



Students' Perceptions of Formative Assessment and the Role of Feedback in Learning Tashreehul Badan (Anatomy): A Cross-sectional Study

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ABSTRACT

Background: Formative assessment is intended to support learning by identifying learning gaps and providing information that can guide subsequent study. In the NCISM curriculum, periodic assessments are a structured component of undergraduate Tashreehul Badan (Human Anatomy) education. However, the educational value of formative assessment depends substantially on what happens after assessment, particularly the provision of timely and useful feedback.

Objective: To assess undergraduate students' perceptions of formative assessment and examine the role and consistency of post-assessment feedback in supporting learning in Tashreehul Badan.

Methods: A descriptive analytical cross-sectional survey was conducted among 103 undergraduate students using a structured self-administered Google Forms questionnaire. Data on assessment exposure, perceived learning benefits, study behavior, feedback availability and quality, academic perceptions, and challenges were analyzed using frequencies, percentages, Likert-scale means, and standard deviations. An exploratory Fisher's exact test assessed the association between feedback availability and perceived feedback quality.

Results: All respondents (100%) were aware of the NCISM periodic assessment pattern and 83.5% had appeared in 7–9 formative assessments. The strongest perceived benefits were early identification of weak areas (82.5%) and promotion of consistent study habits (81.6%). The six-item composite Likert score was 3.86 ± 0.61 on a 5-point scale (77.3% of the maximum possible score). The principal implementation gap concerned feedback: only 30.1% reported that feedback was always provided, whereas 68.0% received it sometimes and 1.9% never received it. Although 71.8% rated received feedback as good or excellent, good/excellent ratings were reported by 96.8% of students who received feedback always compared with 61.1% among those who did not receive feedback consistently (Fisher's exact $p < 0.001$).

Conclusion: Students perceived formative assessment favorably, but inconsistent post-assessment feedback represents an important gap in its implementation. Strengthening timely, structured, specific, and actionable feedback may improve the educational value of the existing periodic assessment framework.

Keywords: Formative assessment; feedback; anatomy education; Tashreehul Badan; undergraduate medical education; NCISM; assessment for learning.

Introduction

Tashreehul Badan (Human Anatomy) is a foundational subject in medical education and provides the structural basis for subsequent clinical learning. The breadth of anatomical content and the need to integrate factual knowledge with spatial relationships, visualization, and clinical application can make anatomy demanding for undergraduate learners. Previous literature has highlighted the interaction between memorization, understanding, and visualization in anatomy learning, emphasizing the importance of appropriate teaching and assessment approaches [1–4].

Formative assessment is intended to support learning during the educational process rather than simply document achievement at its conclusion. The educational literature describes assessment as a mechanism for identifying learning gaps, guiding study, and supporting improvement, with feedback representing a critical link between assessment information and subsequent learning [5–10].

Within the National Commission for Indian System of Medicine (NCISM) curriculum, periodic assessments constitute a structured component of undergraduate Tashreehul Badan education [11]. Repeated assessment provides opportunities for learners and teachers to identify areas requiring attention. However, assessment alone does not guarantee learning benefit. Its formative value depends on whether students receive useful information about their performance and are able to use that information to modify their learning.

Evidence from health-sciences and anatomy education suggests that formative assessment can support learning and academic achievement, while feedback can facilitate deeper learning and self-regulation [7–9,12–15]. Nevertheless, evidence concerning students' experience of the NCISM periodic assessment framework in Tashreehul Badan remains limited. The present study therefore focuses on students' perceptions of formative assessment and, specifically, on the consistency and perceived quality of post-assessment feedback.

Aim and Objectives

Aim:

To assess students' perceptions of formative assessment and examine the role of post-assessment feedback in supporting learning in Tashreehul Badan (Anatomy).

To achieve this aim, the study addressed the following specific objectives:

To assess students' perceptions of the effects of formative assessments on conceptual understanding, retention, identification of weak areas, clinical correlation, study habits, and examination-related stress.

To assess the availability and perceived quality of feedback provided after formative assessments and its perceived contribution to learning.

To describe students' experiences regarding assessment frequency, modalities, and difficulty.

To identify challenges associated with periodic formative assessment and obtain suggestions for improving its educational value.

