Brief Report

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Effect and impression of structured feedback in formative assessment of medical undergraduates of Eastern India

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Abstract:

Feedback, the integral component of formative assessment, should be timely, specific, and methodical. Feedback is a stop-gap that helps the learner to assess their performance and reinforce their desire to learn. This study was conducted to explore the effectiveness of feedback in improving the performance of medical undergraduates in formative assessment and assessment of perceptions of students about feedback. This comparative interventional study was conducted to monitor the improvement in formative assessment scores after the structured feedback. Medical undergraduates of phase1 (Bachelor of Medicine and Bachelor of Surgery (MBBS) Batch 2022–2023) of Bankura Sammilani Medical College and Hospital were included as the study participants. The proportion of students having scores <50% and >50% between the two formative assessments were compared using the Chi-square test. A questionnaire in the Likert scale was devised to assess the perception of students regarding quality of feedback and analyzed by Tastle and Wierman formula. The number of students scoring > 50% as well as their mean formative assessment scores increased significantly after feedback ($P = 0.0009$). The majority of the students proclaimed that feedback was non-judgmental and motivated for the study. Feedback motivated students to assess their deficits and encouraged the desire to study to overcome the lacunae. The majority of the students (65.9%) strongly voiced that the feedback was effective, valuable, and non-judgmental.

Keywords:

Feedback, formative assessment, performance, undergraduates

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Introduction

An effective feedback significantly helps to boost learner's confidence and performance.[1] Feedback, an integral part of formative assessment, provided immediately after formative assessment is a stop-gap that helps the learner to assess their performance and reinforce their desire to learn. Sometimes, critical feedback if delivered in an improper manner may demotivate students. Moreover, literature survey suggests that sometimes, self-assessment may be wrong and thus the external feedback from facilitators is quintessential.[2] Feedback helps learners to reconstruct their knowledge, gain confidence, and provide enthusiasm toward further learning. A feedback helps the students to achieve their learning goals when it is properly structured and constructive[3] but there are a number of hurdles toward delivery of appropriate feedback as facilitators even are unaware of proper methodology of feedback. Further, the teaching faculty and the students must be receptive to both giving and receiving feedback.[4] Looking back at the previous curriculum for medical undergraduates in India, the formative assessment was embedded in the curriculum as items but

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surprisingly, appropriate and timely feedback to all the students was not prevalent in all the institutions. Feedback should be in a form in which the learner is satisfied and should not inculcate a feeling of embarrassment and rejection in the learner. Existing literature suggests that feedback should be customized to the learner's need.[5] There is a continuous need for constructive feedback in Undergraduate healthcare science students during educational process.[6] In this context, this study was designed to assess the perception of undergraduate Bachelor of Medicine and Bachelor of Surgery (MBBS) students regarding the feedback post-formative assessment and monitor their sequential performance. While most of the previous studies conducted in Asia focused only on the low achievers, the novelty of the study lies in involving both low- and high-achieving students. The effectiveness of feedback was evaluated by assessment of students, and the quality of feedback was evaluated by recording the opinion of the students.

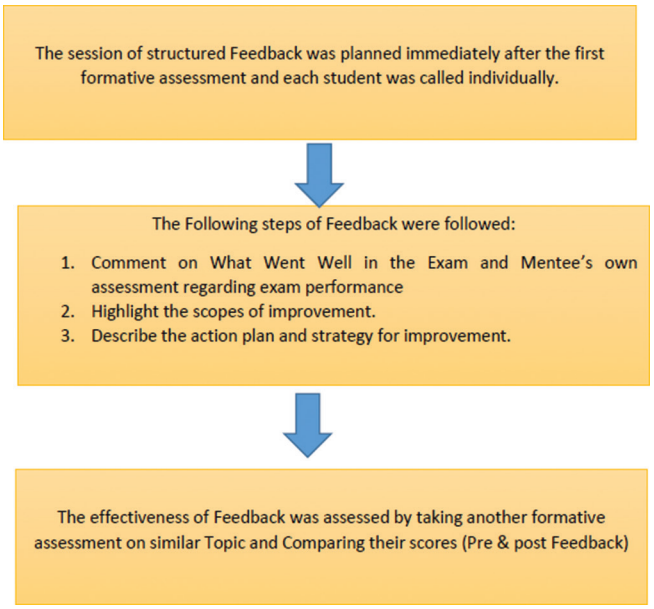

Figure 1: Flow Diagram of Feedback Session

Materials and Methods

Study design and setting

This cross-sectional, interventional study was conducted among the 2022–2023 batch of phase I MBBS for a period of 6 months from January 2023 to June 2023 in the Department of Biochemistry.

