

The Attitude And Perception Of Medical Students Towards Basic Sciences During Their Clinical Years

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ABSTRACT


Background: Basic sciences subjects are taught in the first two years of the medical course. They are considered the base for understanding the pathophysiological process of disease and accurate patient care. The study was done to assess the attitude and perception of the students regarding the course content, recall, and relevance of basic science knowledge in their clinical years.

Methods: This descriptive cross-sectional study was conducted among medical students in their clinical years at Chitwan Medical College, Nepal from September 2020 to December 2020. The self-administered questionnaire targeted medical students in their clinical years to collect the data. The descriptive statistics were applied using IBM SPSS V.20 for analyzing data.

Results: Out of 180, a total of 151 (83.88%) students participated in this study. The study revealed that pathology had the vastest syllabus. About 72.18% (109) of students agreed that pharmacology is the most important subject to be a good clinician. Moreover, many of them added pharmacology 71% (107) and anatomy 71.52% (108) along with pathology as the most needful subject among basic sciences to deeply understand the diseases and their management. Few respondents mentioned Microbiology 34% (51) and biochemistry 27.15% (41) curriculum should cover only the general concepts to give the working knowledge of the subject.

Conclusion: Overall, the student's attitudes and perceptions regarding the basic science subjects in their clinical years were found to be highly affirmative pointing to the relevance of basic science subjects in understanding and solving the clinical problems.

Keywords: Attitude, Basic science, medical students, Perception.

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INTRODUCTION

Medical education has been divided into basic and clinical science over the years.¹ Medical student builds their clinical expertise on basis of previously obtained basic knowledge.² At Chitwan medical college (CMC) Chitwan, the basic sciences subject

(Anatomy, Physiology, Biochemistry, Pharmacology, Pathology and Microbiology) are taught throughout the first and second year of their undergraduate course. The majority of scientific knowledge acquired during preclinical academic years has a role in

student's progression from comprehension to action throughout clinical years.³ Knowledge gained in basic medical science can aid in recalling facts and understanding the proper mechanisms of disease processes, which aid in making diagnostic formulations during their clinical years. Nevertheless, there has been much discussion about the role of basic medical science in learning about clinical practice.⁴ With advances in genetic information, newer technologies and novel diagnostic technique it is more challenging for medical students to understand the principle of normal and diseased bodily function these days.⁵ Moreover, as student proceeds through medical education, their attitude toward basic sciences course highly passive.⁶ Little is known about medical students' attitude and response to the basic sciences during their clinical years. Therefore, the purpose of this study was to evaluate students' attitude and perceptions toward basic sciences during their clinical years. This may be useful for the educational planner in modifying the syllabus and changing the traditional approach of learning basic sciences so that students can use their knowledge collectively to understand the clinical conditions.

MATERIALS AND METHODS

A questionnaire-based descriptive cross-sectional study was conducted among medical students during their clinical years at Chitwan Medical College, Nepal from September 2020 to December 2020. The study utilized an online, anonymous, self-administered questionnaire having eight statements regarding perceptions and attitudes towards the basic science subjects. Google forms were utilized for the creation and administration of the questionnaire, in which participants were limited to response only once to avoid the duplication of responses. Study participants were made aware that the collected data were intended only for publication and presentation. Besides, an online consent form was also obtained from all participants before accessing the questionnaire. Pre-testing for the validity and internal consistency of each item was done using Chronbach's alpha reliability test and revealed a value of 0.85 ($c_2=1743.2$, $p=0.001$). A sample of 20 students was asked to comment on the content and clarity of the statements. There were altogether eight statements related to attitude and perception regarding basic

sciences. All opinions were rated using a positive five-point Likert scale, which ranged from "strongly disagree" to "strongly agree" as a 1 to 5 for scoring strategy. Since the summed up related items emphasize the score for a group of statements, "strongly agree" and "agree" were merged as a single response and also "strongly disagree" and "disagree" were combined together to form three-point Likert scale. Out of 180 students of third and fourth year medical course, total 151 students participated in this study. Data were coded and entered and analyzed using SPSS version 20.0 (IBM Corporation, Armonk, NY, USA). Data were analyzed and displayed in a table and diagram. Since this was a non-probability and descriptive type of study, the descriptive analysis was done to summarize the result by calculating the number and percent for categorical variables. The proposal of this study was reviewed and approved by the Institutional Review Committee of Chitwan Medical College (CMC-IRC/077/078-017), Nepal.

