



RETENTION OF KNOWLEDGE; THE RETENTION OF ANATOMY FOR THE CLINICAL YEARS OF MEDICAL EDUCATION.

Naureen Waseem¹, Khadija Iqbal²

1. MBBS, M.Phil, MHPE
Assistant Professor
Department of Anatomy
Islam Medical College, Sialkot
2. MBBS, FCPS, MHPE
Professor
Department of Anatomy
Al Nafees Medical College,
Islamabad

Correspondence Address:

Dr. Naureen Waseem
Assistant Professor
Department of Anatomy
Islam Medical College, Sialkot
naureen.waseem82@gmail.com

Article received on:

04/12/2017

Accepted for publication:

15/05/2018

Received after proof reading:

02/10/2018

ABSTRACT... Introduction: A good knowledge of anatomy is required for clinical practice. However, there is knowledge loss of anatomy in the later years of medical education as reported by many studies. The study takes a step in determining the extent of the problem by the medical students in the clinical years. **Aim:** An area of study determines the retention of Anatomy in the final year MBBS students. Retention rate of Anatomy taught during the basic medical years and its relevance to their clinical practice is the main focus of this study. **Study Design:** A Quantitative cross-sectional survey. **Setting:** Al Nafees Medical College, Islamabad. **Period:** Feb, 2017 to July 2017. **Methods:** Final year students of Al Nafees Medical College appeared in an MCQ test of anatomy, based on five modules from basic sciences to check their retention of knowledge. **Results:** The post hoc analysis of the result was done. Out of 64 students appearing in the test 58 students scored marks above 50% and 6 students were below 50%. There were 20 students who retained up to 50-60% and 16 who retained anatomy up to 60-70%, with 21 students retaining 70-80% anatomy. **Conclusions:** Different magnitudes of knowledge loss was seen in the students of the same year. The loss of knowledge may be due nonuse in the low achieving and borderline group. On the other hand the high achieving students found the revisit of the subject beneficial to their retention in the clinical years. This level of retention was seen among students who were taught anatomy with clinical relevance (contextual learning), in cooperation of all active innovative teaching and learning methods, and with the modified integrated theme based curriculum followed in the early years.

Key words: Anatomy, Basic Medical Sciences, Clinical Years, Retention.

Article Citation: Waseem N, Iqbal K. Retention of knowledge; the retention of anatomy for the clinical years of medical education. Professional Med J 2018; 25(10):1557-1561. DOI:10.29309/TPMJ/18.4557

INTRODUCTION

Anatomy as one of the important basic sciences subject of a medical school curriculum, has been recognized as an essential foundation for the clinical practice.¹ Sufficient knowledge of applied anatomy is essential for the retention of clinical knowledge and skills.² Majority of the medical schools are planning to shift to more innovative approaches as the medical education is moving in new directions.³ To provide better learning outcomes anatomy curriculum has also been revised over the recent years around the world.⁴ Anatomy teaching has undergone dramatic changes in the teaching methods in the last 20 years.⁵ Modern methods of anatomy teaching have been incooperated which includes teaching based on clinically relevant correlations at earlier stages⁶ the use of active learning formats such as team based learning⁷ small group discussions⁸

peer assisted learning⁹ and the use of audience response systems. Web based instructional methods have also been in cooperated in anatomy to improve students' learning.^{10,11}

It is an important concern in medical education that what are students learning and how much of it is retained in their memory.¹² Knowledge loss has been reported among medical students basic sciences knowledge during clinical clerkships.¹³ Many senior medical students appreciate the importance and relevance of anatomy knowledge in hybrid curriculum to their clinical practice. However there is loss in anatomy knowledge in clerkship.¹⁴ Core basic science knowledge is lost during the clinical years of medical studies. There is a positive correlation between retained basic science concepts and clinical knowledge.¹⁵ Marcel discovered that there was considerable

knowledge loss among medical students in the three basic science courses and this loss was not uniform across courses.¹⁶ He concluded that the loss of knowledge was not related to the marks on the final examination or to the evaluation of course quality by the students.