Materials and Methods

Study design and setting

A descriptive analytical cross-sectional survey was conducted among undergraduate Bachelor of Unani Medicine and Surgery (BUMS) students studying Tashreehul Badan. Respondents were drawn from students associated with the Ayurvedic and Unani Tibbia College (Karol Bagh, New Delhi) and the School of Unani Medical Education and Research (SUMER), Jamia Hamdard (New Delhi), as recorded in the survey dataset.

Participants and sampling

A total of 103 students participated voluntarily through an online questionnaire. Because participation was voluntary and the questionnaire was electronically circulated, the sampling approach was voluntary-response/convenience sampling.

Data collection instrument

Data were collected using a structured, self-administered questionnaire delivered through Google Forms. The questionnaire addressed demographic characteristics, awareness and exposure to periodic assessments, perceived effects on learning and study behavior, assessment preferences, feedback availability and quality, perceived academic improvement, challenges and suggestions.

Likert scoring

Responses were scored from 1 to 5: strongly disagree = 1, disagree = 2, neutral = 3, agree = 4, and strongly agree = 5. The composite score was calculated as the respondent-level mean across the six valid items, with a possible range of 1–5.

Statistical analysis

Categorical variables were summarized using frequencies and percentages. Likert items were summarized using frequencies, percentages, mean, and standard deviation. For the feedback-gap analysis, feedback availability was collapsed into 'always' versus 'not always' (sometimes/never), and feedback quality into 'good/excellent' (good/excellent ratings) versus 'average/poor' (average/poor ratings). Fisher's exact test was used because of sparse cells. A two-sided $p < 0.05$ was considered statistically significant. The analysis was exploratory and associations were not interpreted as causal.

Ethical considerations

Participation was entirely voluntary, and respondents were informed of the research purpose prior to completing the survey. Written informed consent was obtained electronically from all participants prior to their participation. Participant confidentiality was maintained by anonymizing the exported survey dataset, ensuring no personally identifiable information was used in the analysis.

Results

A total of 103 students participated. The mean age of the participants was 22.65 ± 1.69 years (range 20–27 years). The sample consisted of 55 males (53.4%) and 48 females (46.6%). All 103 respondents (100%) reported awareness of the NCISM periodic assessment pattern.

Table 1. Demographic characteristics of participants (n = 103)

Variable	Category	n	%
Age	Mean $\pm$ SD	-	22.65 ± 1.69
Age	Range	-	20–27
Gender	Male	55	53.4%
Gender	Female	48	46.6%

Most students (86; 83.5%) had appeared in 7–9 formative assessments, 14 (13.6%) in 4–6, and 3 (2.9%) in 1–3. Three assessments per term were considered adequate by 65 (63.1%), too frequent by 36 (35.0%), and insufficient by 2 (1.9%). The perceived difficulty of assessments was moderate for 96 students (93.2%), too difficult for 5 (4.9%), and easy for 2 (1.9%).

Table 2. Exposure to and perception of periodic assessments (n = 103)

Variable	Response Category	n	%
Assessments attempted	1–3	3	2.9%
	4–6	14	13.6%
	7–9	86	83.5%
Assessment Frequency	Adequate	65	63.1%
	Too frequent	36	35.0%
	Insufficient	2	1.9%
Perceived Difficulty	Moderate	96	93.2%
	Too difficult	5	4.9%
	Easy	2	1.9%

Students generally reported highly favorable learning effects across several academic dimensions. The highest levels of agreement (agree or strongly agree combined) were recorded for early identification of weak areas (82.5%) and the promotion of consistent study habits (81.6%). Favorable perceptions were also reported for improved understanding of anatomical concepts (75.7%), long-term retention of subject material (75.7%), reduced pre-university examination stress (72.8%), and clinical correlation understanding (63.1%).

