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Original Research Article

Basic Science courses in the eyes of Medical Students during their clinical study years at University of GondarAyechew Adera Getu¹, Bahiru Tenaw^{*2} and Yigizie Yeshaw¹¹Department of Physiology, School of Medicine, College of Medicine and Health Sciences University of Gondar, Gondar Ethiopia P. Box 196²Department of Anatomy, School of Medicine, College of Medicine and Health Sciences, University of Gondar, Gondar Ethiopia P. Box 196**Abstract**

Background: Basic medical sciences play fundamental role for the clinical practice of medical care. These are considered as the base for medicine that a sound knowledge in the field of basic sciences is indispensable for perceiving the pathophysiological processes of disease and accurate patients care. Therefore, the aim of this study was to sight see the attitudes of medical students towards basic sciences in their preclinical years and the applicability of these courses to clinical practice and preference of future career choice.

Methods: A descriptive cross-sectional study was conducted among medical students in their clinical years at university of Gond. Pretested self-administered questionnaire was used to evaluate their opinions about basic sciences applicability to clinical practice and their choice of future specialty. Two hundred forty students (fourth year and interns) were participated.

Results A total of 2404th year and 6th year) medical students were participated in this study. Of these, (17.5% respondents were females. Fifty nine of respondents came from urban area. The mean age of students was 22.7 years with a standard deviation of 1.44 years.

Conclusion: Overall, the attitudes of students toward basic science subjects were positive. Majority of students felt that preclinical teaching is interesting and relevant for future clinical practice, yet recall, overburdens and clinical significance were suboptimal. Reviewing teaching methods with integration clinical fields, premature clinical experience showing relevance of basic sciences and assigning more teaching time exploiting clinicians should be well-planned.

Keywords: Medical students, Medical education, Basic sciences, Career choice, Ethiopia.

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1. Introduction

Basic sciences namely, Anatomy, Physiology, Biochemistry are the science of physical and biochemical, functional and structures of human body which lays the foundation of good clinical medical practice and are seen as important core component of any medical curriculum[1].

Nowadays with the advancement of knowledge, new drugs being introduced, novel diagnostic and interventional techniques developed and a better

understanding of how the genome alters functions, it is more and more critical for the present day medical students to understand the principles of both normal and abnormal body functions [2].

Learning and professionalism based on merit and keen interest has a profound effect on quality of education and service. The need of future qualified, ethical and humane health care providers like medical doctors can be

met if students have interest and preferences for medical sciences. Better health services can be delivered for patients if health professionals have specialized training in the particular areas of the medical field based on merit and choice of the individuals. Therefore, to meet this goal knowing the medical students' attitude and interest of their future career/specialization and identifying possible factors affecting their choice is important. Additionally, if the factors which influence the medical students to choose specific specialty are identified during their training period of the pre- and clinical courses, can be modified to stimulate interest in choices that are not preferred by them and coping the ever need of specializations in medical practice[3].

The inclination of medical students towards any specialty/subject is determined by various interacting variables amongst which the attitudes/opinions of the student towards the subject play a major part [4]. This may, therefore, determine how well the students learn and understand the subject and consider it as a possible future career. Individual's perceptions found to have a profound effect on learning and behavior [4]. According to Kaufman and Mann (2010), "actions, learning and functioning are a result of a continuous, dynamic and reciprocal interaction among 3 sets of determinants; personal, environmental and behavioral. Personal factors include the individual's attitudes, perceptions, values, goals, knowledge and all previous experience [5].

It is good and appropriate to create a ground to medical doctors to teach basic sciences as are best poised to convey the clinical aspects of the subject. But studies from different part of the world are showing the disturbing trend, of medical doctors less inclined to pursue career in the basic sciences. In Ethiopia, where the author based, the number of physicians involved in basic science teaching is declined in alarming rate. One of the aims of this study is to investigate the medical students' career choice of specialization and whether basic science may be one of their future careers. It is becoming clear that medical students do not wish to take up basic science specialty as their career and contribute in teaching, learning and research activities [6].

Study done in Japan showed that the number of physicians in basic sciences research and teaching is dropping to a critical level. According to this finding a crisis point in Japanese basic science research has been reached [7]. The Medical education curriculum in Ethiopia is traditional/conventional teaching basic sciences in the 2nd and 3rd of the 6 years of medical training, even though some medical schools adopted a new integrated approach curriculum. We teach basic sciences [anatomy, Biochemistry, Physiology) as a year based taking approximately eleven months mainly taught by means of lectures and practical classes with least vertical and

horizontal interdisciplinary interaction. This is kind of teaching is more teachers - centered with minimal active participation from the students. Medical education is currently undergoing innovative evidence-based changes in teaching and learning. More emphasis is being placed on student centered, integrated, and problem based, clinically relevant teaching and learning [8]. This is especially true in the teaching of basic sciences where the current trend is to convert the passive learning environment into one that encourages a more active participation from the students and promotes lifelong learning and love for the subject [9].

