

# Students' Perception Regarding the Integration of Basic Sciences Courses in Nursing Curriculum

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## ABSTRACT

### Background

Integration of basic sciences course in nursing provides theoretical and clinical foundation in preparing clinically competent nurses to tackle today's sophisticated health care system. Although basic sciences have always been considered as the subject of difficulty, there is paucity of evidence that explored the difficulties associated with the basic sciences courses in nursing curriculum.

### Objective

To explore the difficulties experienced by the students and solutions to the difficulties related to basic sciences course from nursing students' perspective.

### Method

A descriptive cross sectional study was conducted enrolling 164 nursing students. A self-administered semi structured questionnaire was used to collect data. Data were entered and analyzed descriptively in SPSS version 16 and information obtained was analyzed using descriptive and inferential statistics.

### Result

Of the total 164 students, 93.3% perceived basic science as a difficult subject. Vast course content (79.73%), insufficient time allocation (40.52%) and integration of six basic sciences subjects into one (29.41%) were the major difficulties. Solutions emphasized by students were to: make course specific to nursing (67.36%), organize frequent tests (61.11%), focus more on clinical implications (46.60%), increase credit hours (37.50%), conduct exams of six basic sciences subjects separately and provide examination feedback (29.36%). Entrance marks score was found to influence difficulty in basic sciences ( $p=0.01$ ).

### Conclusion

Basic science is considered as the difficult subject by nursing students. Necessary actions may be taken by the curriculum reviewer, college administration and the educators so as to minimize this difficulty among students.

## KEY WORDS

*Basic sciences, Curriculum, Nursing students, Perception*

## INTRODUCTION

Nurses are in a multifaceted and complicated profession that demands more scientific base on the performance of each and every intervention the nurses take, and the foundation of those scientific rationale in nursing is deeply rooted within the basic sciences courses.<sup>1-6</sup> A high quality nursing curriculum may play an important role in preparing effective nurses for the current and future health care delivery system.<sup>7</sup> One of the approaches of curriculum development is introducing an integrated approach in nursing curriculum so as to make the learning more meaningful and pertinent.<sup>8</sup> The integration of basic sciences curriculum in nursing is central to skillful practice and caring philosophy which helps in producing knowledgeable nurses with expert skill and judgment to bring about novelty in the practices thereby improving the health of people.<sup>9-11</sup>

Although, basic sciences have been considered as a cornerstone for the nursing practice, it has always been challenging for students to integrate and apply the contents taught in basic sciences into the clinical nursing practice.<sup>3,12</sup> Evidence from past and present reveal that it has always been perceived as the subject of anxiety and difficulty by nursing students.<sup>1,13-16</sup> In Nepal, basic sciences have always been integrated in the nursing curriculum from the commencement of B.Sc. nursing program in Nepal. However, the perspective of students regarding the difficulties associated with this course has hardly been addressed. To the best of our knowledge, this study is the first in Nepal, to explore difficulties related to basic sciences courses from the perspective of students. The consideration of viewpoints of students regarding the basic sciences curriculum is expected to dig out perceived difficulties of the students along with solutions so as to facilitate a conducive teaching/learning environment among teachers and students.

## METHODS

A descriptive cross sectional study was conducted in Kathmandu University (KU) affiliated colleges along with the mother institute for a duration of nearly one year from April 2017 to March 2018. Seven out of eight colleges gave permission to collect data. Ethical approval was obtained from Nepal Medical College Institutional Review Committee (NMC-IRC), including other two colleges. Further, from the remaining colleges where IRC was not available, researcher obtained verbal consent from the concerned authorities.

Purposive sampling method was implemented to collect data from students as researcher aimed to obtain opinion of all the students of selected nursing colleges. Of, the total 191 B.Sc. nursing first year students of seven colleges, nineteen students were pretested and were excluded in the main study while the remaining eight students did not participate in the study leaving a total of 164 students in

the main study (response rate: 95.3%). All the B.Sc. nursing first year students who were willing to participate and present at the time of data collection were included in the study after obtaining informed consent. Students from other years were excluded as it could lead to recall bias in answering questions related to basic sciences.

A semi-structured self-administered questionnaire was used to collect data to meet the research objective. Content validity of the instrument was maintained by extensive literature review, consulting with the basic sciences faculty and nursing faculty who had background of studying basic sciences in B.Sc. nursing. Students' perception in this study was operationally defined as the opinion of students regarding the difficulties they experience in basic sciences and the solutions to the difficulties from their perspective. The first part of questionnaire collected general information of students. Another part tried to explore difficulties experienced by students and solutions from their perspective via dichotomous and open ended questions. To facilitate students in answering, they were encouraged to mention difficulties and solutions related to course content, credit hours, teaching/learning environment and examination/feedback systems. Questionnaire was collected in class setting to prevent communication between students which took around 20-30 minutes time.

