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ORIGINAL RESEARCH

Medical Students' Attitude and Perception Towards Basic Medical Science Subjects at Wollo University, Northeast Ethiopia

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Introduction: The knowledge of basic medical science could help to remember a fact and be used to understand causal mechanisms of disease process that improve the accuracy of diagnostic formulations.

Objective: To assess the perception and attitude of medical students towards basic medical science subjects along with retention rate and clinical relevance in Wollo University.

Methods: Institutional-based cross-sectional study design was employed in Wollo University from September, 2020 to October, 2020. A pre-tested and structured self-administered questionnaire was used for data collection. All opinions were rated using a positive-point Likert scale, which ranges from "strongly disagree" to "strongly agree." The data were entered and analyzed using SPSS version 20.

Results: A total of 153 students participated with a 100% response rate. Among them, 45 (29.4%), 38 (24.8%), 39 (25.5%), and 31 (20.3%) were PC-II, C-I, C-II, and Intern students, respectively. Ninety-six (62.7%) of medical students were very much interested in basic medical science subjects. But, 113 (73.9%) of them did not have plans to join the subjects as a future career. The main reasons in more than half 85 (55.7%) of the respondents were less financial growth followed by less chance of promotion 31 (20.3%). There were 66.7% of the students who considered anatomy as clinically relevant, whereas 53.6% and 47.1% considered physiology and biochemistry, respectively, to be clinically relevant. The number of students who could recall anatomy and physiology during relevant clinical discussions was 102 (66.7%) and 85 (55.6%), respectively. This percentage was relatively less for biochemistry (26.8%).

Conclusion: In conclusion, medical students have a positive attitude towards basic medical science subjects. However, they are hesitant to join the field because it offers them less financial growth and few chances of promotion. Moreover, anatomy and physiology were highly relevant subjects during clinical practice. But, the retention rate of basic medical science knowledge during their clinical year was low.

Keywords: basic medical science, perception, attitude, relevance, medical students

Introduction

A variety of sciences, initially biomedical, but recently also behavioral and social sciences, are included in the field of basic science, which serves as the basis for learning medical practice.[1] The basic medical sciences namely anatomy, physiology, and biochemistry are the sciences that mainly deal with the structural, functional, and biochemical properties of the human body. They are the core component of any medical curriculum and important in clinical medical practices.[2] Many

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medical students develop their clinical knowledge from previously acquired basic medical science knowledge.[3] However, the role of basic medical science in learning about clinical practice has been debated frequently.[4]

In many medical schools, innovative curriculums have been implemented, all of which have one way or another achieved system-based curricula or curricula based on problem-based learning.[5] It mainly focuses on student-centered, integrated, and problem-based, clinically applicable methods of teaching and learning.[6] This teaching methodology encourages the active participation of students and promotes lifelong learning and love for the basic medical science subjects.[7] Furthermore, medical students who studied the effects of problem-based learning discovered that the experience they acquired in basic medical science was beneficial.[8,9]

The knowledge of basic medical science could help to remember a fact, and be used to understand causal mechanisms of a disease processes that improve the accuracy of diagnostic formulations.[10,11] Additionally, this knowledge provides a consistent conceptual framework to which diagnostic information is applied to increase comprehension of disease processes.[12] Poor integration of basic medical sciences with clinical practice during medical education may undermine the relevance of these subjects.[13] So, having basic medical science knowledge serves as a prerequisite for a better understanding of clinical medicine and maximizing initial learning.[14]

Many senior undergraduate students informally state that their memory of medical courses in basic medical science is lower than expected and that the content of those courses does not seem relevant to their subsequent clinical work or studies.[15] Some students can only view basic medical science knowledge as obstacles to progress in the clinical years.[16] In addition, as they progressed through their medical education, the students became increasingly negative in their opinions about basic medical science courses.[17] Nevertheless, a study conducted in India (2014) revealed that medical students have a positive attitude to basic medical sciences.[18]

The study conducted by Getu AA (2019) stated only 3.1% of 4th year medical students want to join basic medical science as a future career. Intern medical students do not want to join this field. It also shows that overburdening of medical education curricula in basic medical sciences are imperative obstacles faced by medical students.[19] Another study done at University of Illinois in Chicago stated that the main obstacle in pursuing care in basic medical science was their wish to become a clinician and their concerns about salary.[20]

Several studies have been carried out in various countries on the attitude and perception of medical students towards basic medical sciences, but little is known about the attitudes and perception of medical students towards basic medical sciences in Ethiopia. Therefore, this study aimed to assess the students' attitudes and perception toward learning basic medical sciences taught during their 1st and 2nd year along with retention rate and their relevance during their clinical years.

Materials and Methods

Study Design, Area, and Period

An institutional-based cross-sectional study design was conducted from September, 2020 – October, 2020 at Wollo University.