1.1 Basic Sciences content:

There is a growing concern among medical educators that traditional program of teaching medical students have not provided better outcomes of learning [9]. Many senior undergraduate students indicate informally that their memory of basic science medical courses is less than expected and the content of those courses did not seem relevant to their later clinical work or studies [10]. Moreover, the students become increasingly negative in their opinions about basic science courses as they progressed through their medical education [11]. However study done in India (2014) indicated that medical students have a positive attitude for basic sciences [12].

Students understood that for inclusive medical aptitude and knowledge, basic sciences courses are significant. They recommended the learning experience can be improved significantly by better clinical integration of subjects. According to Gupta, *et al* (2014), anatomy was considered the vastest subject and the recall rate was high as compared to the other basic subjects during relevant clinical discussions. In this study students were asked also to rate the most important subject for them and found that anatomy is the most important basic science subject [13].

1.2 Basic Science as a future career:

Various diverse factors influence medical students' choice of their eventual careers, including student demographics, lifestyle preferences, prestige, expected income, preclinical and clinical experiences, role models and alternate career opportunities [14]. The number of medical graduates who are perusing their post graduate studies in the field of basic sciences (Anatomy, Biochemistry, Microbiology, Physiology and Pharmacology) is falling rapidly. It is becoming clear that medical students do not wish to take up basic science specialty as their career and contribute in teaching, learning and research activities [15]. In study done by Yamazaki *et al* (2013) showed that the percentage of students who liked to pursue basic sciences as their future career is very small (12 %). Students outlined that the main obstacle in perusing a care in basic science was their wish to become a clinician and their concerns about salary [16].

1.3 Basic science clinical relevance:

Contextual teaching linking theory to real life situations is crucial to impress upon the students the usefulness of a basic science subject in clinical years. This would also motivate the student to adopt a deeper approach to learning; resulting in the student interacting vigorously and critically with the course and focusing on the overall meaning [17]. Study in Iran indicated that basic science courses have little clinical relevance and therefore failing to prepare students for clinical clerkship. However Anatomy, general pathology and physiology were the curriculum items considered most helpful in preparing students for clinical work [18].

This study was planned with the objective of exploring the students' attitudes, interest, career choice and application of basic science subjects in the clinical years of their medical education. More specifically this study is aimed to determine the perception of medical students towards basic science courses, assessing the medical students' view on basic sciences as a career choice and to investigate medical students' perception on the importance of basic science courses for their clinical application.

2. Materials and methods

A descriptive cross sectional study was employed. Participants in this study were the fourth-year and 6th year (Interns) undergraduate medical students in their 6 years program at the college of medicine and health sciences at the University of Gondar during the 2018-19 academic calendars. The questionnaire was developed from articles related to our title. The pre-test was performed using a sample of 15 students who were requested to offer a comment on content and clarity of questionnaire. Significant amendment was made as to feedback forwarded from students. Survey participation was voluntary and written informed consent was obtained from the participants. Self-administered questionnaires were distributed for 240 students.

Questionnaires having three items were utilized to gather information. The first item was for demographic information; the second encompasses the general view of students towards basic science subject. The third have a 15 item questionnaire which are close ended and the responses graded on a 5 point Likers scale ranging from 5=strongly agree to 1= strongly disagree. After completion of data collection, the data have been checked for errors and coded to numerical values so that analysis can be done using a computer. Data were entered and analyzed to SPSS version 21.

3. Result

3.1 Socio-demographic Characteristics

A total of 240 participants (4th year and medical intern) were participated in this study. Out of total of

participants, Seventeen (17.5%) respondents were females and 59.2 % of them were urban residence. the mean age of students was 22.70 years with a standard deviation of 1.44 years. Among the respondents one hundred ninety two (80%) were fourth years and forty eight (20%) were medical interns (Table 1).

