Journal of Contemporary Medical Education
www.scopemed.org
DOI: 10.5455/jcme.20151125021314

Original Research

Students' Attitude and Perception towards Basic Sciences in a Medical School of Nepal: A Cross-sectional Study

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Received: September 13, 2015
Accepted: November 11, 2015
Published: November 26, 2015

ABSTRACT

Background: The learning process of medical students is influenced by their attitude and perception towards different subjects. In conventional curriculum, basic medical sciences generally provide basement for students to construct the mansion of clinical knowledge and skills. Objective: We aimed to assess the first and second year medical students' attitudes and perception towards the learning of basic sciences. **Materials and methods:** The questionnaire (nine items) designed by West and coworkers was distributed among 240 students and they were asked to denote their opinions using a five-point Likert scale, which ranges from "strongly agree" to "strongly disagree". First five items measured the perceived importance and relevance of basic sciences to clinical medicine, and last four items measured the students' attitudes toward, and perceived effectiveness of their education in basic sciences. The median score of statements were compared between subgroups of respondents using Mann-Whitney and Chi-square tests, wherever applicable. **Results:** Mean age of students was 19.8± 1.2 years; 58.2% and 41.8% were male and female respectively. Most of the respondents though disagreed with first statement and were neutral for second statement, agreed with all the remaining statements. The median scores were 12 and 9 for combination of first five statements and last four statements respectively. Significant level (p=0.003) of disagreement was shown by scholarship students than self-financed on the effectiveness of their education in basic sciences. Students' curiosity through teaching of basic sciences was found to be significantly decreased (p=0.035) in second year students. **Conclusion:** Students acknowledged the importance and relevance of basic sciences to clinical medicine and showed overall positive attitude toward, and perceived effectiveness of their education in basic sciences.

KEY WORDS: Clinical; Curriculum; Effectiveness; Opinion; Relevance

INTRODUCTION

Students' attitude and perception play a vital role in their learning process. Basic sciences and clinical sciences are the two main part of the medical curriculum in Nepal. In Nepal, lecture-based, teacher-centered, discipline-based, examination-driven, and hospital-oriented teaching pattern is followed.

The Bachelor of Medicine and Bachelor of Surgery (MBBS) degree is a four and half year program, which is followed by one year compulsory rotating internship in medical schools of Nepal. Community medicine and Basic science subjects (anatomy, physiology, biochemistry, microbiology, pathology and pharmacology) are covered in an integrated manner during the first two years. Community medicine continues as a part of curriculum till the final year and the clinical subjects like medicine, surgery, pediatrics, orthopedics etc. are covered during the last two and half years of the course [1]. After completion of five and half years of undergraduate course, they have to qualify Nepal medical council's licensing examination. Once they pass it they become eligible to practice medicine and appear for post graduate entrance examinations. The other side of scenario is that a good number of questions from basic sciences are asked in the most of licensing and post graduate entrance examinations.

Generally, medical students in conventional programs use previously learned basic sciences concepts to build their clinical knowledge. It has been observed that basic science knowledge learned in a clinical context is better comprehended and more easily applied by the students [2-4]. The previous studies done in a medical school of Nepal and India have found overall positive opinion towards the basic sciences among medical students [5,6]. In contrary other studies carried in the Netherland and Saudi Arabia have found that students became increasingly negative in their opinions about basic science courses as they progressed through their medical education [2,7]. An integrated approach of teaching is followed in our institution. However different subjects of basic sciences are taught separately to prepare the students for assessments and unfortunately the process of integrating all the subjects of basic science and clinical subjects do not come about as expected. Therefore, the students neither can relate the different disciplines of basic sciences to each other nor with medical practice in future.

Little is known about the attitudes and perception of Nepalese medical students toward basic sciences. Monitoring the attitudes and perception of medical students throughout their course may be relevant to provide guidelines to the educational planners for better integration of basic sciences with clinical subjects so that students can apply their knowledge unanimously to explain the clinical conditions. Therefore, this study was planned with the objective of assessing the students' attitudes and perception toward

learning basic sciences at the end of first and second year and its association with any other personal variants at Chitwan Medical College, Nepal.

MATERIALS AND METHODS

Study design and the participants

This cross-sectional, questionnaire-based study was conducted at Chitwan Medical College Teaching Hospital in the Chitwan District of Nepal. The study has been approved by Institutional Review Committee of Chitwan Medical College (CMC-IRC). The target population included MBBS students who were at the end of academic session of first and second year at Chitwan Medical College (CMC) in 2014. CMC enrolls 140 students annually for MBBS program. Out of this, 14 are scholarship awarded students from ministry of education of Nepal and others get enrolled on pay basis after qualifying entrance exam conducted by Institute of medicine (IOM). The study was conducted during October to November 2014.

