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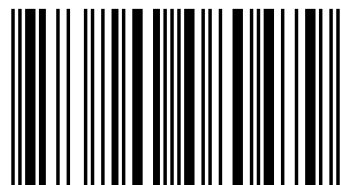
Multiple choice questions are considered to be the most objective, and valid tool for student assessment (Paxton 2000). Reasons of popularity of MCQs among medical teachers include their ability to test factual recall, interpretation of sets of data and problem solving. Also MCQs test a wide area of knowledge in short period of time and are of easy and objective scoring. Appropriately constructed MCQs result in objective testing that can measure knowledge, comprehension, application, and analysis. We aim to identify the factors influencing students' performance in MCQs examination, by selecting final year medical students in pediatrics, obstetrics, surgery and medicine in school of medicine Ahfad University for Women 2012 - 2014.



Yousif Mohammed ELhaj Mohammed Ahmmed
Mohammed Medani Eltayeb Abdullah
Mosab Nouraldein Mohammed Hamad

Dr. Yousif Mohammed ELhaj Mohammed Ahmmed , MB, BS, university of Vitebsk Faculty of Medicine (1991), MS.C In Health Professions Education, Education Development and Research Center, Faculty of Medicine, University of Gezira, 2017. Faculty of Medicine, Karary University
Co-authors: Dr. Mohammed Medani Eltayeb Mr. Mosab Nouraldein Mohammed

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**Yousif Mohammed ELhaj Mohammed Ahmmed
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Mosab Nouraldein Mohammed Hamad

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Dr. Yousif Mohammed ELhaj Mohammed Ahmmed

MB, BS, university of Vitebsk Faculty of Medicine (1991)

Associate Prof: Mohammed Medani Eltayeb Abdullah

Ph.D in Medical Parasitology

Alneelain University

Mr. Mosab Nouraldein Mohammed Hamad

MS.C in Medical Parasitology

Alneelain University

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Dedication

To our parents, daughters and sons

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Acknowledgement

We are grateful to all participants either academic staff or medical student for their cooperation and well understanding to the goals of our study.

Also we are thankful to our colleagues whom support us from the starting point till we finished our study.

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Introduction

Multiple choice questions (MCQs) examinations are well established and widely used in a large number of medical schools (Haladyna, Downing et al. 2002). Multiple choice questions are considered to be the most objective, and valid tool for student assessment (Paxton 2000). Reasons of popularity of MCQs among medical teachers include their ability to test factual recall, interpretation of sets of data and problem solving. Also MCQs test a wide area of knowledge in short period of time and are of easy and objective scoring. Appropriately constructed MCQs result in objective testing that can measure knowledge, comprehension, application, and analysis (Collins 2006).

Formats of MCQ are False/true, one best answer, one correct answer, extended matching and interpretative exercise. Strengths of MCQs is useful for outcomes where there are only few possible alternatives, less affected by reading ability, can be answered in reasonable time, easy to score, good concurrent and predictive validity, the face validity is satisfactory if the question is well structured, the content validity is high if questions address important area, reliable, discriminatory, reproducible, cost effective and high on the index of utility. Limitation of MCQs Difficult to write, knowing the false item provide no evidence that student know the correct one . no diagnostic information is provided from incorrect answers, score is influenced by guessing, validity are affected by construction, test low level knowledge-recall and score does not reflect the amount of student achievements.

Recent research on multiple choice questions has identified deficiencies of inadequate content-equivalence and item-writer bias. Systematic methods of writing multiple choice questions are being advocated as effective responses (Cox, Irby et al. 2007).

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Literature Review

Assessment in medical education is an ongoing process aimed at understanding and improving student learning (Olayemi 2013). It is a systematic procedure for measuring a trainee's progress or level of achievement against defined criteria to make a judgment about her . The goal of assessment in medical education is usually to support learning and to establish the competence of individual students (Olayemi 2013); it helps the person being assessed identify and respond to his own learning needs. Assessments could be formative or summative; should be able to discriminate between good and poor candidates. The purpose of assessment should direct the choice of instruments.. Student assessment is a decision making process with many important implications beyond the measure of students' success. It provides important data to determine the program effectiveness, improves the teaching program, and helps in developing educational concepts (Nicol and Macfarlane- Dick 2006).

Types of assessment:

Formative assessment or diagnostic testing:

It is a range of formal and informal assessment procedures done by teachers during the learning process s to improve student learning typically involves qualitative feedback for both student and teacher that focuses on the details of content and performance (Knight 2001).

Purposes formative assessment:

To provide feedback for teachers to modify learning activities. To identify group of individual deficiencies. To improve students' awareness of how they learn. Frequent, ongoing assessment allows student focus on progress.

Principles for formative assessment:

Should be part of effective planning of teaching and learning. It must focus on students learning attitude. It take account of the importance of learner motivation It should enable learners to receive constructive guidance about how to improve. It regarded as a key professional skill for teachers.

. Benefits of formative assessments for teachers:

Teachers are able to determine what standards students already know and to what degree. Teachers can decide what minor modifications or major changes in instruction they need to make so that all students can succeed in upcoming instruction and on subsequent assessments.

Feedback is the central function of formative assessment It typically involves a focus on the detailed content of what is being learnt, rather than a test score.