Study participants and sampling

This study involved categorical variables, such as perception about the feedback, and sample size was determined using the table adapted from a study by Anokye Adam using 95% confidence interval and margin of error of 0.05.[7] The total number of students in phase1 MBBS was 200 (population size = 200). Considering 95% confidence interval and margin of error of 0.05, the sample size turns to be 132. With 10% non-responders, minimum sample size = 132 + 13 = 145. The first professional MBBS students of the 2022–2023 batch who voluntarily agreed to participate in the study were included as the study participants. Students unwilling to participate were excluded.

Data collection tool and technique

The scores of the student were tabulated after the first formative assessment, and the students were grouped under two categories <50% and >50%, according to cut-off based on National Medical Commission (NMC) guidelines of Undergraduate Assessment.[8] The steps of structured feedback were planned according to Pendleton's model.[9] The following steps were followed according to Figure 1. The students were allowed to appear for a second formative assessment on the same topic. The proportion of students were again categorized on the basis of scores as <50% and >50%. The proportion were compared using the Chi-square test. The scores of the student were in non-parametric distribution, and the medians of scores were compared using the Mann-Whitney U-test. The IBM SPSS Statistics version 22.0 was used for the Chi-square test and Wilcoxon signed-rank test. Moreover, opinion about the quality of feedback was collected using a questionnaire. The questionnaire items were in Likert-type scale, where the responses were categorized as "Strongly disagree," "Disagree," "Neither agree nor disagree," "agree," and "strongly agree." The questionnaire estimated content validity and reliability coefficient using Cronbach's alpha (with Cronbach's alpha = 0.785).[10]A pre-tested and validated questionnaire (Proforma) in Google Forms (https://forms.gle/nEG7ATTEpBPR83549) was given to the students after explaining details about its various contents. No option for name entry by the students was available in Google Forms to maintain anonymity. The consensus opinion of Likert scale items was analyzed using the formula adapted from Tastle and Wierman.[11]

Ethical consideration

This study has been conducted in the Department of Biochemistry vide Memo No: BSMC/IEC/945 dated 23/03/2023. Informed consent has been taken from the study participants.

Results

The formative assessment scores of a total of 200 students were compared. The students were grouped into two categories after the first formative assessment as students achieving <50% and >50%. It is evident from Table 1 that after the first formative assessment, 66 (33%) and

134 (67%) students scored <50% and >50%, respectively. However, after the second formative assessment, 43 (21.5%) and 157 (88.5%) students scored <50% and >50%, respectively. There was a significant rise in the proportion of students who crossed the 50% cut-off scores post-feedback as evident from the Chi-square test (P = 0.0009). The number of students after the first formative assessment according to scores <35%, 35–<50%, 50–<75%, and ≥ 75% was 10, 56, 126, and 8, respectively, but the number of students after second formative assessment (post-feedback) according to scores <35%, 35-<50%, 50-<75%, and ≥ 75% was 7, 36, 149 and 8 respectively. Though the number of students crossing the 50% cut-off increased from 126 to 149, there was no significant statistical difference (P = 0.07853) as evident from Table 2. The scores of the first formative assessment were compared to the second formative assessment after feedback, and it was observed that the scores were in non-Gaussian distribution. The medians of the score were compared using the Wilcoxon signed-rank test. The medians of the score in the first and second formative assessments were 54.5 and 57, respectively. It was observed that the scores increased significantly in the second formative assessment as evident from Table 3.

A questionnaire was given to 200 students via Google Forms to know the insight into the students about the quality of feedback. Of 200, only 174 students voluntarily participated in the survey. It was observed that 65.9% strongly voiced that feedback was non-judgmental and constructive. About 84.4% and 82.6% of the participants had a strong consensus agreement that the feedback motivated them to study and facilitators detailed a plan for improvement. About 87.3% of the students had a strong consensus opinion of 0.74 that the purpose of feedback was thoroughly explained as evident in Table 4.

Table 1: Comparison of the proportion students in two categories (1.e., <50% and >50%)in the first and second formative assessments (post-feedback)

Assessment	<50%	>50%	Chi-square test
1st formative assessment	66	134	P=0.009**
2nd formative assessment (post-feedback)	43	157	

**P<0.05, statistically significant

Table 2: Comparison of the proportion of students according to scores in the first and second formative assessments (post-feedback)

Assessment	<35%	35-<50%	50-74%	>75%	Chi-square test
1st formative assessment	10	56	126	8	P=0.078523##
2nd formative assessment (post-feedback)	7	36	149	8	

##P>0.05, statistically insignificant

Table 3: Comparison of median values of scores between first and second formative assessments (post-feedback)