Table 3. Students' perceptions of learning effects of formative assessments (5-point Likert scale; n = 103)

Statement	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Mean $\pm$ SD
Understanding anatomical concepts	19 (18.4%)	59 (57.3%)	21 (20.4%)	3 (2.9%)	1 (1.0%)	3.89 $\pm$ 0.77
Long-term retention	18 (17.5%)	60 (58.3%)	21 (20.4%)	2 (1.9%)	2 (1.9%)	3.87 $\pm$ 0.79
Early identification of weak areas	23 (22.3%)	62 (60.2%)	13 (12.6%)	2 (1.9%)	3 (2.9%)	3.97 $\pm$ 0.83
Clinical correlation	14 (13.6%)	51 (49.5%)	29 (28.2%)	6 (5.8%)	3 (2.9%)	3.65 $\pm$ 0.89
Consistent study habits	23 (22.3%)	61 (59.2%)	14 (13.6%)	4 (3.9%)	1 (1.0%)	3.98 $\pm$ 0.78
Reduction in examination stress	18 (17.5%)	57 (55.3%)	20 (19.4%)	7 (6.8%)	1 (1.0%)	3.82 $\pm$ 0.84

The composite Likert score calculated across the six valid items was 3.86 ± 0.61 on a 5-point scale, equivalent to 77.3% of the maximum possible score. This indicates an overall high level of perceived learning benefit from the periodic formative assessments.

Table 4. Composite Likert score for perceived learning benefits (six valid items; n = 103)

Measure	Value
Valid non-duplicated items	6
Possible score range	1–5
Mean composite score $\pm$ SD	3.86 $\pm$ 0.61
Observed score range	2.17–5.00
Percentage of maximum possible score	77.3%

4.1 Influence on study behavior and assessment modalities

Formative assessments were reported to influence study patterns by 85 students (82.5%), while 16 (15.5%) were uncertain and 2 (1.9%) reported no influence. Across the entire sample, 60 (58.3%) identified the development of regular study habits as the primary behavioral change, followed by improved conceptual understanding (24.3%), last-minute preparation (14.6%), and rote learning (2.9%).

In terms of assessment methods, Multiple Choice Questions (MCQs) were selected as the most helpful format by 31 students (30.1%), closely followed by viva voce (28 students; 27.2%), short-answer questions (25 students; 24.3%), and practical formats including OSCE/DOPE (19 students; 18.4%).

Table 5. Influence on study behaviour and preferred assessment modality (n = 103)

Variable	Response Option	n	%
Study pattern influenced	Yes	85	82.5%
	Maybe	16	15.5%

Variable	Response Option	n	%
	No	2	1.9%
Main study behavior change	Regular study habit	60	58.3%
	Conceptual understanding	25	24.3%
	Last-minute preparation	15	14.6%
	Rote learning	3	2.9%
Most helpful assessment format	MCQs	31	30.1%
	Viva Voce	28	27.2%
	Short Answer Questions	25	24.3%
	Practical / OSCE / DOPE	19	18.4%

4.2 The feedback gap

The principal finding of this study concerns the consistency and provision of post-assessment feedback. Only 31 students (30.1%) reported that feedback was always provided after assessments, whereas 70 (68.0%) reported that it was provided sometimes, and 2 (1.9%) never received it. Thus, a substantial majority of 72 students (69.9%) experienced inconsistent post-assessment feedback.

Table 6. Frequency of post-assessment feedback (n = 103)

Feedback Availability	n	%
Always	31	30.1%
Sometimes	70	68.0%
Never	2	1.9%
Total	103	100.0%

Despite the inconsistency in feedback delivery, the perceived quality of the feedback received was generally highly favorable: 19 students (18.4%) rated the quality as excellent, 55 (53.4%) as good (resulting in a combined good/excellent rating of 71.8%), 28 (27.2%) as average, and 1 (1.0%) as poor.

Table 7. Perceived quality of post-assessment feedback (n = 103)

Quality Rating	n	%
Excellent	19	18.4%
Good	55	53.4%
Average	28	27.2%

Quality Rating	n	%
Poor	1	1.0%
Total	103	100.0%

To explore the relationship between the availability of feedback and its perceived quality, the variables were collapsed. Feedback availability was divided into 'always' versus 'not always' (sometimes/never), and quality was divided into 'good/excellent' versus 'average/poor'. Among the students who reported always receiving feedback, 30 of 31 (96.8%) rated its quality as good/excellent. In contrast, among those who did not receive feedback consistently (not always), 44 of 72 (61.1%) rated its quality as good/excellent. Conversely, average/poor ratings were reported by only 1 of 31 (3.2%) students who always received feedback, compared with 28 of 72 (38.9%) students who did not receive it consistently.