Table 1: Socio-demographic characteristics of respondents

Variable	Frequency	Percentage
Age	-	-
Sex		
Male	198	82.5
Female	42	17.5
Year of study		
4 th year	192	80
Medical Intern	48	20
Residence		
Urban	142	59.2
Rural	98	40.8
Educational status of Father		
Illiterate	52	21.7
Read/write	32	13.3
Primary School	36	15.0
Secondary School	14	5.8
Diploma and above	106	44.2
Educational status of Mother		
Illiterate	84	35.0
Read/write	46	19.2
Primary School	14	5.8
Secondary School	18	7.5
Diploma and above	78	32.5
Occupation of father		
Farmer	100	41.7
Merchant	30	12.5
Health Professional	10	4.2
Employee	100	41.7
Occupation of Mother		
Farmer	88	36.7
House Wife	54	22.5
Merchant	32	13.3
Health Professional	2	0.8
Employee	64	26.7

3.2 Career preferences of medical students:

Students were asked as to which post graduate specialty would be their primary choice. As shown in table 2 and figure 1. Internal medicine was the most wanted future career specialty for student, 88(36.7%) and surgery was the second most preferred specialty field with total number of 52(21.7) respondents. The least preferred specialty career was Emergency Medicine (0.8%). Six students (2.5%) considered basic science as their future postgraduate career.

As to the students correlation the importance of the basic medical science teaching on their clinical attachment, majority (95.5%) believed that basic sciences is helpful, relevant and important. However, (56.8%) of respondents had said that basic sciences teaching was not helpful in preparing them for clinical practice and also 49.16%, 19.16% of students were overloaded and difficulty of

recalling their knowledge of basic sciences, respectively. At the same time 140 (58.3%) stated that overall most of the basic sciences teaching lacked clinical significance and that they are not satisfied with basic sciences teaching.

The involvement of practical sessions in smoothing theoretical understanding was the maximum for physiology (95% of students), and the least percentage (75%) of

students felt for biochemistry. Physiology was perceived as the subject with the maximum applicability to clinical practice (95% of students), followed by anatomy (91%) and biochemistry (75%). Overall, students did feel that they could study science courses as a relevant and beneficial in later clinical years for their patient care activities (Table 3).

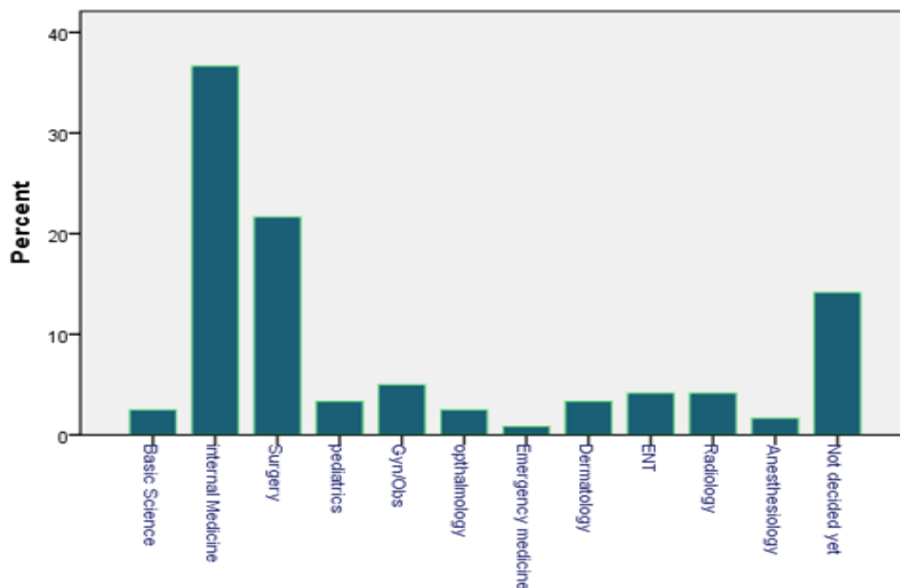


Figure 1: Students' preference for future career of as primary choice

Table 2: Students' preference for future career of as primary choice per Year of study

Variable	Year of Study(4 th year)	Year of Study(Intern)
Basic Science	6(3.1%)	0(0.0%)
Internal Medicine	78(40.6%)	10(20.8%)
Surgery	42(21.9%)	10(20.8%)
Pediatrics	4(2.1%)	4(8.3%)
Gynecology obstetrics	10(5.2%)	2(4.2%)
Ophthalmology	2(1%)	4(8.3%)
Emergency medicine	2(1%)	0(0.0%)
Dermatology	2(1%)	6(12.5%)
ENT	10(5.2%)	0(0.0%)
Radiology	8(4.2%)	2(4.2%)
Anesthesiology	0(0.00%)	4(8.3%)
Psychiatry	0(0.00%)	4(8.3%)
Not decided yet	28(14.6%)	6(12.5)

Table 3: Students' perception of the importance and relevance of basic sciences to clinical medicine

