

## Trends in Addressing Different Cognitive Domains in SAQs of Anatomy Paper-I Written Examination Held Under Rajshahi Medical University

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### Abstract

**Background:** Short answer question (SAQ) is an important component of the written part of the first professional MBBS examinations in Bangladesh even after several revisions of the curriculum. No study was noted regarding the status of the implementation of the curricular directive on SAQ to assess the learning of the medical students at Rajshahi Medical University. **Objectives:** The present study was designed to assess the weightage given to different components of the cognitive domain in SAQs in anatomy in the first Professional MBBS Examination held under Rajshahi Medical University. **Materials and methods:** This was a descriptive cross-sectional study conducted in the Department of Anatomy, Ad-din Akij Medical College in Khulna, Bangladesh. All the SAQs of Anatomy, Paper-I of Rajshahi Medical University (from 2019 to 2023) were included. A total of 424 question parts and 550 question segments from 126 SAQs were analyzed in this study. Every question segment was assessed, categorized, and tagged as either recall, understanding, or application types. Then the total marks allocated for each type of the questions were calculated and compared with the total marks (98) allocated for total questions in a paper. Then the resultant weightage of marks was also compared with the curricular directive weightage of marks allotted for each type of SAQ. **Result:** In this study, it was revealed that 87.64% and 12.36% of SAQ segments were recall and understanding types respectively. No application type of question was found in any question paper. **Conclusion:** This study interpreted a lack of implementation of the curricular demands in SAQ question papers.

**Keywords:** SAQ, Anatomy, Recall, Understanding, Application

## Introduction

The assessment is a vital component of medical education, as it allows educators to measure the students' understanding of the subject matter, their mastery of specific skills, and their readiness for real-world application. In addition, a good assessment can help students become more effective self-directed learners (1). Assessment also influences the students' learning process, motivation, and self-regulation (2). Therefore, the assessment should be aligned with the curriculum and the expected outcomes of the medical education program to maintain a high professional standard. Hence, the review and formulation of curriculum components is an ongoing process in several medical schools all over the world (3). In Bangladesh, the undergraduate medical [Bachelor of Medicine and Surgery (MBBS)] curriculum was developed first in 1988 followed by several revisions in 2002, 2012, and 2021. Although the curriculum includes the continual formative assessment, nonetheless, the final summative (professional) examination plays a major role in determining students' passing or failing status. The written papers, viva voce sessions, and practical exercises are incorporated into the final summative examination of the first phase (i.e., the first professional MBBS examination).

The written examination is traditionally an integral part of the evaluation in undergraduate medical education. It is a helpful assessment tool that evaluates students' higher-order cognitive abilities, such as data interpretation and problem-solving techniques, in addition to their memory of facts. The cognitive ability is also assessed by the written examination using essay question (EQ), modified essay question (MEQ), short answer question (SAQ), and multiple-choice questions (MCQ). The SAQ is an open-ended, semi-structured question format. The predetermined marking scheme of SAQ improves its objectivity and even these

questions can incorporate clinical scenarios. Moreover, SAQs have better content coverage as compared to long essay questions (4). Therefore, the SAQs are more flexible in that, they can test creativity, spontaneity, and perhaps the most widely accepted tool. Although, the undergraduate medical (MBBS) curriculum of Bangladesh, published in 2021, shows an extensive modification of the assessment system in the written examination format adopting SEQ (structured essay question), PBQ (problem-based question), and SBA (single-best answer) type MCQ along with MTF (multiple true-false) type MCQ of the previous MBBS curriculum of 2012. However, SAQs still remain as an important part of written examinations in this new curriculum bearing 40% marks in each paper whereas 70% marks were allocated for SAQs in each paper in the previous curriculum. Therefore, the written examinations held under the curriculum of 2012 are a good