Data Collection Tool and Procedure

A pre-tested and structured self-administered questionnaire was used for data collection. The questionnaire was developed from other similar research related to our topic.[18,21] The pre-test was performed on 5% of the sample size to check the content and clarity of the questionnaire. Participants in this study were all the PC-II (Pre-clinical II or second-year medical student), C-I (Clinical year I or third-year medical students), C-II (Clinical year II or fourth-year medical students), and Interns undergraduate medical students at the College of Medicine and Health Sciences of Wollo University during the 2020 academic calendars. A total of 153 questionnaires were distributed among students after taking their consent for participation in this study. The questionnaire collected information on students' academic year and their perceptions towards basic medical science subjects. All opinions were rated using a positive-point Likert scale, which ranges from "strongly disagree" to "strongly agree." After completion of data collection, the data have been checked for errors and completeness to assure the quality of data.

Data Entry and Analyses

Data were cleaned, coded, and entered into Epi-info version 7.1 then exported to SPSS version 20 for analysis. A descriptive analysis was carried out to see the distribution of independent variables. All opinion levels were analyzed. Chi-square test was performed on categorical variables and significance was considered at $P<0.05$.

Results

Socio-Demographic Characteristics

A total of 153 students participated in this study with a 100% response rate. One hundred thirty-nine (90.85%) of them were in the age group of 23–27. Most of the respondents 142 (92.81%) were male. Almost half of the respondents 79 (51.63%) came from rural areas of the country. The majority of the respondents were Orthodox 73 (47.7%) followed by Muslim 64 (41.8%). Regarding their ethnicity, more than half of the respondents were Amhara 93 (60.7%) followed by Oromo 29 (18.95%). Among the students enrolled for the study, 45 (29.4%), 38 (24.8%), 39 (25.5%), and 31 (20.3%), were PC2, C-I, C-II, and Intern students, respectively (Table 1).

Perception and Interest of the Participants Towards Basic Medical Science Subjects

Ninety-six (62.7%) of medical students were very much interested in basic medical science subjects. But, 113 (73.9%) of the students do not have a plan to join the subjects as a future career. And also, the majority 103 (67.3%) of the students will not guide their juniors to join this subject as a future career. The reason for not joining the basic medical science in more than half 85 (55.7%) of the respondents were less financial growth followed by less chance of promotion 31 (20.3%). Among the respondents, one hundred sixteen (75.8%) of them agreed that the basic medical science teachers encourage the students to join the field. More than half 88 (57.5%) of the respondents agreed that the number of lecturers could be increased in a basic medical science field. The integrated curriculum does not increase the interests of medical students to basic medical science as indicated by 72 (47.1%) students (Table 2).

Table 1 Socio-Demographic Characteristics of the Respondents

Variables		Frequency	Percentage
Age	18–22	2	1.31
	23–27	139	90.85
	28–32	9	5.88
	≥33	3	1.96
Gender	Male	142	92.81
	Female	11	7.19
Residence	Urban	74	48.37
	Rural	79	51.63
Religion	Orthodox	73	47.71
	Muslim	64	41.83
	Protestant	12	7.84
	Others	4	2.61
Ethnicity	Amhara	93	60.78
	Oromo	29	18.95
	Tigre	16	10.46
	SNNP	12	7.85
	Afar	3	1.96
Year of study	PC-II	45	29.4
	C-I	38	24.8
	C-II	39	25.5
	Intern	31	20.3

Abbreviations: SNNP, South Nation and Nationality People; PC-II, preclinical year II; C-I, clinical year I; C-II, clinical year II.

Clinical Relevance of Basic Medical Science Subjects

Overall, the students rated anatomy as more clinically relevant than biochemistry and physiology. There were 66.7% of the students who considered anatomy clinically relevant, whereas 53.6% and 47.1% considered physiology and biochemistry, respectively, to be clinically relevant. In contrast, 3.9% and 2% of the respondents considered physiology and biochemistry, respectively, are clinically irrelevant (Table 3).

Chi-Square Test Comparing Across Subjects

Out of the total respondents, 131 (85.6%) of the students were considered anatomy as the vastest subject during their first and second year, while only 92 (60.5%) respondents considered physiology curriculum as extensive. Most 129 (84.3%) of the respondents revealed that studying anatomy entertained them during 1st and 2nd years. One hundred twenty-four (81%) of the students considered that having knowledge on physiology is very important to be a good clinician followed by biochemistry 98 (64%). More than half 85 (55.6%) of the students believed that anatomy can cover the general concepts in order to have a working knowledge without going in to much detail. The number of students who could recall anatomy and physiology during relevant clinical discussions was 102 (66.7%) and 85 (55.6%), respectively. This percentage was relatively low for Biochemistry (26.8%). Nearly three-fourths 108 (70.6%) of the respondents considered physiology was helpful for practical integration in a manner that raises