Question	SA (%)		A (%)		N (%)		DS (%)		SDA (%)	
	4 th	intern	4 th	intern	4 th	intern	4 th	intern	4 th	intern
Difficulty of recalling basic science knowledge relevant to be a skilled clinician basic science knowledge required	30.2	12.5	38.5	33.3	11.5	29.2	13.5	16.7	6.3	8.3
Overburdens of basic sciences	14.6	50.0	30.2	16.7	17.7	12.5	32.3	16.7	5.2	4.2
Most clinical applied	anatomy	60.4	12.5	30.2	83.3	8.3	4.2	1.0	0	0
	physiology	70.8	29.2	25.0	66.7	4.2	4.2	0	0	0
	biochemistry	41.7	4.2	33.3	79.2	19.8	16.7	5.2	0	0
Overall, satisfaction and quality	19.8	8.3	46.9	16.7	14.6	41.7	13.5	31.3	5.2	0

All values are expressed in percentage

SA - Strongly Agree; A- Agree; N- Neutral; DS- Disagree; SDA- Strongly disagree

4. Discussion

As to preclinical courses, basic medical sciences are considered as a prerequisite for other clinical medical science disciplines for student's next clinical practice. Courses are educated to articulate students for assessments and unfortunately the method of assimilating basic science and clinical subjects is not continually accentuated [19]. Every discipline is induced that it embodies the most significant measure of medicine and turns on the plug of information coercing students to ask the applicability of the learnt facts [20].

Research studies indicated that the basic science knowledge learned in a clinical framework is enhanced understood and more effortlessly realistic clinical exercise by medical students [21-22]. In the present study, medical students appreciate the importance of integration of basic sciences to clinical discipline majority of students in our survey felt that this approach would have helped in better understanding of respective subjects.

Medical educational curriculum overburdens in basic sciences is an imperative challenge in counted faced by medical students. The students' had been overloaded with study of different aspects of the basic medical sciences courses and is intelligent to dedicate very tiny time to other courses. As an intervention to content overload may be establishing a primary curriculum concern with other possibilities. This way of approach would guarantee that medical students obtain the knowledge, skills and attitudes required for maintaining their educational basic standards, and also consenting them to revenue more responsibility for their own teaching and learning activities [24]. The present study also similar with this study by the participants' response of 27.6% was considered basic sciences as overburden course. The basic medical science courses are actually educated in a considerably detailed in first and second years of study periods.

The durability of basic science knowledge learned in medical school has all times concern. There was an extensive certainty among medical professionals that a considerable share of basic science evidence learned in the in all preclinical study years in medical school is lost during the clinical years [25]. There are also similar studies that support students could only recall a knowledge of 10% of basic sciences offered in their first and second year's course [27-28]. A present study has described that 28.6 % participants recall loss were reported when they try to remember previous knowledge of basic sciences to their clinical practice

Another cross sectional study in Saudi Arabia reported that 21%, 19% and 50% of their students were able to recall anatomy, biochemistry and physiology respectively in their clinical years [29].

Our study shows overall ability of recall is 28.6%. Differences in retention between basic sciences can probably be accounted for by differences in rehearsal. The outcomes of the current study denote that clinical facts can be developed deprived of wide-ranging understanding of basic science education. This finding encounters the awareness that basic sciences knowledge has a direct impact on the successful application to clinical practice as an augmented knowledge of basic sciences pointed to the open-minded empathetic of the physiological processes of diseases [30]. The present study results also suggest that the knowledge attained clinical evidences are not constantly recalled along with the correlating basic sciences knowledge.

Even though a study conducted in clinical inductive reasoning revealed a little signal that clinician's secondhand basic science knowledge for routine diagnosis and examination of any disease conditions of their patients [31]. The knowledge of basic medical sciences may have charge in clinical investigation by plateful students' reminiscence the relationship between features and diagnosis. Owing to its conceptual consistency, basic science was more notable and facilitated students to renovate the manifestation of disease types after the preliminary symptom had been elapsed [32].

Ethical clearance

Ethical clearance was sought from the University of Gondar, an Ethical review committee of the school of medicine. Then, Informed consent was obtained from all participants for being included in the study

Conflict of interest

The authors declare that there is no conflict of interest regarding the publication of this paper

Author's contribution

A.A. contributed to conception and design, acquisition of data collection, data entry, data analysis, interpretation of data and preparation of manuscript. **B.T.** contributed data collection, data analysis, interpretation of data, prepare and review manuscript. **Y.Y** contributed data collection, data analysis, interpretation of data, prepare and review manuscript. All authors approved their accountability all aspects of the work. All authors read and approved the final manuscript.

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