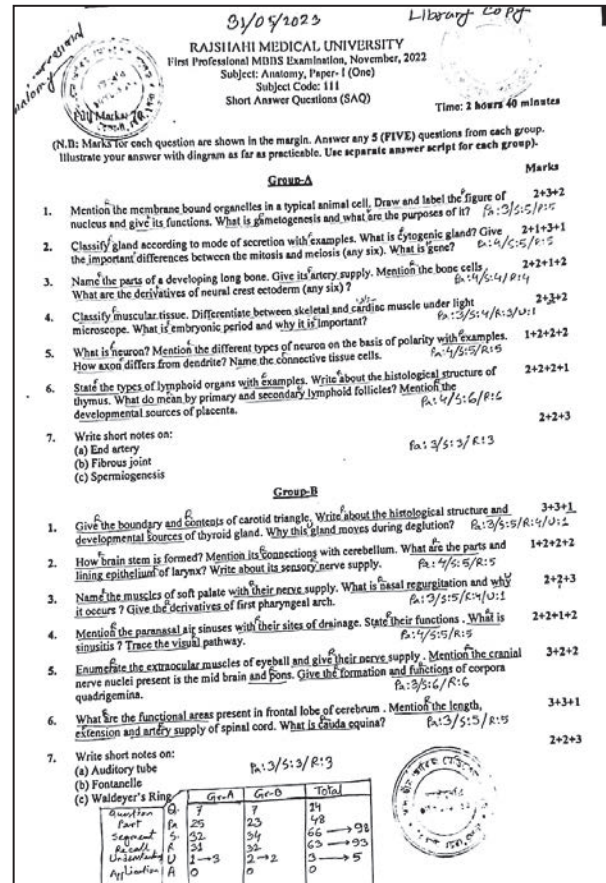
Source of SAQs for analysis which recommended 70% marks for recall, 20% for understanding, and 10% for application types of questions during the construction of the SAQs to assess different cognitive domains of students in anatomy. Moreover, no systematic evaluation has yet been conducted on the status of implementation as directed in the curriculum to assess the medical students' learnings in the first professional MBBS written examination of anatomy held under Rajshahi Medical University, a leading medical university in Bangladesh. Keeping this fact in mind, the present study was conducted to evaluate the status and determine the trends in addressing the cognitive domains of the students in the anatomy of MBBS course while constructing SAQs for the final summative (first professional) examination intended for further improvement in constructing SAQs according to the new MBBS curriculum of 2021.

### Materials and Methods

This descriptive cross-sectional study was conducted in the Department of Anatomy of Ad-din Akij Medical College in Khulna, Bangladesh after obtaining permission from the institutional review board (IRB). The short answer questions (SAQs) of the Anatomy Paper-I of the first professional MBBS examination held under Rajshahi Medical University from the initiation of its activities till date i.e., from May 2019 to May 2023 were selected. As the first professional MBBS examination is being held twice a year, a total of 9 SAQ papers [(2 x 4) + 1 = 9] were included in this study. A total of 14 questions carrying 98 marks were contained in each paper as there were two groups (Group A and Group B) each having seven (07) questions contained seven (07) marks for each question. Every question had one or multiple parts (a separate complete sentence of an SAQ) and every ‘part of an SAQ’ had one or multiple segments (a component of a ‘part of an SAQ’ that calls for a different answer). Therefore, a total of 424 question parts and 550 question segments from 126 questions of 18 groups in 9 question papers were analysis in this study.

Every segment of an SAQ in a paper was assessed, and categorized as recall, understanding, or application type of question and was tagged accordingly by the superscripted symbols on each question paper. The process of selecting the parts and segments of the SAQs and tagging the question-type is shown in Figure 1. Subsequently, a table was formulated to calculate the total marks against each type of question observed in a paper and compared with the total marks of each group (49) as well as that of each paper (98). Then the resultant weightage (percentage) of marks was compared with the curriculum-

recommended weightage (percentage) of marks for the respective component of the addressed cognitive domain (i.e., 70% for recall, 20% for understanding, and 10% for application types of questions). The statistical analysis was carried out using the software SPSS version 25.



**Figure 1:** A sample question paper showing how each ‘part’ (Pa), ‘segment’ (S) and their cognitive domain addressed [‘recall’ (R), ‘understanding’ (U), or ‘application’ (A)] was tagged and counted using underlines, superscripted symbols, and table on each paper.

### Results

Among 424 question parts and 550 question segments of 126 short answer questions studied, the question parts were found more in Group-A (n = 221) than Group-B (n = 203) whereas the question segments were almost

equally distributed among both groups. The distribution of the question parts and the question segments is shown in Table 1.

**Table I:** Distribution of the parts and segments in each group of the question papers

Group	Examination	Part	Segment	Recall	Understanding	Application
<b>Group A</b>	May, 2019	23	29	25	4	0
	November, 2019	22	26	22	4	0
	May, 2020	23	27	22	5	0
	November, 2020	22	25	20	5	0
	May, 2021	26	34	32	2	0
	November, 2021	26	34	31	3	0
	May, 2022	27	33	28	5	0
	November, 2022	25	32	31	1	0
	May, 2023	27	34	32	2	0
<b>Total</b>		<b>221</b>	<b>274</b>	<b>243</b>	<b>31</b>	<b>0</b>
<b>Group B</b>	May, 2019	22	29	27	2	0
	November, 2019	21	35	35	0	0
	May, 2020	20	22	19	3	0
	November, 2020	19	28	25	3	0
	May, 2021	25	31	30	1	0
	November, 2021	25	36	35	1	0
	May, 2022	23	30	27	3	0
	November, 2022	23	34	32	2	0
	May, 2023	25	31	30	1	0
<b>Total</b>		<b>203</b>	<b>276</b>	<b>260</b>	<b>16</b>	<b>0</b>