Data were entered and analyzed via Social Package for Statistical Sciences (SPSS version 16). Data were analyzed descriptively to obtain frequency, percentage, mean and standard deviation. In addition, inferential statistics (chi square test) was used to assess association of difficulty in basic sciences with independent variables such as: entrance preparation, marks secured in entrance, interest in basic sciences and self-study time.

## RESULTS

Of the total 172 students (excluding pretested students) who were eligible to be enrolled in the study, 164 students participated in the study giving a response rate of 95.3%. The age of the participants ranged between 17 and 24 with the mean age being 19.01 (SD=1.08). Majority (90.9%) of respondents found basic science as an interesting subject. Nearly all (98.2%) of the respondents felt that basic sciences course have helped them in their nursing theory and clinical aspect (Table 1).

Of the total 164 students, 153 (93.3%) students felt that basic sciences course is difficult. Of them, more than two third (79.7%) perceived the reason of being difficult as course being vast. This was followed by insufficient time allocation (40.5%) while the least reported reason of difficulty was lack of adequate preparation leave for exam (24.1%) (Table 2).

Majority (87.8%) of the students agreed that course content should be improved. This was followed by need

**Table 1. General information of respondents**

	n (%)
<b>Age</b>	
Range: 17 -24	
Mean± SD= 19.01± 1.08	
<b>Entrance Preparation course taken or not</b>	
Yes	148 (90.2)
No	16 (9.8)
<b>Spare self- study time for basic sciences</b>	
Yes	102 (62.2)
No	62 (37.8)
<b>Number of Hours Spent for studying Basic Sciences</b>	
Study Hours Range from : 1 to 5 hours	
Mean ± SD =1.52 ± 1.48	
<b>Do you find basic science course interesting?</b>	
Yes	149 (90.9)
No	15 (9.1)
<b>Do you think basic sciences course has helped you in your nursing theory and clinical aspects?</b>	
Yes	161 (98.2)
No	3 (1.8)

**Table 2. Perceived reasons of difficulty in basic sciences**

Statements	n (%)
<b>Is basic science course difficult for you?</b>	
Yes	153(93.3)
No	11(6.7)
Reasons of difficulty (n=153)*	
1 Vast course content	122(79.7)
2 Time allocated for basic science not sufficient so difficult to study	62(40.5)
3 Six subjects combined in one, so difficult to study and memorize	45(29.4)
4 Many new and difficult terminologies	42(27.4)
5 No adequate preparation leave and gap in exam	37(24.1)

\*Multiple responses

of improvement in the student’s self-study habit (84.1%), While, the least was perceived need to improve in the teaching/learning environment (62.8%) (Table 3).

The preferred solutions to the difficulties related to the course as perceived by students were: amending course as per need of nursing (67.3%) followed by increasing credit hours (37.5%) and making course more practical than theory based (30.5%). Students also expressed the need to improve in teaching/ learning of basic sciences by: focusing more in clinical implications for nursing students while teaching (46.6%), making classes more interactive and interesting (30.0%) and providing more lab exposures than the theory (23.0%). Regarding examination/feedback system, nearly two third (61.1%) of students felt that class tests should be conducted after completion of teaching each human systems. More than one third (38.8%) of

**Table 3. Solutions to the perceived difficulties from the perspective of students (n=164)**

S.N	Statements	n (%)
<b>Do you think basic sciences course needs improvement ?</b>		
	Yes	144 (87.8)
	No	20 (12.2)
<b>If yes, what can be done to improve course content ? Give your opinions (n=144)*</b>		
	Course should be more specific as per the need of nursing students	97(67.3)
	Credit hours should be increased for basic sciences	54 (37.5)
	Course should be more practical based than theory	44 (30.5)
<b>Do you think Teaching/ Learning environment needs improvement?</b>		
	Yes	103 (62.8)
	No	61 (37.2)
<b>If yes, what can be done to improve in Teaching Learning environment? Give your opinions (n=103)*</b>		
1	Teachers should teach focusing on the clinical implications of nursing students	48 (46.6)
2	Classes should be interactive and interesting	31 (30.0)
3	Teachers should provide more lab (Practical) exposure than theory	24 (23.3)
<b>Do you think Examination/Feedback system needs to improve?</b>		
	Yes	126 (76.8)
	No	38 (23.1)
<b>If yes, what can be done to improve Examination/ Feedback system, in your opinion? (n=126)*</b>		
1	Class tests should be conducted after completion of each systems	77 (61.1)
2	Adequate preparation leave before university exam	49 (38.8)
3	Answer sheets should be shown after correction and feedback should be given accordingly in an individual basis	37 (29.3)
4	Exam should be conducted separately for six subjects as separate paper	37 (29.3)
<b>Do you think you should improve your self-study habit?</b>		
	Yes	138 (84.1)
	No	26 (15.8)
<b>If yes, what can be done to improve your self-study habit? (n=138)*</b>		
1	Study in daily basis	83 (60.1)
2	Allocate time to study for each subject daily	59 (42.7)
3	Revise regularly	28 (20.2)