RESULT

A total of 151 students participated in the study. Out of the total participants, 58% (88) were male and 42% (63) were female. The majority of the participants were of age 20-25, 87% (132) whereas 11% (17) were more than 25 years of age and 1% (2) were of less than 20 years of age. About 58.27% (88) of students felt overburdened by the Pathology course during their basic years. The overburden was felt by 77.90% of female and 22.10% of male students. Students ranked Biochemistry lowest 25.16 % (38) in terms of overload course content. Pharmacology was perceived as the subject with the highest applicability to be a good clinician 72.18% (109) followed by Anatomy 71.52% (108); Microbiology was ranked lowest 48 % (72). Students agreed basic subject is important for understanding clinical, Anatomy being the important subject with the highest positive response of 70% (106). Among them 52.80% were female and 47.20% were male. The highest number of respondents 56.29% (85) contradicted that just working knowledge of Physiology is sufficient. As to knowledge recall and relevancy, 48.34% (73) students indicated that they retained Physiology during their clinical years. Among 73 students 64.80 % were female and only 35.20% were male. The contribution of practical in facilitating theoretical understanding was highest for

Anatomy 59% (89) and least for 30% (45) for Microbiology.

Furthermore, students believed that Problem-based learning (PBL) would help them better understand basic science subjects. About 62% (93) students; 56.30% male and 43.70% female had

positive responses toward Physiology. The majority of students 71% (107) perceived Pharmacology as the most important subject in Basic sciences. Among them 62.40% were male and 37.60% were female. (Table 1 and Figures 1 and 2).

Table 1: Student's attitude and perception towards basic sciences in Chitwan medical college teaching hospital

Overloaded courses or vastest subject in basic science	Subject	Disagree (%)	Neutral (%)	Agree (%)	Mean \pm SD
	Anatomy	38 (25.16)	34 (23)	79 (52.31)	3.37 \pm 1.40
	Physiology	48 (31.78)	51 (34)	52 (34.43)	3.08 \pm 1.20
	Biochemistry	49 (32.45)	64 (42.38)	38 (25.16)	2.88 \pm 0.96
	Microbiology	42 (28)	59 (39.07)	50 (33.11)	3.06 \pm 1.02
	Pathology	26 (17)	37 (25)	88 (58.27)	3.62 \pm 1.27
	Pharmacology	42 (28)	50 (33.11)	59 (39.07)	3.13 \pm 1.12
Good knowledge of basic science is important to be a good clinician	Anatomy	33 (21.85)	10 (6.62)	108 (71.52)	3.87 \pm 1.61
	Physiology	35 (23.17)	11 (7.28)	105 (70)	3.84 \pm 1.54
	Biochemistry	37 (24.50)	31 (20.52)	83 (55)	3.46 \pm 1.39
	Microbiology	42 (28)	37 (24.50)	72 (48)	3.69 \pm 1.55
	Pathology	38 (25.16)	12 (7.94)	101 (67)	3.31 \pm 1.38
	Pharmacology	33 (21.85)	9 (5.96)	109 (72.18)	3.88 \pm 1.49
Important for understanding clinical cases	Anatomy	33 (22)	12 (8)	106 (70)	3.81 \pm 1.50
	Physiology	34 (23)	13 (9)	104 (69)	3.83 \pm 1.52
	Biochemistry	41 (27.15)	30 (20)	80 (53)	3.37 \pm 1.27
	Microbiology	42 (28)	37 (25)	72 (48)	3.24 \pm 1.26
	Pathology	38 (25.16)	12 (8)	101 (67)	3.75 \pm 1.47
	Pharmacology	35 (23.17)	21 (14)	95 (63)	3.66 \pm 1.41
Just working knowledge is required	Anatomy	83 (55)	32 (21.19)	36 (24)	2.49 \pm 1.37
	Physiology	85 (56.29)	30 (20)	36 (24)	2.52 \pm 1.29
	Biochemistry	66 (44)	44 (29.13)	41 (27.15)	2.74 \pm 1.15
	Microbiology	57 (38)	43 (28.47)	51 (34)	2.99 \pm 1.30
	Pathology	80 (53)	28 (19)	43 (28.47)	2.62 \pm 1.31
	Pharmacology	79 (52.31)	30 (20)	42 (28)	2.60 \pm 1.37
Knowledge recall is easy and relevant during clinical discussions	Anatomy	55 (36.42)	39 (26)	57 (38)	3.0 \pm 1.38
	Physiology	41 (27.15)	37 (25)	73 (48.34)	3.36 \pm 1.38
	Biochemistry	49 (32.45)	44 (29.13)	58 (38.41)	3.05 \pm 1.23
	Microbiology	48 (32)	46 (30.46)	57 (38)	2.91 \pm 1.30
	Pathology	46 (30.46)	45 (30)	60 (40)	3.09 \pm 1.29
	Pharmacology	41 (27.15)	37 (25)	73 (48.34)	3.30 \pm 1.27
Practical integration is high	Anatomy	40 (26.49)	22 (15)	89 (59)	3.52 \pm 1.45
	Physiology	39 (26)	30 (20)	82 (54.30)	3.45 \pm 1.41
	Biochemistry	43 (28.47)	46 (30.46)	62 (41.05)	3.19 \pm 1.23
	Microbiology	45 (30)	61 (40)	45 (30)	3.01 \pm 1.17
	Pathology	45 (30)	32 (21)	74 (49)	3.29 \pm 1.40
	Pharmacology	36 (24)	36 (24)	79 (52.31)	3.53 \pm 1.30
If PBL had been in pre-clinical years, it would have helped the better	Anatomy	38 (25.16)	27 (18)	86 (57)	3.54 \pm 1.54
	Physiology	36 (24)	22 (15)	93 (62)	3.63 \pm 1.51