The retention of knowledge of medical students has been a topic of debate for many years. These discussions have been magnified since the start of 21st century when there was curricular reform in medical schools. An excellent systemic review on long term retention of basic science knowledge by Custers discusses this question not only from a historical perspective, but also by comparing retention of basic science knowledge in medical education to retention of knowledge in general education.¹⁷ He concluded that there is a significant loss in the retention of general education knowledge: 70% retained after 1 year of nonuse; 40–50% after 2 years; 30% after 4 or more years.

MATERIAL AND METHODS

The study was conducted in Al Nafees Medical College, Islamabad in Feb, 2017. A Quantitative cross-sectional survey was done to find retention rate in Anatomy from final year students. The MBBS students of Al Nafees Medical College participated in the study. Students from final year 0 were included in the study according to the sampling criteria. All voluntary Final year MBBS students were included for the quantitative survey. Consensus sampling was done, for voluntary final year students to be assessed by an objective test of Anatomy.

Data collection method was an objective test of Anatomy consisting of 25 questions from musculoskeletal, gastrointestinal, cardiovascular, maxillofacial and gastrointestinal modules. All the MCQ's were previously tested with a DI between 0.3-0.6. All were designed to check the application of level ie C3. Data was analyzed by a Post Hoc Analysis of the MCQ test of Anatomy.

Informed consent was obtained from all participants. They were informed about the voluntary nature of participation. Non consenting students were not included in the study.

The participants were assured of anonymity, confidentiality and secrecy of information. They were also assured of information about the results of the study if so desired by anyone. No reward or payment was assured to any of the participants.

RESULTS

A total of 64 voluntary students from final year MBBS class participated in the study for the quantitative data. An objective test of anatomy comprising of 25 MCQ's from five basic sciences modules, was taken from all participating students.

The post hoc analysis of the anatomy test gave the following results:

Total possible points: 25	Median Score: 16.00	Maximum Score: 21.00
Total Students: 64	Mean Score: 16.03	Minimum Score: 11.00
Standard Deviation: 2.56	Reliability Coefficient(KR20): 0.61	Range of Scores: 10.00

Table-I. Analysis of the objective test of anatomy

Student Scoring <50	Student Scoring >50%
6	58

Table-II. Table showing pass and fail percentage of students, Passing Criteria 50 Percent

Percentages Range	Number of Students
0-20%	---
20-30%	---
30-40%	---
40-50%	6
50-60%	20
60-70%	16
70-80%	21
80-90%	1
90-100%	---

Table-III. Table showing number of students according to percentage range

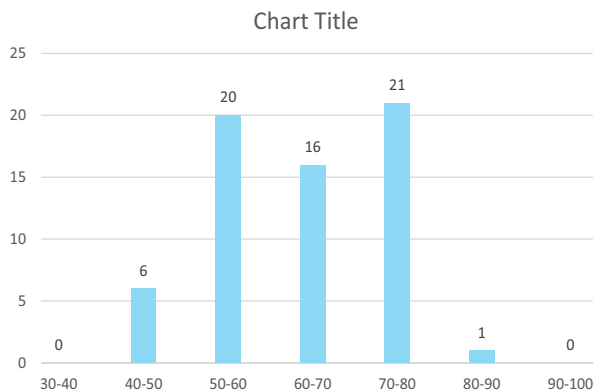


Figure-1. Figure showing retention of anatomy in percentage range

Out of all final year MBBS students invited for the study, 64 voluntary students took part in the MCQ test of anatomy. It was a 25 items MCQ test with all the MCQ's of application level. The reliability coefficient of the test was 0.61, with a median score of 16.

