

# Adequacy of Undergraduate Orthopedic Training at a Nepalese Medical Academy

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## ABSTRACT

**Introduction:** A basic familiarity with orthopaedic disorders is important for all medical school graduates. The purpose of this study is to assess the adequacy of undergraduate orthopaedic knowledge among the first batch interns of our academy.

**Methods:** The validated basic cognitive examination designed by Freedman and Bernstein, consisting of 25 short answer questions was administered to the first batch interns. Overall scores and responses to the individual questions were analyzed. The recommended passing score of 73.1 per cent as suggested by Freedman and Bernstein was considered. The overall unweighted and weighted scores were calculated. The questions were also separated into anatomy, general orthopedics and trauma groups. The Microsoft Office Excel 2007 was used for the statistical analysis.

**Results:** Forty eight interns appeared the examination with the mean scores obtained was 58.79 per cent. Forty five interns (94 per cent) failed to demonstrate basic competency on the examination. The overall weighted score for all interns was 61 per cent. Forty two (88 per cent) of the 48 interns failed the examination even when the questions were weighted. The average scores in the general orthopedics, trauma and anatomy groups were 49, 76 and 54.6 per cents respectively.

**Conclusion:** Majority (94 percent) of the first batch interns failed the validated basic musculoskeletal examination. Curriculum and teaching methods is inadequate or inappropriate and should be re-evaluated to address this problem.

**Keywords:** orthopedic training, undergraduate, medicine

## INTRODUCTION

Musculoskeletal problems are common and second only to the upper respiratory illness for seeking medical attention.<sup>1,2</sup> Medical officers, general practitioners, physicians, rheumatologists, pediatricians, and orthopaedic surgeons constitute the musculoskeletal service providers. So, basic musculoskeletal knowledge is essential for all mentioned medical practitioners, which helps to provide a

strong foundation for diagnosing and treating the musculoskeletal problems. Medical school is the primary source of formal education with regard to the musculoskeletal system. But studies have shown that undergraduate medical

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students spend very few hours on basic science and clinical skills.<sup>3</sup> Different studies have shown decrease competency in musculoskeletal medicine among the medical practitioners due to inadequacy of musculoskeletal education at medical schools.<sup>1-6</sup> The purpose of this study is to assess the adequacy of orthopaedic education by testing the first batch interns during the last week of one year rotational internship at our academy.

### METHODS

The validated basic cognitive examination designed by Freedman and Bernstein<sup>1</sup>, consisting of twenty five short answer questions was administered to the first batch interns of our academy. Before conducting the study, permission from the authors of the questionnaire to use those validated questions was obtained by email. Also approval for the study was obtained from the institutional review committee. The test was timed in such a way that all the interns had completed their orthopedic posting. All the interested first batch interns at their last week of rotational one year internship program during their two weeks elective posting were enrolled and hence included in this study. Those interns who were not interested to participate in the study and absent on the day of the examination were excluded.

Informed consent was obtained from all the participants. Three hours time was allotted for completion of the examination. Answer sheets were collected promptly and scored anonymously by the authors of this study. Each question was worth one mark, but partial credit was given for questions with multiple answers. The raw scores were multiplied by four in order to obtain a percentage scores. Overall scores and responses to the individual questions were analyzed. The recommended

passing score of 73.1 per cent as suggested by Freedman and Bernstein was considered in our study.

The overall unweighted and weighted scores were calculated as described in the original paper by Freedman and Bernstein. Weighted scores were calculated to examine the hypothesis that the overall score may not adequately reflect the interns' level of competence because they may perform better on the most important questions and worse on the least important ones. Each question was weighted from 0 to 10 according to its importance score as determined by the chairpersons of the orthopedics in United States as mentioned by Freedman and Bernstein. The score for each question was then multiplied by the weight of the question. The sum of these products (that is, the score on a given question multiplied by the weight of the question) yielded the raw weighted score. The raw question was converted to a percentage by dividing it by the sum of the weights assigned by the chairpersons (the highest possible score).

The questions were separated into general orthopedics (8), trauma (7) and anatomy (9) groups. The place of their clinical posting during senior clerkship at different health centers of Nepal was also noted.

### RESULTS

Among 54 interns, 6 were absent on the day of assessment and hence excluded from the study. The examination was administered to the 48 interns. The mean unweighted score for all 48 interns was 58.79 per cent with a range of 32 to 84 per cent. Only three (6 percent) interns among 48 obtained a score of 73.1 per cent. Remaining 45 interns (94 percent) had a score of less than 73.1 per cent and thus failed to demonstrate basic competency on the

examination. The scores for individual questions ranged from as high as 100 per cent to as low as 11 percent. The overall weighted score for all interns was 61 per cent. Forty two (88 per cent) of the 48 interns failed the examination even when the questions were weighted according to their attributed importance. The average score in the general orthopedics, trauma and anatomy groups were 49, 76 and 54.6 per cents respectively. Among 48 interns, 13 interns were posted in the Nawalparasi district, 13 in Nuwakot district, 12 in Gorkha district and 10 in Ampippal district for the community posting during their senior clerkship.

### DISCUSSION

Nepal is a small land-locked country with plenty of hills and mountains, with lots of fall injuries attending to the primary health centers and district hospitals. The medical officers and general practitioners are the initial responders for these cases. Also with increasing urbanization, high prevalence of traumatic cases is encountered in daily clinical practice. Furthermore, with increasing life expectancy, geriatric populations are increasing with lot of bone and joint diseases presenting to the clinical practice. So, fundamental orthopedic knowledge is essential to the all responsible medical practitioners.