Questionnaire design

We used the questionnaire designed by West and coworkers which was presented in English to students [8]. The same questionnaire was used by other authors in similar studies [2,5]. The students were asked to denote their opinions using a five-point Likert scale, which ranges from "strongly agree" to "strongly disagree". The demographic and personal characteristics of the respondents were also noted in the same questionnaire form.

A total of 9 scale items were utilized. Five items (no. 1-5) measured the perceived importance and relevance of the basic sciences to clinical medicine, and four items (no. 6-9) measured the students' attitudes toward, and perceived effectiveness of their education in basic sciences. Agreement with items 3,4 and 5, and disagreement with items 1 and 2 reflect acknowledged relevance of the basic sciences to clinicians. Item 6 states the emphasis in basic science learning in the conventional curriculum, while item 7, the emphasis in the experimental curriculum. Items no. 8 and 9 measures the perceived value of students' medical education experiences to date.

Data collection

The objectives and the scope of the study were explained and the students were assured that their demographic and personal information would be confidential and they were invited to participate. A total of 260 questionnaires were distributed among students of MBBS 1st and 2nd year after taking their verbal consent for participation in this study. Data was collected personally by distributing the questionnaires to participants at the end of lecture. The completed forms were collected at the end of the session next day. Only 240 students returned the questionnaire, out of which 232 were completely filled and considered for analysis.

Analysis

Data were compiled and entered in Excel 2007 and Statistical Package for Social Studies (SPSS) version 18 for the analysis. The median scores for the different statements were compared among different subgroups of respondents. The Mann-Whitney U and Chi-square tests were applied wherever applicable. A p value < 0.05 was taken as statistically significant.

RESULTS

The response rate of the participants to administered questionnaire was 89.2 % (232/260). The age range of the participants was 18-24 years with mean age of 19.8± 1.2 years. Among them 58.2% and 41.8% were male and female respectively. Twenty seven out of 232 were scholarship awarded students by ministry of education of Nepal and others were self-financed for their education. The majority of students (87.9%) were from urban. When asked about occupation of parents, 96.1% participants mentioned that none of their parents were doctor while remaining had either one or both of the parents doctor. Only 9% respondents showed interest towards Basic sciences subjects for their post graduation (Figure 1).

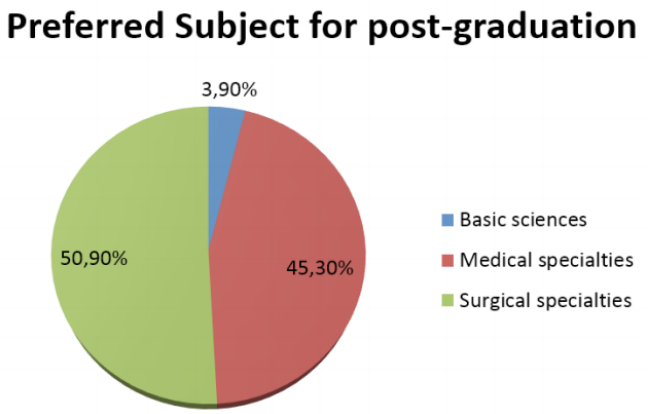

Figure 1: Preferred Subject for post graduation of the participants

The median score and the inter-quartile range for the nine statements and the two subgroups of statements are shown in Table 1. Table 2 shows the median scores of the statements according to selected demographic characteristics of the respondents. More number of male than female students were in agreement with the statement "of the facets of a good physician, his/her knowledge of biological mechanisms is most important" (p=0.033). Self financed students had a more positive opinion than scholarship students regarding the statements "what students should learn in basic sciences are the general concepts, in order that they might have a good working-knowledge without having to know all the facts" and "the information and experiences I have gotten to date are fundamental to my future role as a physician" (p=0.030 and p=0.016 respectively).

Table 1. Median and the inter-quartile range for the nine statements and the two subgroups of statements

Statement no.	Statements	Median (Inter-quartile range)
1	A physician can effectively treat most medical patients without knowing the details of the biological processes involved.	4 (4-5)
2	Most basic science research is so far removed from clinical medicine that its usefulness to the practicing doctor is slight.	3 (2-4)
3	Psychological factors are just as important as physical factors in the healing process.	2 (1-2)
4	Of the facets of a good physician, his/her knowledge of biological mechanisms is most important.	2 (1-2)
5	Applying the basic science of medicine to clinical practice is a skill which should be reinforced early on in medical education.	2 (1-2)
6	It is first necessary to learn as many facts as possible in the basic sciences and then learn to apply them later on in the clinical years.	2 (1-2)
7	What students should learn in the basic sciences are the general concepts, in order that they might have a good working knowledge without having to know all the facts.	2 (2-4)
8	The information and knowledge I have gained to date are fundamental to my future role as a physician.	2 (1-2)
9	Faculty members excite students" curiosity through the teaching of the basic sciences.	2 (2-3)
Overall, importance and relevance of the basic sciences to clinical medicine		12 (11-13)
Overall, values and perceived effectiveness of medical education in the basic sciences		9 (7-10)