Table 8. Association between feedback availability and perceived feedback quality (n = 103)

Feedback Availability	Good/Excellent n (%)	Average/Poor n (%)	Total Row n
Always	30 (96.8%)	1 (3.2%)	31
Not always	44 (61.1%)	28 (38.9%)	72
Total Column n	74 (71.8%)	29 (28.2%)	103

Fisher's exact test demonstrated a highly statistically significant association between feedback availability and its perceived quality (odds ratio = 19.09; two-sided $p < 0.001$). This indicates that consistent feedback delivery is strongly linked to how students perceive the overall standard of the educational guidance provided. However, this is an exploratory association and cannot be interpreted as a causal effect of feedback frequency on feedback quality.

4.3 Perceived academic benefit and challenges

Sixty-nine students (67.0%) reported a subjective improvement in their marks over successive periodic assessments, while 31 (30.1%) were uncertain and 3 (2.9%) reported no improvement. In addition, a large majority of 82 students (79.6%) believed that formative assessments would help them perform better in the final university examination. It is critical to note that these findings represent students' perceived academic improvement rather than objectively measured academic performance.

The survey also highlighted several prominent challenges faced by students regarding frequent assessments. The most frequently reported main challenges were examination-related stress (34 students; 33.0%), overall time constraints (31 students; 30.1%), and inadequate preparation time (30 students; 29.1%). In comparison, a lack of feedback (7 students; 6.8%) and poor question quality (1 student; 1.0%) were less commonly cited as primary challenges.

Table 9. Perceived academic benefit and main challenges (n = 103)

Variable	Response Category	n	%
Marks improved over successive tests	Yes	69	67.0%
	Maybe	31	30.1%
	No	3	2.9%
Formative assessments help in final exam	Yes	82	79.6%
	Maybe	19	18.4%
	No	2	1.9%

Variable	Response Category	n	%
Main challenge faced	Stress	34	33.0%
	Time constraint	31	30.1%
	Inadequate preparation time	30	29.1%
	Lack of feedback	7	6.8%
	Poor question quality	1	1.0%

Discussion

The findings of this study demonstrate that undergraduate BUMS students generally perceive periodic formative assessments in Tashreehul Badan (Human Anatomy) positively. However, the study also identifies a critical implementation gap: post-assessment feedback is not consistently provided. While students highly value the academic benefits of these assessments—especially in the early identification of weak areas and the promotion of consistent study habits—the results indicate that the educational potential of repeated periodic assessments remains underrealized because students do not consistently receive specific, actionable feedback to guide their subsequent learning.

Early identification of weak areas was the most strongly endorsed learning benefit, with 82.5% of students in agreement (mean score of 3.97 ± 0.83). This finding aligns with the core educational purpose of formative assessment, which functions to map learning deficiencies while students still have opportunities for remediation [5,6,8–10]. Early identification is particularly critical in Tashreehul Badan, where students must move beyond rote memorization to master spatial relationships, visual recognition of anatomical structures, and clinical correlations [2–4].

The highly favorable perceptions of conceptual understanding (75.7%) and long-term retention (75.7%) are consistent with health-sciences literature indicating that structured formative assessments support academic achievement [7,12]. Previous studies in anatomy education have reported similarly positive student perceptions and suggested that formative exercises prepare students for high-stakes summative evaluations [13,14]. However, because the current study relies on self-reported perceptions rather than objective academic records, these findings represent perceived academic improvement rather than demonstrated causal effects.

Another key benefit is the reported influence of formative assessments on student study habits. More than four-fifths of respondents (82.5%) reported that periodic assessments influenced their study patterns, with 58.3% identifying the development of regular, consistent study habits as the primary change. This is a desirable educational outcome because the large, dense volume of anatomical content often leads students to resort to cramming and last-minute memorization. This outcome supports the paradigm of 'assessment for learning' and is compatible with previous studies on the interaction of memorization, understanding, and visualization in anatomy [2,5,10]. Nevertheless, longitudinal studies are necessary to evaluate whether these self-reported study habits are sustained over time.