understanding of the subjects	Biochemistry	37 (25)	28 (19)	86 (57)	3.53±1.47
	Microbiology	41 (27.15)	34 (23)	76 (50.33)	3.37±1.46
	Pathology	39 (26)	24 (16)	88 (58.27)	3.59±1.55
	Pharmacology	36 (24)	24 (16)	91 (60.26)	3.59±1.48
Most important basic subject					
	Anatomy	34 (23)	12 (8)	105 (70)	3.89±1.61
	Physiology	34 (23)	12 (8)	105 (70)	3.35±1.33
	Biochemistry	40 (26.5)	33 (22)	78 (52)	3.83±1.49
	Microbiology	48 (32)	40 (26.5)	63 (42)	3.12±1.32
	Pathology	34 (23)	10 (7)	107 (71)	3.78±1.55
	Pharmacology	31 (21)	13 (9)	107 (71)	3.99±1.50

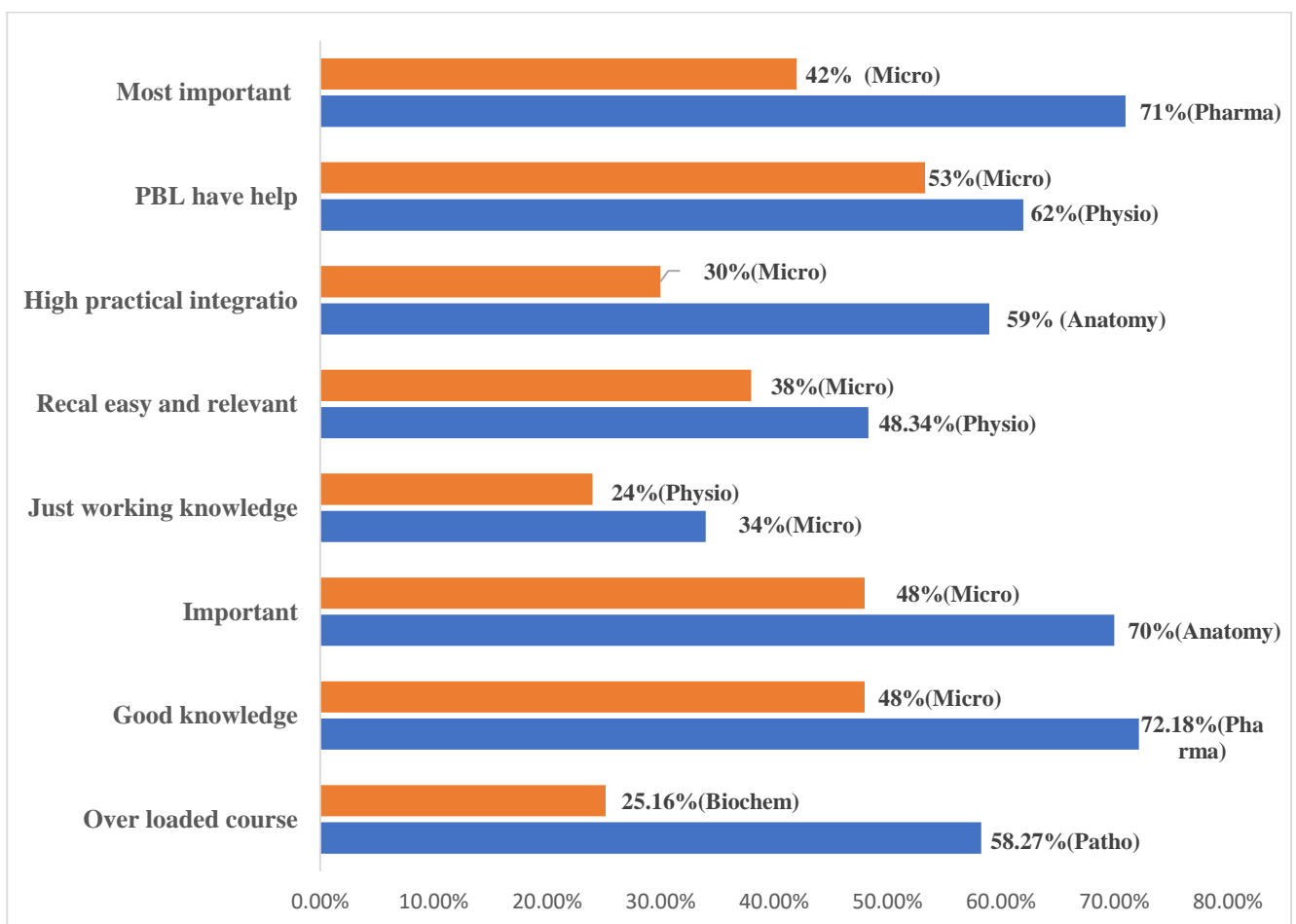


Fig 1: Student's attitude and perception towards basic medical sciences

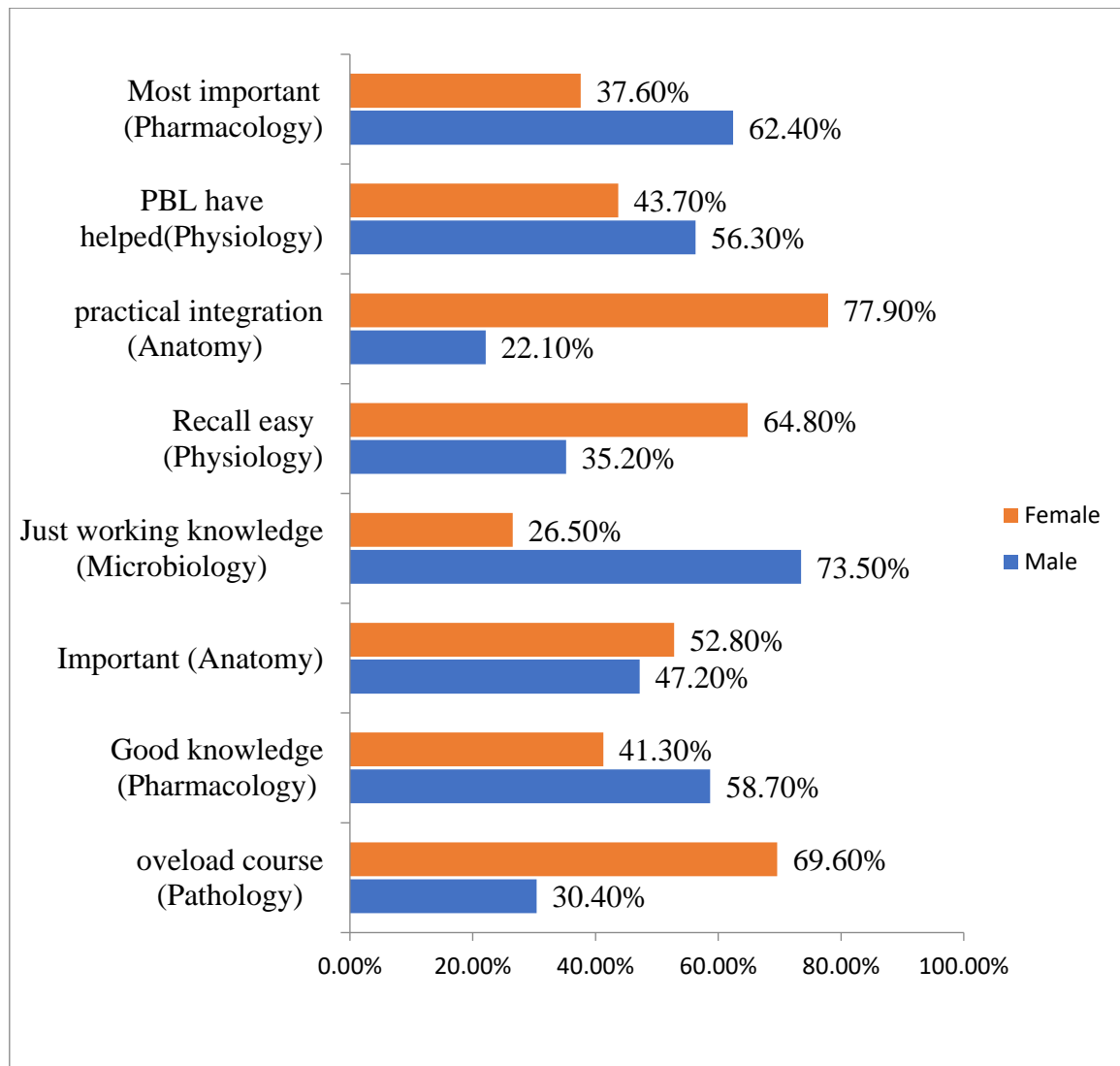


Fig 2: Student's attitude and perception towards basic sciences according to gender

DISCUSSION