\*Multiple responses

students mentioned that they should be given adequate preparation leave before exam. The equal proportion (29.3%) of students agreed that, answer sheets should be shown to students after exam and feedback should be given accordingly; and exam of six basic sciences subjects should be conducted separately as a separate paper than combining into one. Students also revealed that they need to improve in their self-study habit. More than half of the

students (60.1%) mentioned that they should study in a daily basis, while the least (20.2%) agreed that they need to revise the course taught regularly (Table 3).

The difficulty in basic sciences was not found to be influenced by any of the independent variables of the study such as: enrolling in entrance preparation courses, interest in basic sciences and sparing self-study time except by the entrance marks score ( $p=0.01$ ). Students securing more than 60 out of 100 in entrance were found to report less difficulty in basic sciences than those securing less (Table 4).

**Table 4. Association of Independent variables with difficulty in basic sciences**

Variables	Difficulty in basic sciences		Total n(%)	$\chi^2$	p value
	Yes n(%)	Yes n(%)			
<b>Entrance Preparation course taken</b>					
Yes	139 (93.9)	9 (6.1)	148 (100.0)	0.33	0.29
No	14 (87.5)	2 (12.5)	16 (100.0)		
<b>Entrance Marks Score out of 100</b>					
Up to 60	99 (97.1)	3 (2.9)	102 (100.0)	6.11	0.01*
>60	54 (87.1)	8 (12.9)	62 (100.0)		
<b>Interest in basic sciences</b>					
Yes	140 (94.0)	9 (6.0)	149 (100.0)	0.28	0.26
No	13 (86.7)	2 (13.3)	15 (100.0)		
<b>Spare self- study time</b>					
Yes	94 (92.2)	8 (7.8)	102 (100.0)	0.45	0.53
No	59 (95.2)	3 (4.8)	62 (100.0)		

Pearson Chi Square ( $\chi^2$ ) Test\*: p value significant at <0.05 level

## DISCUSSION

In the curriculum of Kathmandu University, basic sciences course is termed as integrated health sciences (IHS) in which six subjects namely anatomy, physiology, pathology, biochemistry, microbiology and pharmacology are blended together in to one. Basis sciences is divided into IHS-I, IHS-II and IHS-III which previously used to be only two parts.

The finding of this study revealed that basic sciences are the subject of difficulty to more than two third students. Although, the content included in basic sciences added advantages of skillful learning focusing a valuable part of nursing education, students seemed to be burdened by heaps of study material but less time provided to learn which is not just the problem in our context but in various countries too.<sup>1,3,9,17,18</sup> While, students from other disciplines such as medical, dental have the privilege of studying only three or four basic sciences subjects in first year, nursing students have the tough choice of studying six basic sciences subjects along with core nursing subjects such as fundamentals of nursing, community health nursing and nutrition and dietetics in the same year. On top of that, the clinical and community field placements in between the

sessions make the learning and grasping the contents of basic sciences even more daunting.<sup>18,19</sup>

In our context, the depth of basic sciences course content seems to be similar to MBBS course lacking in the course content as per the need of nursing. This scenario is similar in another study conducted in Korea.<sup>20</sup> This could be why students might have reported basic sciences as difficult subject with vast course content which is consistent to the finding of another study.<sup>3</sup> Besides, because of less time to complete syllabus, teachers might have taught in fast pace, which might have further led to lack of understanding of the course content among the students.<sup>18</sup> Few studies have emphasized that basic science course could be spread throughout the years rather than concentrating in the foundation program.<sup>21,22</sup> The other options could be increasing the credit hours or minimizing the course content as per the relevance of nursing practice.<sup>21</sup> Moreover, curriculum should be revised taking into considerations of opinions of students, clinicians and the basic sciences faculty.<sup>4,10</sup>