Groups	Mean rank	Wilcoxon signed-rank test
1st formative assessment score	93.30	Z=-3.766, P<0.005***
2nd formative assessment score (post-feedback)	99.06	

***P<0.05, statistically significant

Discussion

This study aimed to assess the effectiveness of feedback and monitor the change in the performance of students by comparing the formative assessment scores (pre- and post-feedback). An interventional study was conducted by Patil and associates to evaluate the effect of feedback after the first formative assessment on the final scores of first-year undergraduates.[12] They only involved the students who achieved low scores in the first formative assessment, as the study participants (n = 30). The students were arranged in alphabetical order of the names and were sub-grouped as groups A and B according to odd and even serial numbers. Group A only received feedback, whereas group B did not. It was seen that there was an improvement in the long-term summative assessment score of students who received feedback. Thus, there are lacunae in the methodology. Here, the effectiveness of feedback was assessed by a final university examination. The effectiveness of feedback should be assessed by serial formative assessment, not to be assessed by a snapshot of performance in university examination. Moreover, they only focused on low-achieving students. However, our study involved 200 study participants and assessed the effectiveness of feedback among the low achievers as well as high-scoring candidates. Our study findings corroborate with the interventional study of Kadiyala and associates where only 10.99% of students scored <50% marks after feedback as compared to 16.48% pre-feedback assessment.[13] There was no significant increase in the number of students scoring >75% as evident from Table 2. This finding is contrary to the findings of Guthi *et al*.[14] where the number of students >75% increased from 50.6% to 57.7%.However, they compared the proportion of the first formative assessment to summative examination. In our study, the median of scores of the first formative assessment was compared to the second formative assessment after feedback and it was observed that the scores were in non-Gaussian distribution. It was observed that the scores increased significantly in the second formative assessment as evident from Table 3. Similar findings were noted by the interventional study of Guthi *et al*.[14]

In a prospective study conducted by Gupta and associates to assess the perceptions of first-year MBBS

Table 4: Opinion of students regarding quality of feedback. Figure in parentheses suggests percent distribution

Indicator	Statement	Strongly agree andagree	Consensus score****
Students' opinion	Purpose of feedback session was thoroughly explained	151 (87.3%)	0.74
	The teacher acknowledged our effort initially	113 (65.3%)	0.64
	Comments and suggestion were made for improvement	156 (86.2%)	0.74
	The feedback was non-judgmental and constructive	114 (65.9%)	0.67
	The teacher detailed a plan for improvement	143 (82.6%)	0.72
	Feedback session motivated for the study	146 (84.4%)	0.72

****The consensus score among the Likert scale items was calculated by the formula as described by Tastle and Wierman

students (n = 135), a feedback questionnaire on a 7-point Likert scale (1 = poor to 7 = excellent) was designed. Nearly, 70% of students felt that the feedback sessions helped them recognize their learning gaps.[15] In our study too, the opinion of the students was recorded in a Likert Scale Questionnaire and the consensus scores were calculated. Of 200, only 174 students voluntarily participated in the survey. It was observed that 65.9% strongly voiced that feedback was non-judgmental and constructive. About 84.4% and 82.6% of the participants had a strong consensus agreement that the feedback motivated them to study and facilitators detailed a plan for improvement. These findings are similar to the findings of another study.[16] The students opined that the feedback was conducted according to prior intimation and planning. It emphasized the positives in the participants and chalked out a plan to revamp the deficits. The results derived from this study will motivate facilitators to assimilate the policy of providing effective feedback after every formative assessment. Moreover, the study also emphasized on encouragement of feedback-seeking behavior in students.

Conclusion

The scores of the students significantly increased after the feedback session in the second formative assessment. A significant rise in the proportion of students crossed the 50% cut-off[8] after the feedback session in the second formative assessment. The majority of the students agreed that the feedback was non-judgmental, structured, and constructive in nature. It was well-designed and motivated the students to plan for further study and detailed scope of improvement. It was one of the few studies that not only showed the effectiveness of feedback by comparing the scores of the candidates in successive formative assessment. This study addressed all these issues pertinent to feedback, monitored the performance in assessment after feedback, and received the perception about feedback among the undergraduate medical students.

Limitations and recommendation

The study was questionnaire-based and Likert-type scale-based; hence, quantitative data could not be collected. Open questions, interviews, and observations should be incorporated in the future. The results from this study cannot be generalized as it was a single-center study. Studies should be conducted in multiple centers. As unwilling students were excluded from the study, the students who participated in the study might have stronger motivation to learn; therefore, results cannot be generalized.

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Conflicts of interest

There are no conflicts of interest.

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