Table 2 Perception and Interest of Medical Students Towards Basic Medical Science Subjects

Variables	Rate	Frequency	Percentage
Are u you interested in basic science subjects	Very much	96	62.7
	Minimal	42	27.5
	Null	15	9.8
Future plan to join it as a career	Of course	12	7.8
	Maybe	28	18.3
	Never	113	73.9
Will you guide your junior to join basic science as a career	Of course	17	11.1
	Maybe	33	21.6
	Never	103	67.3
Why not to join basic science	Not interested	11	7.2
	Family pressure	23	15
	Less financial growth	85	55.6
	Less chance of promotion	31	20.3
	Less thrilling field	1	0.7
	No role model	2	1.3
Should basic science teacher encourage the students to join this field	Yes	116	75.8
	No	37	24.2
Should the number of lecturer increased in basic science field	Yes	65	42.5
	No	88	57.5
Will integrated curriculum increase the interest of medical students to basic science	Yes	64	41.8
	No	72	47.1
	I do not know	17	11.1

Table 3 Clinical Relevance Rating of the Basic Medical Science Disciplines

	Irrelevant		Moderately Relevant		Highly Relevant	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
Anatomy	0		51	33.3	102	66.7
Physiology	3	2	68	44.4	82	53.6
Biochemitry	6	3.9	75	49	72	47.1

useful clinical skills. The majority 123 (80.4%) of the respondents felt that problem-based learning (PBL) would have helped in a better understanding of anatomy followed by physiology 98 (64.1%) (Table 4).

Discussions

In Ethiopia, the new innovative medical curriculums are partitioned into two years of basic medical sciences teaching and three years of clinical education. The two years of pre-clinical education are offered in both lecture-oriented and integrated systems with some lab integration. Most of the courses were taught by the members of basic medical science teachers. It is known that basic medical science subjects are a precondition for all of the other clinical sciences as they help to recall facts, contribute to better diagnostic formulations, and help to solve complex and atypical clinical scenarios.[22]

In this study, we have tried to explore the perception and attitude of our medical students towards basic medical sciences and their perceived clinical relevance and retention of basic medical sciences across the medical education continuum. Moreover, we have tried to find out their preference regarding basic medical science as their future career and the reason for students not getting interested in basic medical science subjects. In the present study, 62.7% of medical students were interested in basic medical science subjects. But, only 7.8% of them wish to join the field as a future career. This

Table 4 Chi-Square Test Comparing Attitudes and Perceptions of Medical Students Toward Basic Medical Science Subjects Across Subjects

Variables/Subjects	Anatomy			Physiology			Biochemistry		
	Frequency	Percent	P value	Frequency	Percent	P value	Frequency	Percent	P value
Was the course content of the 1st and 2nd year subjects very extensive?	131*	85.6%	0.02	92	60.1%	0.14	62	40.5%	0.31
Does studying the subject entertain you during 1st and 2nd year?	129	84.3%	0.42	84	54.9%	0.32	53	34.6%	0.16
Does having knowledge on them is very important to be a good clinician?	92	60.1%	0.36	124*	81%	0.03	98	64%	0.43
Does basic science subjects can cover the general concepts in order to have a working know without going in to detailed?	85	55.6%	0.24	81	52.9%	0.17	58	37.9%	0.25
Do you able to recall these subjects during relevant discussion in your clinical years?	102*	66.7%	0.04	85	55.6%	0.14	41	26.8%	0.13
Does practical integration of subjects was done in a manner that was helpful to inculcate useful clinical skills?	87*	56.9%	0.03	108	70.6	0.33	76	49.7%	0.18
Do you think PBL ie integration of basic subjects with clinical subjects to discuss a topic would have helped you?	123	80.4%	0.12	98*	64.1%	0.02	95*	62.1%	0.04

Note: *$P<0.05$ in Chi-square test comparing across subjects.
Abbreviation: PBL, problem-based learning.

finding was in agreement with a study conducted in Avicenna Medical College, Lahore by Javed et al where only 8.1% of the respondents want to join the field as a career.[21] It is also in line with the study conducted by Kitajima et al which reveals that a high percentage (74%) of medical students was interested in basic medical science subjects.[23] But, it is in contrast to a study conducted on Japanese medical students where only 24.7% of them were interested in this field.[24] This discrepancy may be due to differences in the medical curriculum of the two countries.

Concerning the lack of interest of medical students in joining the basic medical science field, significant numbers of students have claimed that the key reason is less financial growth and less chance of promotion in these fields. This finding is in line with the study conducted in China, Malaysia, and South Asia which found that there is a limited opportunity in basic medical science restricted to teachings, research, and diagnostic laboratories.[25] Moreover, several countries, including Australia, France, and Japan, have reported that financial constraints are a major barrier to join basic medical sciences. Many studies have looked into these issues and salary and financial growth is now considered as a significant factor that influences the student's choice of subject as a career and as a result, most of the students are still interested in clinical subjects rather than basic medical science.[26–28] Furthermore, the majority of the students in our country still aspire to be a well-known clinician in the future rather

than an academician or researcher, who enjoys greater social respect and earning potential.