Statements	Characteristics	Mean Rank	Sum of Ranks	Statistical test
4	**Gender**			Mann-Whitney U=5586.500, p =0.033
	Male	109.38	14766.50	
	Female	126.41	12261.50	
8	**Funding source**			Mann-Whitney U=3687, p =0.016
	Scholarship	133.60	6947	
	Self finance	110.21	19618	
7	**Funding source**			Mann-Whitney U=3786, p =0.030
	Scholarship	133.69	6952	
	Self finance	111.53	20076	
9	**Level of study**			Mann-Whitney U=5669.5, p =0.035
	MBBS I	108.36	13544.50	
	MBBS II	126.01	13483.50	
6,7,8 and 9	**Perceived effectiveness of medical education in the basic sciences**			Mann-Whitney U=3425.5, p =0.003
	Yes	140.63	7312.50	
	No	109.53	19715.50	

While comparing the median score of the individual statements between first and second year students, it was found that first year students' curiosity was more excited by the faculty members through the teaching of the basic sciences compared to second year students (p=0.035). Scholarship students had more negative opinion than self-financing students regarding the statements (sum of score of statements 6,7,8 and 9) measuring value and perceived effectiveness of medical education in the basic sciences (p=0.003).

DISCUSSION

The curriculum followed in medical schools of Nepal offers 2 years of basic sciences in preparation for the subsequent clinical years. This pre-clinical curriculum is largely lecture-based, teacher-centered and taught almost exclusively by basic scientists. Such separation of basic and clinical sciences worked as a source of discontent among students who tended to undervalue basic sciences, seeing them primarily as a hurdle in order to enter the clinical years [9,10].

Only 9% respondents considered Basic sciences subjects, the least preferred for their post-graduation. Similar result was shown in a study conducted by Kumar A *et al.* in medical students of different countries [11]. The reason they mentioned seems very logistic that is because of limited opportunity in basic science restricted to teachings, research and diagnostic laboratories. Moreover before joining the medical school in our country, dream of most of the students remains to be a famous clinician rather than an academician or researcher in the future in whom there is more social respect and opportunities to earn.

The disagreement (median score- 4) with the statement "A physician can effectively treat most medical patients without knowing the details of the biological processes involved" and agreement with the statements (median score of each-2) "Psychological factors are just as important as physical factors in the healing process; Of the facets of a good physician, his/her knowledge of biological mechanisms is most important; and Applying the basic science of medicine to clinical practice is a skill which should be reinforced early on in medical education" indicate acknowledged relevance of the basic sciences to clinicians by the students. The neutral view of 1st and 2nd year medical students towards the statement "most basic science research is so far removed from clinical medicine that its usefulness to the practicing doctor is slight" is justifiable as they are not yet exposed to clinical years and their unawareness about research value of basic science in clinical years can be understood.

Overall median score (nine) of the last four statements "It is first necessary to learn as many facts as possible in the basic sciences and then learn to apply them later on in the clinical years; What students should learn in the basic sciences are the general concepts, in order that they might have a good working knowledge without having to know all the facts; The information and knowledge I have gained to date are fundamental to my future role as a physician; and Faculty members excite students' curiosity through the teaching of the basic sciences" signifies the positive opinion regarding perceived value of students' medical education experiences to date. Similar result was obtained by Shankar PR *et al.* among the medical students of Manipal Medical College of Nepal [5]. This shows the uniformity in student's attitude and perception towards basic sciences in different medical schools of Nepal. Gupta S *et al.* also found that students understand the significance of basic sciences subjects for inclusive medical aptitude and knowledge [6]. On the other hand, Alam A. (2011) showed that the students become increasingly negative in their opinions about basic science courses as they progressed through their medical education [7]. Then again in a study by D'Eon MF, many senior undergraduate students indicated informally that their memory of basic science medical courses was less than expected and the content of those courses did not seem relevant to their later clinical work or studies [12].