Teaching learning ways implemented for basic sciences is a matter of concern as various studies have emphasized the inadequacy of guidelines regarding ways in teaching basic sciences to nursing students, along with appropriate content.<sup>23,24</sup> And depth of basic sciences knowledge required by the nurses.<sup>9,18</sup> Studies have pointed the difficulty in the part of basic sciences teachers to deliver lectures with appropriate examples in nursing context, which has contributed difficulty among students to integrate and apply basic sciences theory into clinical nursing practice.<sup>15,25,26</sup> Basic sciences course in B.Sc. nursing program are taught by non- nursing faculty, because of which it might have been difficult in the part of basic sciences teachers to provide appropriate examples in the nursing context.<sup>20</sup>

Evidence have highlighted on providing conceptual links between the basic sciences course and nursing practices by focusing on the areas that the trainee needs to know while practicing.<sup>27</sup> Several studies have pointed the need to synchronize between theory and its application in real clinical environment, so that nursing students be able to develop knowledge and practical skills effectively to prepare themselves to practice in the clinical situations.<sup>1,17,28-31</sup> Our study finding revealed that nursing students valued the teaching/learning environment where theory is linked to clinical applications of nursing which is consistent to several other studies.<sup>15,22,32-35</sup> Similarly, in this study, students mentioned that there should be enough teacher student interaction in class which is comparable to another study.<sup>22</sup> Moreover, team teaching approach involving both nursing teachers and basic science teachers in teaching nursing student may be implemented which is an effective approach to aid nursing students to enhance their ability to integrate basic science knowledge into their practice.<sup>1,36</sup>

Students in this study have emphasized the need of frequent class assessments after accomplishing each human system which is consistent to the study findings of other two studies.<sup>21,22</sup> The need of proper feedback system along with technique to answer questions was also equally felt vital to provide to students so that they can improve their academic performance. Students in our study have also mentioned that they should be given adequate preparation leave before exam. Normally, students are given a weeks' time duration to prepare for university examination while preparation leave are not usually given during formative evaluations. This may be due to tight academic schedule along with clinical and community field placements students have to undergo with. Therefore, examination of each basic sciences subject could be taken separately, in order to bring about best results among students which also have been suggested by students in this study.

Some of the studies have pointed that students should have background of basic science education before they start the nursing programme.<sup>1,15,16</sup> However, it is not the case in our study as only those students who take biology in intermediate level are eligible to apply for B.Sc. nursing program. Our study revealed that students securing less than 60 in entrance marks reported more difficulty than those securing more. This is supported by another study which found that a low entrance marks requirement is found to influence the success of students in science subjects in nursing.<sup>16</sup> In our context, the minimum criterion to be passed in entrance is 50 which may be an acceptable one. However, this may be raised to at least 60% so as to encourage bright students to enroll in the course. In our study, although more than two third of students were interested in the basic sciences course, majority of them found it difficult. However, studies revealed that greater the interest in the subject, lesser was the difficulty in other studies.<sup>16,37</sup>

Our study included all the colleges of Kathmandu University which may be the strength of our study as finding may be generalized to all the KU affiliated colleges, however, the findings cannot be generalized to the colleges under Tribhuvan (TU), Purbanchal (PU) or Pokhara University (PU). Use of descriptive cross sectional design further limits its generalizability. Mixed method approach including a

focus group discussion would have been a better choice. To the best of our knowledge, our study is first of its kind in Nepal, so it may act as a catalyst and reference to conduct future similar studies. Future studies may be conducted involving both basic sciences faculty and students. Also, comparative study may be conducted between colleges of KU, TU and PU affiliated colleges.

Despite of its limitations, this study is expected to facilitate curriculum reviewer and faculty members (both nursing and basic sciences) to sensitize on the difficulties experienced by the students in basic sciences and to implement solutions perceived by students during future curriculum review process and in teaching basic sciences.

## CONCLUSION

The integration of basic sciences course in nursing is inevitable in today's world so as to prepare nurses with strong foundation of biological sciences which will enable them to care for the patients holistically. The vast contents, less time allocation, blending of six different subjects into one, lack of specification of contents in terms of depth and scope of nursing are the major difficulties experienced by students. The preferred solutions mentioned by students were need to revise course content as per the relevance of nursing, increasing credit hours, lectures focusing more on clinical implications of nursing, more teacher student interaction in class, arranging for frequent class tests, provision of showing exam papers and providing feedback for improvements and conducting exams of six subjects of basic sciences separately. Basic sciences in nursing have always been a subject of difficulty and anxiety and will continue to be so, if timely interventions are not taken into consideration. Therefore, these aspects should be considered during curriculum review in the future to facilitate conducive teaching/learning of basic sciences.

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