According to many reports, medical students are better able to understand basic medical science knowledge gained in a clinical environment and conduct more practical clinical exercises.[28–30] In our study, the majority of the medical students acknowledge the significance of integration of basic medical sciences with clinical discipline, which helps in better understanding of respective subjects. But, 47.1% of the respondents said that the integrated curriculum has not increased their interest in basic medical sciences. This finding is in agreement with Javed et al report.[21]

Basic medical science knowledge can assist the clinical investigation by helping students to remember the relationship between features and diagnoses.[10] Regarding the clinical relevance of basic medical sciences, anatomy and physiology were highly relevant subjects in nearly more than half of the respondents. But, biochemistry was irrelevant for about 3.1% of the respondents. This is in agreement with a similar study conducted in Australia.[22] But; this result contradicts the finding of Yograj et al, who found that during their clinical years, 88.8% of the respondents found physiology to be the most relevant subject, followed by anatomy (72.4%) and biochemistry (45.4%).[31] This discrepancy may be due to variations in basic science teachers' teaching methodology. In terms of course content and subject entertainment, significant numbers of the respondents claimed that anatomy is the most extensive and exciting subject of all other basic medical sciences during their first and second years. This finding is in agreement with the study conducted in India, which stated that 84.2% of the respondents said anatomy had an immense syllabus and 20.4% said biochemistry had a syllabus overload, which was statistically significant ($P < 0.05$).[31] Another cross-sectional study conducted in India also found that 75% of respondents consider anatomy as the vastest subject.[18]

In the current study, the respondent demonstrated that having knowledge of physiology is more important to be a good clinician as compared to anatomy and biochemistry. This finding is consistent with the study conducted in India, which states that 95.4% of the respondents claimed that a detailed understanding of these fundamental subjects is needed to become better clinicians.[18,31] Our result was also in agreement with those of Shankar et al, Shah et al, and Sentí et al.[32–34] To detect any structural abnormality, abnormal function, or deranged biological processes in the body, one must have a detailed knowledge of the normal structure, functions, and biochemical reactions, which are taught in these fundamental subjects.

The durability of medical school basic medical science knowledge has always been a matter of concern. A popular belief among physicians and medical educators is that during the clinical years, a large portion of the basic medical science knowledge gained during the typical preclinical years of medical school is lost.[35] Only 26.8% of respondents could recall biochemistry during their clinical discussions, while 55.6% could recall physiology and 66.5% could recall anatomy. Our findings were in line with those of Gupta et al and Nuggedalla et al.[18,36] Spencer et al also wrote in their paper that basic medical science retention was generally low, so they recommended to fully integrate basic medical sciences during the whole duration of a medical curriculum.[37] Instead of concentrating on ways to minimize knowledge loss, medical education program designers should concentrate on ways to increase the degree of knowledge development.[15] Studies have shown that students understand and apply basic medical science knowledge better when it is taught in a clinical environment.[1] Students also understand the significance of PBL, with 60–80% of students in our survey claimed that this strategy would have aided in better comprehension of their subjects. Several studies reported from India have stressed the value of case study or PBL for better learning outcomes.[38–42] Though this approach cannot cover the entire syllabus, a hybrid approach must be used, with a few topics covered by conventional didactic lectures and the rest through clinical cases.[41] Moreover, it requires better cooperation between various basic and clinical departments, as well as motivated faculty dedicated to raising the quality of medical education.[39]

Conclusion

In conclusion, medical students have a positive attitude towards basic medical science subjects. However, they are hesitant to join the field because it offers them less financial growth and few chances of promotion. Moreover, anatomy and physiology were highly relevant subjects during clinical practice. But, the retention rate of basic medical science knowledge during their clinical year was low. So, successful integration of the basic medical sciences into clinical practice is required, assisting medical students in increasing their retention rate. Furthermore, attracting medical students towards basic medical science is a necessary task that can be accomplished by alleviating

their financial difficulties and promoting basic medical science teachers.

Data Sharing Statement

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

Ethics Approval and Consent to Participate

Ethical clearance was obtained from Wollo University, College of Medicine and Health Sciences, Department of Preclerkship. All study participants were informed about the purpose and confidentiality issues related to the study. Participation was voluntary and written informed consent was obtained from each participant. Finally, the data were collected and confidentiality of client information was maintained. Lastly, the authors confirmed that this study was conducted in accordance with the declaration of Helsinki.

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Disclosure

The authors declare that they have no conflicts of interest for this work.

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