Original Article

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Enhancing Medical Proficiency: A Comparative Analysis of Performance of MBBS Doctors before and after Internship Training

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Abstract

Background: The medical students become MBBS doctors after qualifying in different assessments according to curriculum. But there is no objective evaluation system in the curriculum to test the performance of doctors after finishing training and before issuing the MBBS certificate. This study aims at finding out whether the fresh doctors improve or deteriorate in theoretical knowledge after internship training. The results may be of value in determining the necessity of introducing an evaluation test for interns at the end of internship training.

Materials and Method: Eighty-four fresh MBBS doctors who passed from Sylhet Women's Medical College were selected as participants. They were assessed twice during the study. First assessment was taken before their joining as interns and the second assessment was taken one year later, after the completion of the internship training. Same evaluation tool was used for both the assessments. Fifty 'single best answer' type questions carrying equal marks (total 100 marks) were set involving all disciplines of the phase 4, MBBS curriculum, as the evaluation tool. More weightage was given on understanding (38%) than recall (25%) type questions. The obtained marks by each student in the two assessments were compared and statistical significance of the difference in average score was calculated by paired t-test. The study was kept hidden from the participants, most of the co-researchers and the teachers/trainers until the end of the completion assessment to avoid bias. The students were also kept blind about the post-test during their training.

Results: There was a significant (*p value* 0.001931) difference between the pre-and-post test scores among doctors with a worsening of post-test average than pre-test, indicating deterioration in the theoretical knowledge status among doctors after 1 year of training.

Conclusion: According to this study, the participating doctors deteriorated in their theoretical competence after the internship training. However, further studies are needed to see whether this finding is reproducible or not.

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Introduction

The journey from medical school to professional practice is a transformative period marked by theoretical learning and hands-on clinical experience.[1]

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For graduates with a Bachelor of Medicine, Bachelor of Surgery (MBBS) degree, the transition into internship training plays a pivotal role in shaping their clinical acumen and refining their skills. Of many objectives of this training, the important ones are- improving in clinical skill, learning professional responsibility, and a warming-up for the post-graduate residency.[2] The rotatory internship training in Bangladesh is a pre-requisite for MBBS certificate and registration under the BM&DC (Bangladesh Medical and Dental Council. This training program, however, is not structured and there is no provision for evaluation and feedback.[3]

This article aims to explore and compare the performance of MBBS doctors before and after undergoing internship training, shedding light on the impact of this crucial phase on their medical proficiency in terms of theoretical knowledge. As medical education evolves to meet the dynamic demands of healthcare, understanding the efficacy of internship training becomes imperative.[4] The internship period serves as a bridge between academic knowledge and real-world patient care scenarios, providing aspiring physicians with the opportunity to apply their theoretical understanding in a practical setting.[5]This investigation delves into the tangible outcomes of this transitional phase, seeking to evaluate how it influences the competence, decision-making abilities, and holistic approach of MBBS doctors as they embark on their professional journey. Through a comprehensive analysis, the researchers of this study aim to contribute valuable insights to the ongoing discourse surrounding medical education and the continuous enhancement of healthcare practitioners' capabilities.

The existing medical education curriculum certifies students as MBBS doctors based on assessments conducted throughout their academic journey. However, there is a notable absence of an objective evaluation system to assess the performance of doctors immediately post-internship, prior to receiving the MBBS qualification.[6] This study seeks to investigate whether recently graduated doctors experience an enhancement or decline in theoretical knowledge following internship training.

Materials and Method

This was a quasi-experimental study carried out from November 2022 to November 2023 in Sylhet Women's Medical College (SWMC), Bangladesh. Approval from the Institutional Review Board (IRB) was obtained.

The participants

The participants were the fresh MBBS doctors of SWMC passing in the regular academic session of 2022. This cohort was subjected after consent to undertake an evaluation test just before joining training as interns. Their individual scores in the test were recorded. They were kept blind about the study until the post training assessment just after completion of internship training, which was carried out with the same set of questions. The scores in the post-tests were again recorded. A total of 84 participants were primarily selected. But 12 of them did not appear in the pre-test and 2 were absent from the post-test (Figure 1). The remaining 70 students, who took part in both the tests, were finally taken into account for analysis. Not only the participants, but also the majority of the co-researchers and, the teachers/trainers were kept unaware of the study throughout the whole process so that the post-test results could remain free from any voluntary intervention.