The study was carried out in Chitwan Medical College, where initial two years of basic medical sciences teaching and three years of clinical posting along with one year of internship. The two years in basic sciences are both lectures-oriented and integrated system with laboratory practical's.

In our study, most of the students 58.27% (88) perceived Pathology subject with the vastest subject in basic science of the courses in basic sciences perceived whereas 52.31 % (79) students considered Anatomy being the second vastest subject in the basic sciences. Biochemistry was perceived as subject with least vast course by 25.16% (38) (Figure 1). Similar to our study, studies in Saudi Arabia,⁸India⁹,Germany¹⁰also considered Pathology and Anatomy with an immense syllabus. This

curriculum overburden can be solved by establishing a curriculum created by both basic science and clinical faculty members, which would amalgamate more clinical knowledge into preclinical years. Furthermore, new approaches like PBL and CBL (case base learning) can be introduced. This method would make sure to promote self-learning and share the responsibility of maintaining learning with the student.⁷In contrast to our study, a study from Ethiopia considered the physiology curriculum as extensive.⁴

The majority of the students 72.18% (109) believed that good knowledge of pharmacology is very important to be a good clinician followed by Anatomy 71.52% (108) and Physiology 70% (105). According to Studies, medical students understand and apply basic sciences knowledge gained in a

clinical framework is better understood and more practical during clinical exercise.⁵ In contrast to our finding, Croatian study suggested that clinical knowledge can be acquired without completely understanding the basic sciences.¹¹