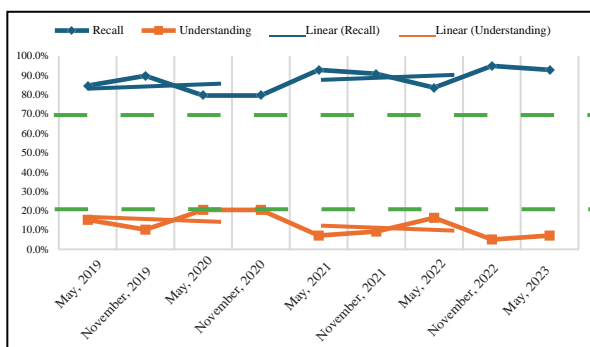
Regarding the cognitive domain addressed in the SAQ papers, it was observed that the mean  $\pm$  SD percentages of marks allocated for the recall type of question was  $87.64\% \pm 7.49\%$  whereas that of understanding type was  $12.36\% \pm 7.49\%$ . The scenario of the distributed marks over the years is shown in Table 2. Moreover, the application type of question was found to be not addressed in any segment of any question paper of any year.

The trends of the types of questions show an increased tendency of occurring the recall type of questions in recent years (the lowest was 79.59% in May 2020 and November 2020 and the highest was 94.90% in November 2022) and it was always far more than the curriculum directed recommendations (70%). A decreasing tendency of occurring the understanding type of questions (lowest was 5.10% in November 2022 and highest was 20.41% in May 2020 and November 2020) was observed

**Table II.** Proportion of the types of questions of the SAQs in Anatomy Paper-I written examination held under Rajshahi Medical University

Examination	Recall	Under-standing	Appli-cation
May, 2019	84.69%	15.31%	0%
November, 2019	89.80%	10.20%	0%
May, 2020	79.59%	20.41%	0%
November, 2020	79.59%	20.41%	0%
May, 2021	92.86%	7.14%	0%
November, 2021	90.82%	9.18%	0%
May, 2022	83.67%	16.33%	0%
November, 2022	94.90%	5.10%	0%
May, 2023	92.86%	7.14%	0%
<b>Mean</b>	<b>87.64%</b>	<b>12.36%</b>	<b>0%</b>

that didn't meet the curriculum directives (20%) except for the year 2020 (Figure 2).



**Fig 2.** Percentages of marks as distributed for different types (recall, understanding, or application) of questions in SAQs of anatomy and their trends over the years in the first professional written examination held under Rajshahi Medical University. Note the green dotted lines placed as reference lines representing the curriculum directed marks for recall (70%) and understanding (20%) types of questions. Record the absence of the application type of questions also.

### Discussion

All the short answer questions (SAQs) of Anatomy, Paper-I of the first professional MBBS written examination held under Rajshahi Medical University were analyzed in this study revealing that the recall type of question is dominating in every group of Paper-I of all question papers (mean was 87.64%) and even it always goes beyond the curricular recommendations of 70%. This increased tendency of distributing more marks for recall type of question is also observed in the first professional MBBS written examination of Anatomy held under the University of Dhaka from the year 2009 to 2014 as observed by Akhter and Sayeed (5), meanwhile, their observed value (76.58%) was almost nearer to the curricular directives. In 2022, Rajwana et al. (6) noted that more than 80% of the total SAQs of physiology written examination among all the four medical universities of Bangladesh were also recall type of question. A report by Tariq et al. (7) in Pakistan also depicted a similar trend of distribution of marks for the recall type of question (90.7%) in their 'internal assessment examination' on pharmacology. However, this higher percentage of occurring the recall type of question in the SAQ papers showed be shifted towards addressing the higher level of the cognitive domains as the assessment culture in the newer curriculum aims at assessing the acquisition of higher- order thinking processes and competencies instead of mere factual knowledge and low-level cognitive skills (8).

In this study, it was found that the weightage of the distributed understanding type of questions (12.36%) throughout the papers did not meet the recommendation of the curriculum (i.e. 20%). Moreover, it showed a downward trend over the last few years. In contrary to this, Akhter and Sayeed (5) observed 23.42% of marks were allocated for the understanding

type in the question papers of the University of Dhaka, which was not much deviated from the curricular directive. Rajwana et al. (6) found 11-13% understand type questions in physiology. Nevertheless, this declining tendency should be taken into account during the construction of questions to implement the recommendations of the curriculum.

The most striking finding of the current study was the absence of the application type questions in all the question papers. This lack was also pointed out by Akhter and Sayeed (5) in the anatomy questions of the University of Dhaka. A very negligible portion of the questions in physiology (0.25-0.95%) were found to be of application type as noted by Rajwana et al. (6). Although the detailed scenario of anatomy, as well as that of the other subjects, is not clear yet, this small scenario of the present study assumes that the effort in the construction of SAQs may not be reached up to the mark or there may be a lack of training on implementation of the curriculum. However, structuring the question papers may improve the status.

### Conclusion

The study interpreted the lack of implementation of the curricular demands in addressing different cognitive domains of the students in the first professional MBBS examination held under Rajshahi Medical University. Nonetheless, further study would be instituted to ascertain the detailed scenario of the written examination of anatomy. To improve the quality of SAQ and increase the efficacy of the faculty members, we recommend regular and intensive training programs on curriculum should be arranged.

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