The most significant contribution of this study is the characterization of the feedback gap. Although 71.8% of the respondents rated the feedback, they received as good or excellent, only 30.1% reported that feedback was always provided. The majority (68.0%) received feedback only sometimes. This distinction is vital: the presence of an assessment alone does not make it formative. Feedback is the necessary mechanism that helps learners identify the gap between their current level of understanding and the expected standard, providing them with a path forward [8,9,15,16].

The exploratory analysis underscores this link. Good or excellent feedback was reported by 96.8% of students who always received feedback, compared with only 61.1% of those who received it inconsistently ($p < 0.001$). This highly significant association suggests that the perceived quality and value of feedback are deeply tied to its consistency and reliability, rather than being viewed as an optional, ad-hoc post-assessment activity. This interpretation is supported by recent anatomy-education studies showing that formative assessment accompanied by consistent feedback significantly reinforces anatomical concepts and supports self-regulated learning [13,15]. Feedback must be structured, specific, and actionable to have educational value [15].

Effective feedback in Tashreehul Badan should therefore go beyond simply providing marks or showing correct and incorrect answers. It should clarify what the student understood correctly, point out the specific anatomical structure or concept requiring improvement, explain the nature of the error, and recommend study strategies [9,16].

The study also highlights a tension between regular assessment and student workload. Although 63.1% regarded three assessments per term as adequate, 35.0% found this frequency too high. Stress (33.0%), time constraints (30.1%), and inadequate preparation time (29.1%) were the most prominent challenges. This suggests that the solution is not to reduce formative assessments, which are curriculum-defined, but to ensure they are appropriately spaced, aligned with learning outcomes, and followed by feedback. Repeated assessments without feedback add to the academic burden without achieving their formative purpose.

The distribution of preferred assessment modalities was balanced among MCQs (30.1%), viva voce (27.2%), short-answer questions (24.3%), and practical formats (18.4%). This supports a multimodal assessment framework in anatomy, which must evaluate diverse competencies including recall, explanation, identification, and hands-on clinical application [1,3,17].

From an educational perspective, the findings support a simple feedback cycle within the existing NCISM periodic assessment structure: assessment, identification of learning gaps, feedback, remediation, and subsequent assessment. This cycle would allow periodic assessments to function clearly as assessment-for-learning rather than primarily as repeated measurements of performance.

Study Limitations

Several limitations of the present study must be acknowledged. First, the study is cross-sectional and relies on self-reported perceptions; therefore, it cannot establish causality or objectively demonstrate improvement in actual learning outcomes or final examination performance. Second, the sample of 103 students was drawn using convenience/voluntary-response sampling from two Unani medical institutions, which may introduce selection and response bias, limiting the generalizability of the findings. Third, the small number of students who reported that feedback was 'never' provided (1.9%) limits the statistical precision of subgroup comparisons. Finally, to preserve data integrity, one duplicated and mislabeled Likert item in the Google Forms export was excluded from the composite scoring rather than being recoded based on assumptions.

Conclusion

Undergraduate BUMS students in this study perceived formative assessment in Tashreehul Badan favorably, particularly for identifying weak areas and encouraging regular study. The principal finding, however, was a clear feedback gap: while 71.8% rated the feedback they received as good or excellent, only 30.1% reported receiving feedback consistently. Students who reported consistent feedback were substantially more likely to rate its quality as good or excellent (96.8% vs. 61.1%, $p < 0.001$). These findings suggest that the educational value of the existing periodic assessment framework may be strengthened not simply by conducting repeated assessments, but by ensuring that each assessment is followed by timely, structured, specific, and actionable feedback. Objective effects on examination performance should be evaluated separately using academic records in future longitudinal studies.

Recommendations

Establish a standardized post-assessment feedback protocol for Tashreehul Badan across Unani medical institutions.

Ensure that structured feedback is provided within a defined, short time period after each periodic assessment.

Provide multidimensional feedback that goes beyond scoring: identify errors, explain relevant anatomical concepts, and offer specific study recommendations.

Utilize a balanced mix of assessment modalities (written, oral, and practical formats) mapped directly to intended learning outcomes.

Review assessment scheduling to minimize avoidable stress, ensuring appropriate gaps and adequate preparation time.

Conduct a separate, objective-outcome study using the nine formative assessment scores and university examination results to determine academic correlation.

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