Anatomy was ranked as the most significant subject for understanding clinical cases by 70.19% (106) students, followed by Physiology 69% (104) and Pathology 67% (101). Similarly in another study⁹ students graded Physiology as main subject for understanding clinical cases. Subjects such as Physiology, Anatomy and pathology are frequently preferred by clinical students because they bridge the gap between practical skills and fundamental theory.¹ Physiology and Pathology aid in the study and comparison of normal with the disease while Anatomy is useful during surgeries.⁶ Furthermore, the clinically oriented scenario-based evaluation may boost students' perceptions of basic sciences' value and relevance of the basic sciences to clinical practice, as well as their involvement in learning and retention of basic science curriculum content.¹²

Regarding the response for "just working knowledge is required", students disagreed with this statement for all the subjects in basic sciences. A large number of the students 56.29% (85) disagreed that having only working knowledge of physiology is sufficient. According to a study, strong clinical knowledge requires a thorough comprehension of its foundation in basic sciences.⁶ This positive attitude toward basic sciences was also seen in a study done in Nepal and India¹³. But in contrast to our study, a study in Ethiopia⁴ reported that having good knowledge in Physiology and Biochemistry is important but Anatomy can be covered superficially without going into detail. Very detailed knowledge of basic science is necessary to effectively treat patients and applying basic knowledge to clinical medicine is an art that should be learned by students in their early stage.¹⁴

In response to the recalling of the basic knowledge and its relevance during clinical years; a higher percentage of students acknowledged the relevance of basic science in their clinical years. Basic subjects like Physiology 48.34% (73) and Pharmacology 48.34% (73) are most relevant. Our findings were in line with those of Nuggedalla et al⁶ and Gupta et al¹³. The reason may be due to

conceptual consistency, these subjects were more memorable and helpful for students to recall or reconstruct the relationship between features and diagnosis.¹⁵ In contrast to our result, studies reported loss of major knowledge of subjects like Biochemistry and neuroanatomy, among students with increasing years of time.^{12, 16} This may be related to volume overload and lack of application of the concept studied.⁸

In our study, most of the students acknowledge the integration of practical with basic science theory is high in Anatomy 59% (89) followed by physiology 54.30% (82). Pharmacology 52.31% (79), Pathology 49% (74) Biochemistry 41.05% (62) and Microbiology 30% (45). A study in Ethiopia revealed that physiology had the maximum practical integration.⁵

Basic science knowledge learned in a clinical context is better understood and utilized during their clinical years.¹⁷ Many medical and health institutes across the world quickly adopted this novel approach.¹⁸ Students also understand the value of PBL during their pre-clinical years, as seen by their enthusiastic reaction to the statement "If PBL had been in pre-clinical years, it would have helped the better understanding of the subjects." Respondents felt that PBL would have aided in greater understanding. Physiology received 62% (93), Pharmacology received 60.26% (91), Anatomy received 57% (86) Pathology received 58.27% (88), Biochemistry received 57% (86), and Microbiology received 50.33% (76). A number of studies in Nepal, India^{13, 19}, Ethiopia⁴, Jordan have identified and emphasized the benefit of PBL for higher learning outcomes. PBL provides motivation for self-directed learning, helps in problem-solving skill and develop group work ability.²⁰ Though, in our study, the students had emphasized the need of self-learning and deep approach of learning strategy like PBL, it has not given much importance in TU curriculum.

Furthermore, the findings regarding student's opinion about the most important basic subject; about 70% (107) of the student agreed Pathology and Pharmacology 70% (107) as important subject whereas 60% (105) respondent agreed with Physiology and Anatomy as important subjects in the basic sciences.

CONCLUSION

Basic sciences are essential component of primary medical education, and serve an important developmental role in facilitating efficient knowledge for clinical practice. To summarize, the student's attitude and perception regarding the basic science subjects in their clinical years were found to be highly affirmative pointing the relevance of basic science subjects in understanding and solving the clinical problems. Such study could provide the valuable guidelines to the educational planner to adjust the

curriculum in the future as per the need for the students to improve their motivation towards basic science study.

Limitation: The findings of the study could be stronger indicators for modification in basic science curriculum, if conducted in large scale with some appropriate changes in methodology.

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