The maximum score achieved was 84% and the minimum score was 44 %. The pass percentage was 50%. 58 students scored greater than 50% and 6 were below 50%. The number of students with their different percentage range is shown in table 3. The retention of 6 students was between 40-50%, 20 students between 50-60%, 16 students between 60-70%, 21 students between 70-80% and 1 student scored more than 80%. The retention was not too bad, may due to the spiral nature of the curriculum in the institute. Although there was knowledge loss seen by the percentage range of the students.

DISCUSSION

Retention of basic science knowledge has been a long standing problem in medical education. Anatomy is meant to build a framework for the later clinical years. It is an important concern in medical education to what are students learning and how much of it is retained in their memory. If students are not remembering what they have been taught in the early years of medical education, if they cannot apply the knowledge, if the knowledge becomes inaccessible and inert, then the effort is wasted. The present study focuses on to determine to what extent the

students retain anatomy in the clinical years.

In the current study for the Anatomy test, the passing criteria was 50%. Out of total 64 students who appeared in the test, 6 students scored less than 50% and 58 students scored greater than 50%. There were 20 students who retained up to 50-60% and 16 who retained anatomy up to 60-70%, with 21 students retaining 70-80% anatomy. Different magnitudes of knowledge loss was seen in the students of the same year. The loss of knowledge may be due nonuse in the low achieving and borderline group. On the other hand the high achieving students found the revisit of the subject beneficial to their retention in the clinical years. This level of retention was seen among students who were taught anatomy with clinical relevance (contextual learning), in cooperation of all active innovative teaching and learning methods, and with the modified integrated theme based curriculum followed in the early years. The results obtained indicate several important findings.

Knowledge loss can be attributed to many reasons including work overload, lack of clinical relevance, teaching methods, lack of reinforcement over time and lack of a defined anatomy curriculum. Harris *et al* reported that when the knowledge is not applicable to clinical context or not directly relevant, it is lost quickly.¹⁸ Similar studies have showed that the basic science knowledge learned with clinical application is better comprehended and more easily applied by students in the clinical years.¹⁹ This requires more coordination among different basic and clinical departments and faculty committed and motivated to improvement in standards of medical education.²⁰

Large amount of irrelevant material in a curriculum encourages surface learning.²¹ Didactic teaching of clinically irrelevant anatomy lacks relevance in the modern medical curriculum.²² A checklist of essential topics along with appropriate emphasis can give the importance of topics prior to reading about them.²³ This will result in the development of a core document/curriculum available to students and faculty. It will include core information required for clinical settings following the spiral

concept of learning. This is an important way to identify that only core content is delivered within the curriculum, keeping in mind the knowledge and skills required by a 'generalist graduate.

The importance of metacognitive abilities of medical students and the use of planning, reflection, self-evaluation and self-awareness for learning and retaining anatomy for the clinical years should also be considered. In a study findings regarding self-regulation and metacognition have been reported though not in the perspective of retention of knowledge.²⁴ Significant research has been done to support the need for metacognition instruction based on the students' learning.²⁴ However, it is also shown that merely supporting metacognition does not improve general learning and retention of the students.²⁵ Further research may be required for the instruction of metacognitive skills in the perspective of retention.

CONCLUSIONS

Different magnitudes of knowledge loss was seen in the students of the same year. The loss of knowledge may be due nonuse in the low achieving and borderline group. On the other hand the high achieving students found the revisit of the subject beneficial to their retention in the clinical years. This level of retention was seen among students who were taught anatomy with clinical relevance (contextual learning), in cooperation of all active innovative teaching and learning methods, and with the modified integrated theme based curriculum followed in the early years.

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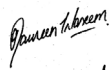
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*The tragedy in life doesn't lie in not reaching your goal.
The tragedy lies in having no goal to reach.*

– Benjamin Mays –

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AUTHORSHIP AND CONTRIBUTION DECLARATION

Sr. #	Author-s Full Name	Contribution to the paper	Author=s Signature
1	Naureen Waseem	Synthesis, Interpretation and Analysis of data, Data collection, Review of Literature.	
2	Khadija Iqbal	Synthesis, Interpretation and Analysis of data.	