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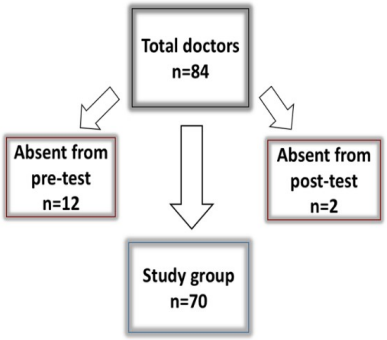
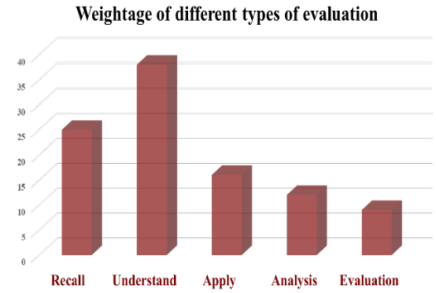
Figure-1: *Flow-chart of enrolment*



The assessment tool: question

It was a multi-disciplinary evaluation of the theoretical knowledge of phase 4 MBBS course with Single Best Answer (SBA) type questions based on the MBBS curriculum, prepared by regular question setters of the professional examinations. Pilot testing and refining of the question was done on a small sample of fifth year MBBS students before final tests were done. The total allocated score of the question was 100, with 40 marks for Medicine and allied, 40 marks for surgery and allied and, 20 marks for obstetrics and gynecology. The questions were selected with recall (25%), understanding (38%), application (16%), analysis (12%) and, evaluation (9%) weightage (Figure 2).

Figure 2: *Weightage of questions*



The assessment details

The assessments were undertaken through google forms with 1 hour allocated time. The study subjects participated online but had to be physically present in the examination venue during exam. They could view neither their scores nor their errors instantaneously. The scores were machine-generated and were preserved in the response spread-sheets. The pre-test and post-test questions had the same content but were accessed through different links to avoid chances of 'response memory' in devices. This assessment was independent of the internship logbook performances.

Statistical analysis:

The statistical analysis was done by a type 1, one-tailed, paired t-test in Microsoft Excel Spreadsheet Software (Microsoft 365). It was a per-protocol analysis on the 70 participants who participated in both the tests. The combined score graphs (Figure 4) and, the 'Bell curves' (Figure 5) were also prepared using the same software. However, the total point distribution graph was directly obtained from the 'google form' results (Figure 3).

Results:

Of the 70 participants 24 had increased scores in the post-test (a total of 124 increase in score), 7 had equal scores in both the tests whereas, 39 participants had decreased scores in the post-test (a total of 302 decrease in score) [**Figures 3, 4**]. There was a reduction in average score in the post-test than the pre-test indicating deterioration in theoretical knowledge status after 1 year training of period. The normal distribution curves of performance of participants in the two tests are shown in **Figure 5.** And this difference was statistically significant (***p-value***0.001931) as shown by the paired t-test analysis of the pre-and-post test scores among doctors. The average pre-test and, post-test scores were 79.42 and 76.52 respectively. The mode, median, variance, standard deviation (SD) and, range differences between the two test scores of respondents are shown in **Table 1**.

Figure 3: Total point distribution in chronology of response in pre and post-tests (generated by google form)

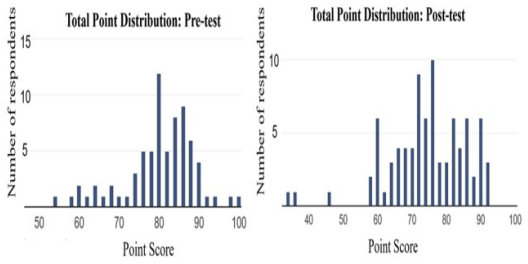


Figure 4: The 'Bell curves' of performance in the two tests.

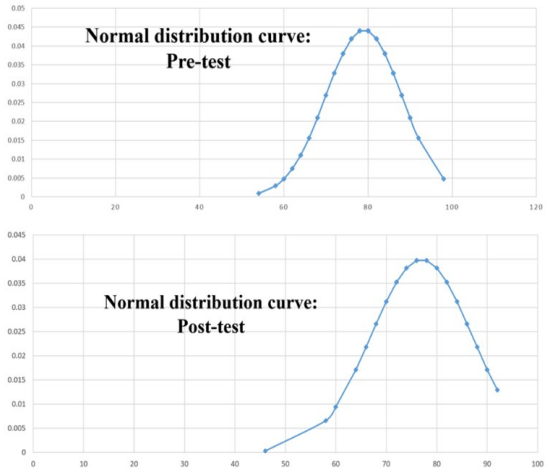


Figure 5: Comparative graphs of the respondents' scores in the two tests

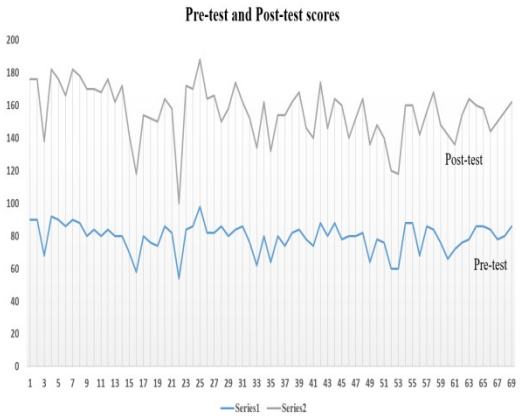


Table 1: Statistical differences between pre and post tests

Score parameter	Pre-test value	Post-test value
Average	79.42	76.52
Mode	80	72
Median	80	76
Variance	77.54	93.96
SD	8.81	9.69
Range	44	46