There was no correlation of demographic characteristic and occupation of parents with the responses for the statements. Only the statements with significant differences between subgroups of students are shown and considered for discussion. More no. of male than female students were in agreement with the statement "of the facets of a good physician, his/her knowledge of biological mechanisms is most important" ($p=0.033$) and in over all there is greater degree of agreement with this statement no 4. Medical students learn the biological mechanisms in different basic medical sciences (e.g. anatomy, physiology, biochemistry, pathology). The similar degree of acceptance of the fact that biological mechanisms are keys for the gateway of good physician is also shown by the previous study [5]. On contrary study conducted among both old- and new-curriculum students at University Medical Center (UMC) Utrecht showed knowledge of biomedical mechanisms as a less important characteristic of good physicians. Surprisingly, the same study also showed that female students tend to disagree to a lesser extent with this statement than the male which is opposite to our result [2]. The influencing factors for gender variation in the response of this statement among the students of two different parts of the world can be further explored.

Self financed students had a more positive opinion than scholarship students regarding the statements "what students should learn in basic sciences are the general concepts, in order that they might have a good working-knowledge without having to know all the facts" and "the information and experiences I have gotten to date are fundamental to my future role as a physician" ($p=0.030$ and $p=0.016$ respectively). In overall, students have agreed with both of these statements which emphasizes the conventional and experimental curriculum respectively in our study as well as in the study done by Shankar PR *et al* [5]. Gupta S *et al.* in her study also showed the acknowledgement of students that good knowledge of these subjects is important to be a good clinician [6]. However, the study conducted in UMC Utrecht revealed that students were not in favor of the traditional way in which the basic sciences are taught (the conventional approach that is also followed in CMC) and they were more inclined towards experimental approach of learning these sciences [2]. Moreover, experimental curriculum requires greater coordination among different basic and clinical departments along with motivated faculty members committed to improve the standard of medical education [13].

We found that the student's curiosity in first year of medical education is more excited by the faculty members through teaching of basic sciences than in second year. The similar result was shown in study by Shankar PR *et al.* but we did not find any gender variation as their study [5]. The decline in curiosity of students might be negatively affecting their choice of basic sciences as preferable subject of post graduation. The role of faculty members or any other confounding variables that decreases the students' curiosity should be necessarily surfaced for the betterment of education.

In our study, scholarship students had more negative opinion than self-financing students regarding the statements (sum of score of statements 6,7,8 and 9) measuring value and perceived effectiveness of medical education in the basic sciences ($p=0.003$). However, we could not associate this finding with the gender difference

as by Shankar PR *et al* [5]. The practice of conventional approach of teaching basic sciences rather than proper clinical integration might have impelled to generate negative opinion in scholarship awarded students who are generally considered more conscious about their learning modalities than self-financed. Students from distinct matriculate pools have significant differences in multimodal, visual and kinesthetic learning styles [14]. The meritorious students, who were awarded scholarship, gave an impression of kinesthetic learners who wanted concrete application and manipulation of the information they were receiving through experiments, discussions or direct relevance. Previous studies also have supported the view that the basic science knowledge learned in a clinical context is better comprehended and more easily applied by students [4,15].

Our study was conducted among only the students of MBBS first and second year. Our sample size was small. We intend to re-administer the basic sciences attitude questionnaire in the beginning of internship after approximately 2-3 years among the students who participated in the present study, when they have completed the clinical curriculum as well and will have to apply their knowledge in a holistic manner to treat the patients. Such a longitudinal study will be more appropriate to reveal possible shifts in attitudes toward the basic sciences with increased clinical experience. Moreover, we think it may be very interesting to investigate the observed differences in attitudes toward the basic sciences between students at the beginning and end of undergraduate medical course. Similar studies in different medical colleges of Nepal are required to draw a conclusion regarding students' attitude towards basic sciences in Nepal.

Our study revealed that first and second year MBBS students acknowledged the importance and relevance of the basic sciences to clinical medicine and showed overall positive attitude toward, and perceived effectiveness of their education in basic sciences. However scholarship students disagreed on the effectiveness of their education in basic sciences. The reasons for decreased curiosity of students through teaching of basic sciences in second year should be explored instantly. The demographic influence on the attitude and perception of the students could not be established though some personal characteristics varied the responses. A longitudinal study which will be carried out during their internship period will disclose the persistence or change in their attitude towards basic sciences when they will be implementing their knowledge practically. Such findings may provide some guidelines to the curriculum developers in future. Better clinical integration of basic science subjects can meliorate the learning experience of medical students in first phase to view the curriculum as a single general topic of medical science rather than an aggregate of separate basic science subjects.

ACKNOWLEDGEMENT

Authors would like to thank all the participants and Chitwan Medical College ethical committee for approval of this study.

CONFLICTS OF INTEREST

The authors declare that they have no conflict of interest.

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Source of Support: Nil, Confl ict of Interest: None declared