Our academy is a public, autonomous, not-for-profit, Health Science University dedicated to sustained improvement of the health of people in Nepal, especially those who are poor and living in rural areas, through innovation, equity, excellence and love in education, service and research. With this mission, our academy has made a six months clinical posting at different rural part of the country during senior clerkship (final year) to learn to manage the patients in resource poor settings.

Our academy has adopted Problem Based Learning (PBL), Clinical Presentation Curriculum (CPC) with small group sessions, as well as Community Based Learning and Education (CBLE) as the principal teaching learning methods adopted for MBBS program. The first batch medical students had eight weeks of rotational orthopedic posting, with four weeks each during junior and senior clerkships.<sup>7</sup>

Our study showed that the majority of the first batch interns, who are qualifying from the academy as medical doctors, do not have a basic level of competency in orthopedics. Forty five interns (94 percent) failed to achieve the score 73.1 per cent or more as devised by Freedman and Bernstein. Forty two (86 percent) of the 48 interns failed the examination even when the questions were weighted according to their attributed importance. This is alarming sign for us because the treatment of large number of orthopedic patients is dependent on the medical officers and general practitioners without specialist support in the many rural part of the country.

Anatomy is the foundation of the medicine and any surgical subjects. Basic and general orthopedics is required for the management of day to day cases attended in the outpatient department of any hospitals, primary health centers and outreach clinics. Our study demonstrated the poor scores in general orthopedics and anatomy questions with the average scores being 49 and 54.6 percents respectively. The poor results in anatomy and general orthopedics reminded us to improve on these subjects for upcoming batches of the medical students to achieve our mission.

In their original study, Freedman and Bernstein assessed 85 residents at the start of their first

post-graduate year. Seventy (82 per cent) of the 85 residents failed the same musculoskeletal assessment.<sup>1</sup> Another study by Rob Dachs and team conducted the similar study among 79 interns who were in their first post-graduate year and showed that 72 (91 per cent) of the 79 interns failed in the examination.<sup>6</sup> Similarly, Jagdish Menon and Dilip K Patro showed that 38 (95 per cent) of the 40 final year medical students failed this competency examination. All their students had completed the clinical postings at the time of this examination.<sup>5</sup> Elizabeth Matzkin and team had conducted the similar examination among 113 medical students, 167 residents and 54 staff physicians. The average score for each group was 48.8 per cent for medical students, 58.1 per cent for residents and 70.4 per cent for staff physicians. Two hundred and sixty-five participants (79 per cent) failed the examination. A score of 73.1 per cent was achieved by 21 per cent of the residents (including the orthopaedic residents) compared with 5 per cent of the students and 52 per cent of the staff physicians.<sup>2</sup> Our results showed the poor results as compared to the findings at different international medical institutions.

Three of 48 interns were able to achieve the score of 73.1 per cent (unweighted scores) and they were posted in the three different districts i.e., Nawalparasi, Gorkha and Nuwakot. The interns who were posted at Gorkha during their senior clerkship claimed that they had good orthopedic exposure; but our result showed no difference in the success rate among the interns. The duration of orthopedic teaching was different at different medical centers. Freedman and Bernstein mentioned the mean duration of only 2.1 weeks of instruction in orthopedics among their study population. In addition, 28 residents (33 per cent) had graduated from medical schools with no

rotation, required or elective, in orthopedic surgery and these residents had the lowest mean score (55.9 per cent) on the examination and the highest rate of failure (93 per cent).<sup>2</sup> In South African medical schools, six weeks duration was the allocated for the orthopedic posting.<sup>7</sup> Our first batch interns while at their medical school were posted for the eight weeks in orthopedic department, with four weeks each during junior and senior clerkships. Further, they had to undergo 4 weeks of the rotational internship in the orthopedic department. As compared to the other medical institutions, mentioned by Freedman and Bernstein<sup>1</sup> and Rob Dachs<sup>6</sup> we had few weeks more posting at the orthopedic department. However, we got the poor results. Further study to define why our interns performed so poorly is required. A review of the orthopedic curriculum including the aspects like time allocation, contents as well as teaching methods and faculty's skills is essential to ensure the upcoming medical doctors to obtain the knowledge and skills for safe and good orthopedic practice in the rural medical centers where specialists are unavailable.

There are several limitations to this study. Freidman and Bernstein questionnaire was not validated for relevance in our country. The authors of the questionnaires accepted their weakness as they validated the questions by the orthopedic chairpersons rather than the primary care physicians. The chairpersons' determination of what is important may not reflect the true imperatives of primary care practice. Furthermore, they coined another potential defect which was the examination itself, including the distribution of the topics, the open-response format, the wording of the questions, and the accepted answers. We used the pass score of 73.1 per cent established by 124 orthopedic residency program chairpersons

instead of that of 70 per cent established by 240 internal medicine program directors.<sup>4</sup> Selecting the lower pass score may have changed some of our findings. Another limitation of our study was few sample size and those were selected from a single batch of the interns. Further studies with large sample sizes are needed to get more significant results, possibly with enrolling the interns from other medical institutions.

## **CONCLUSIONS**

This study showed a lack of basic orthopedic knowledge among the first batch interns of our academy. So improvement in the curriculum and teaching methods should be considered to train our future doctors graduating from this institution. This will help to practice orthopedics in the rural parts of the country where specialists are unavailable.

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