teaching</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Which tool would you prefer to understand anatomy in theory classes?</td>
<td>Power point Presentation 160 (51.4%)</td>
<td>Models 73 (23.5%)</td>
<td>White board and marker 45 (14.5%)</td>
<td>Dissection 33 (10.6%)</td>
</tr>
<tr>
<td>2</td>
<td>Which tool would you prefer to understand anatomy in practical classes?</td>
<td>Dissection 229 (69.1%)</td>
<td>Specimens 58 (16.8%)</td>
<td>Models 34 (9.8%)</td>
<td>PPT 15 (4.3%)</td>
</tr>
<tr>
<td></td>
<td>Methods of teaching</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Which method would you like to prefer more to understand anatomy clearly?</td>
<td>Practical classes 222 (64.5%)</td>
<td>Self study 61 (17.6%)</td>
<td>PBL session 36 (10.4%)</td>
<td>Theory classes 26 (7.5%)</td>
</tr>
<tr>
<td></td>
<td>Mode of assessment</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>For theory, which method would be the best to evaluate knowledge/concept of anatomy?</td>
<td>MCQ 164 (47.4%)</td>
<td>SAQ 93 (26.9%)</td>
<td>PBQ 79 (22.8%)</td>
<td>Any other 10 (2.9%)</td>
</tr>
<tr>
<td>5</td>
<td>For practical, which method would be the best to evaluate knowledge/concept of anatomy?</td>
<td>Spotter for gross 232 (67.4%)</td>
<td>Viva-Voce 69 (20.1%)</td>
<td>Any other 28 (8.1%)</td>
<td>Histology slides 15 (4.4%)</td>
</tr>
<tr>
<td></td>
<td>Sources of teaching material</td>
<td>Textbooks 143 (41.3%)</td>
<td>Internet sources such as You tube, PDF etc 116 (33.5%)</td>
<td>Teacher’s note (63 (18.3%)</td>
<td>Fast track Book 10 (2.9%)</td>
</tr>
</tbody>
</table>

taught or learned effectively.\textsuperscript{11} A sound knowledge of anatomy, for training of medical students, is very essential part for clinical practices.\textsuperscript{10} In UK, more than 90% of the students had similar opinions\textsuperscript{12} which are in accordance with findings of the present study.

A study also reported that adequate anatomical knowledge is essential for the clinicians who perform an invasive procedure of the patient.\textsuperscript{13} It is also essential in order to determine pathological disorders which may be applied during diagnostic approaches, clinical practices and treatment planning.\textsuperscript{14}

A study also quoted that the majority of the students have understood the importance of anatomy in making them a self-directed lifelong learner and in development of professional skills and ethics of medicine. It has also enhanced their analytical and critical thinking.\textsuperscript{15}

Coverage of learning outcomes
In the present study, there was a good coverage of learning outcomes in anatomy classes which was opined by majority of the students. A similar study was done in India and quoted that the majority of the students were satisfied with the coverage of content in lectures.\textsuperscript{8} A study also mentioned that about 80% of the students thought that the theory and practical classes taken by faculties were satisfactory.\textsuperscript{16}

Quality of teaching
The faculties clearly explained subject matters which helped them to understanding the topic very well as noticed in the present study. This is also similar to the observations of a study in which majority of the students were satisfied with the content, oration, explanation and language used. However, a study done in India in which most of the students were dissatisfied with the way of teaching by teachers. They rated the method of explanation and highlighting of important points in lectures and the demonstrations during dissection sessions as unsatisfactory. Moreover, few researchers also claimed that most of their students were not satisfied with the teaching quality for anatomy teaching and learning.

Tools of teaching

PowerPoint has a variety of features including animations, inclusion of videos and pictures which was the most favourable tool for theory classes as reported in the present study. A similar study was done and revealed that multimedia teaching was the best anatomy teaching tools and it does not affect lack of attention for theory classes. A study also quoted that cadaveric dissection was the best tool for anatomy practical classes which was followed by slide projector, audio-visuals projection, conventional chalk and board tools which is accordance with the findings of the present study.

Most of anatomists still support the use of cadaveric dissection more than other teaching tools. A study also revealed that majority of the anatomists chose dissection, followed by projections as the most appropriate teaching tools. Another study also found that dissection was favoured by both the anatomists and the students as most “fit for purpose” in meeting learning outcomes, but no single teaching tool met all aspects of medical curriculum.

Methods of teaching

In the present study, most of the students preferred practical classes as the most favourable method to understand anatomy clearly which was followed by self study, PBL session and theory classes which are similar to the results of a study in which practical classes were also most preferred teaching method which was followed by PBL, small group discussion, interactive lecture, educational videos, pro-sections and anatomical models.

However, in UK, the main methods of teaching anatomy in medical schools were PBL followed by theory classes and cadaveric dissection. Pro-sections and multimedia were being the least common methods of teaching and learning anatomy. These methods were chiefly used as adjuncts to the major teaching method.

Mode of assessment

A study was conducted in India, in which majority of the students favoured SAQ as the best mode of assessment followed by SEQ (Short Essay Question) as these modes were easier to answer, time saving and obtain good marks. Moreover, majority of the students also requested to incorporate MCQ in their theory examination. However, the present study noticed that MCQ was the best preferable mode to evaluate knowledge and concept of anatomy for theory assessment which was followed by SAQ and PBO.

A similar study was done in UK and found that not a single mode of assessment was perfect to evaluate knowledge, skills and concepts of the students. Therefore, multiple modes of assessment like MCQ, SEQ, SAQ; and practical and viva-voce were more appropriate for evaluation of the medical students which is accordance with this study.

Sources of teaching material

A study revealed that the most of the students preferred textbook as a source of teaching material, followed by teacher’s notes and Internet sources. The similar findings were recorded in the present study, in which textbook was the best source of teaching material for anatomy, followed by Internet sources such as YouTube, PDF etc and teacher’s note.

Limitations

The current study was included on medical students and conducted in only one medical institution. Therefore, one of the limitations of the study was the limited sample size of the students. Hence, the findings of the current study could not be generalized. For generalizations, this type of study should be conducted in others medical colleges or institutions in Nepal which may give more reliable data regarding anatomy teaching and learning. However, even with these limitations, the implications of these findings appear to be applicable as it is congruent with other studies in the same domain.

CONCLUSION

Overall, the students were favoured the tools and methods of teaching and learning anatomy at Kathmandu University School of Medical Sciences. The PowerPoint presentation for theory classes and the cadaveric dissection for practical classes were the most favourable tools for teaching and learning anatomy.

Till date, no single teaching tool or method has been recorded to achieve all curriculum requirements. The best way to teach modern anatomy is by combining multiple pedagogical resources (Dissection, theory classes, practical classes, PowerPoint presentation, PBL etc.) to complement one another.

MCQ was the best mode of assessment to assess knowledge and concept of anatomy for theory whereas for practical, gross anatomy spotter was the best mode of assessment to evaluate skill and critical thinking competencies.

These suggestions can play important role in bridging the communication gaps between the faculties and the students which may enhance quality of teaching and learning environment. These may also help the stakeholders to revisit the medical curriculum to strengthen and maintain the quality of medical education.
ACKNOWLEDGEMENT

The authors are very grateful and thankful to the student who have participated in this study and have their valuable their perceptions.

REFERENCES:

5. KUSMS Medical curriculum, Revised 2011.

CONFLICT OF INTEREST: None

FINANCIAL DISCLOSURE: None