Discussion

Internship in the MBBS (Bachelor of Medicine, Bachelor of Surgery) medical curriculum is a mandatory period of supervised practical training that follows the completion of the undergraduate medical degree. It serves as a bridge between the theoretical knowledge gained during medical school and the practical skills required in clinical practice. During the internship, medical graduates, known as interns or house officers, work in various departments of a hospital, gaining hands-on experience in areas such as internal medicine, surgery, pediatrics, obstetrics and gynecology, and more.[1,7] The principal objective of this rotatory training is to become practically skilled through experience. But future service and post-graduate education needs both theoretical and practical competence. Many countries of the world, including the USA, Australia, the UAE and, Singapore have reformed their medical curricula to improve undergraduate and postgraduate medical education to enhance competency in knowledge and skill of doctors. Some of them have adopted competency-based curricula in the residency training which has attracted educators more than the current transitional internship training.[4,8]

The analysis of the study results, involving 70 participants, revealed diverse trends in the post-internship performance. Notably, 34.3% of participants (24 out of 70) demonstrated an increase in their scores, with a cumulative improvement of 124 points. Conversely, 55.7% of participants (39 out of 70) exhibited a decrease in scores, reflecting a total decline of 302 points. The findings suggest a varied impact of internship training on the theoretical knowledge of participants. The observed reduction in the average post-test score compared to the pre-test (76.52 vs. 79.42) signals a concerning deterioration in theoretical knowledge status after one year of training. This decline is not merely anecdotal but is statistically significant, as indicated by the paired t-test analysis (p-value 0.001931) of the pre and post-test scores among doctors. This statistical significance underscores the reliability of the observed decline and prompts a closer examination of factors contributing to this trend.

However, the google form format used in this study, did not specify the subject in which the participants deteriorated in performance.

It is imperative to explore the specific domains in which participants experienced a decrease in scores to pinpoint areas of potential concern. Additionally, identifying factors influencing knowledge deterioration, such as lack of adherence to theories, exhaustion due to work-load, lack of time, losing interest to studies. Or it could be a pitfall in the curriculum that the doctors would not encounter an examination at the end of training as a motivation to study.[9,10] Knowledge of these facts can provide valuable insights for targeted interventions and changes in educational methodology and curriculum. The outcomes shown in this study warrants the need for a critical review of current internship training programs. While a subset of participants showed improvement, the overall trend towards decreased scores highlights challenges in sustaining and building upon knowledge acquired during training. The statistically significant difference in scores emphasizes the importance of implementing a structured evaluation system post-internship, ensuring a comprehensive assessment of doctors' preparedness for professional practice.[9,11]

There is lack of standardization of the medical colleges that offer internship training both nationwide and worldwide. In a Saudi study, interns expressed opinions in favor of the effectiveness of their training. On the other hand in other studies students expressed dissatisfaction about their training.[11,12,13] There is a valid debate on the advantages and disadvantages of using Microsoft Excel Spreadsheet Software as statistical analysis tool over SPSS. The types of analysis used in this study were comfortably and simply done with using the Excel which has a growing popularity among researchers.[13,14]
The intern-ending assessment score, if it is ever introduced in the medical curriculum, may provide as an admission criteria in different medical post-graduate courses, as it has been seen in an Australian study that the initial score in a reliable entry exam has a reliable predictive value for acquiring and applying knowledge afterwards.[9,15] Addressing the identified challenges is crucial for ensuring that doctors not only acquire knowledge during their training but also retain and apply it effectively as they move into their professional roles.[16]
From a worldwide standpoint, the internship year possesses substantial potential to influence public health and currently it stands as an overlooked opportunity for reforming medical education. There is a necessity for global initiatives to improve the internship year, recognizing its pivotal role in transitioning to practice in various settings globally. We suggest implementing an instructional design model to better align the internship year with the specific needs of local health systems.[17,18]

Conclusion:
In conclusion, the participants in this study lost, at least to some extent, their theoretical competence at the end of internship training. The results prompt a re-evaluation of the effectiveness of internship training in maintaining and enhancing medical knowledge. Further studies are needed to see whether this finding is reproducible or not and, also to do more studies to see whether the doctors improve in practical skill at the end of internship or not before a valid recommendation is made.

Limitation of the study: This study did not explore the practical skill development of the intern doctors through their internship training.

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