Principles of good feedback practice:

It clarifies what good performance is. It facilitates the development of self-assessment in learning. It encourages teacher and peer around learning. It encourages positive motivational beliefs. Formative assessment is more valuable when it is used to adapt the teaching to meet students' needs. Formative assessment helps teachers to monitor their students' progress and to

modify the instruction accordingly. It also helps students to monitor their own progress as they get feedback from their peers and the teacher (Nicol and Macfarlane- Dick 2006).

Summative assessments:

It used to evaluate student knowledge, skills, and attitude the conclusion of a defined instructional period typically at the end of course, semester, program, or school year. , Summative assessment tends to have the least impact on improving an individual student's understanding or performance. Teachers can use the results of summative assessments to see where the student's performance lies compared to another a group of students. Teachers can use these assessments to identify strengths and weaknesses of curriculum and instruction, with improvements affecting the next year's students to determine pass or fail (Al-Wardy 2010).

Three major criteria of summative assessments:

The tests, assignments are used to determine whether students have learned what they were expected to learn. Summative assessments are given at the conclusion of a specific instructional period, and therefore they are generally evaluative, rather than diagnostic. Summative-assessment results are often recorded as scores or grades that are then factored into a student's permanent academic record, whether they end up as letter grades on a report card or test scores used in the college-admissions process. The most important of Summative-assessment to determine pass or fail.

Types of Summative assessment:

Examinations (major, high-stakes exams). Final examination (a truly summative assessment).
Performances Student evaluation of the course (teaching effectiveness). Instructor self-evaluation.

Benefits for students:

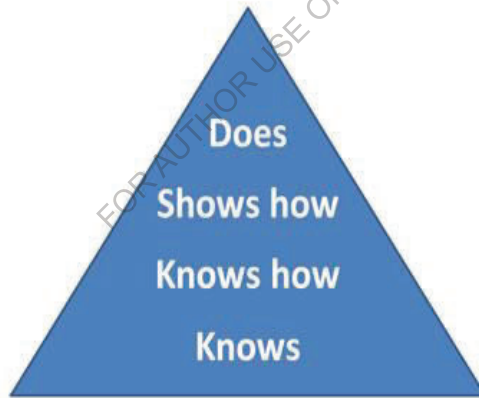
Students are more motivated to learn. Students take responsibility for their own learning. Students learn valuable lifelong skills such as self-evaluation, self-assessment (Cox, Irby et al. 2007)

Theories of assessment:

Theoretical knowledge assessments that primarily test knowledge are of limited value (Fogarty and Stoehr 2008). Students must be assessed on: what they know (cognitive domain) focusing on knowledge acquisition and intellectual skills and abilities the diagnosis of disease, strategizing treatment options. Remembering (factual recall) is considered to the lowest level of learning. The ability to create new knowledge is considered to be the highest level of learning in this domain. Skills they have learned (psychomotor domain) (doing): Relating to skills that require varying levels of well-coordinated physical activity and precise manipulative procedures. Psychomotor Domain assessment of clinically based students occurs in the clinical setting - workplace based assessment - with judgments based on observation of performance in an effort to determine what a student can do. The psychomotor domain can be useful in determining the level of learning to be evidenced for psychomotor skills.

Miller's Triangle Miller (1990) uses a triangle to describe the levels of competence.

It is a curricular concept designed to provide the skills physicians need, rather than solely a large,. A medical school or residency program using competency-based medical education defines a set of skills or competencies based on societal and patient needs, such as medical knowledge, patient care, or communications approaches, and then develop ways to teach that content across a range of courses and settings. “Competency-based medical education focuses on what a physician should actually be able to do (Farley 1989).



Written examination is the most commonly used type of assessment for certification purposes (Leung 2002; Roediger III and Marsh 2005). This examination assesses candidates’ knowledge in specific areas. Written examination is best suited for initial certification as it enables to assess a wide of knowledge its. Other advantages that explain the popularity of

this method include its low cost for candidates and its decreased cost to administrators as the number of candidates increases. It can also be delivered online and it has a high degree of candidate acceptance. Written examination is flexible and can be used either on its own or paired with other tools.

History of MCQs in assessment in medical education:

Frederick J. Kelly wrote the first multiple choice question (MCQ) in 1914 in an attempt to improve standardization assessment methods such as short answer questions (Roediger III and Marsh 2005). Although E. L. Thorndike developed an early multiple choice test, Frederick J. Kelly was the first to use such items as part of a large scale assessment. While Director of the Training School at Kansas State Normal School (now Emporia State University) in 1915, he developed and administered the Kansas Silent Reading Test. Soon after, Kelly became the third Dean of the College of Education at the Kansas. The first all multiple choice, large scale assessment was the Army Alpha, used to assess the intelligence and more specifically the aptitudes of World War I military recruits. After nearly a century of application, early examples of multiple choice questions bear significant to today's models. Multiple-choice tests had their origin in World War I, when Dr. Robert Yerkes², President of the American Psychological Association (APA), convinced the Army to commission them to test the intelligence of recruits. The Army's goal was to improve the efficiency of evaluating men by moving away from time-consuming written and oral examinations. The College Entrance Exam Board's multiple-choice Scholastic Aptitude Test (SAT) became the standard in 1926 -- and there was no going back. By the 1930s, the multiple-choice tests and their offspring, true-false questions, were permanent fixtures in schools. The MCQ has become widely adopted over the past century in medical education. Some of the key benefits possessed by MCQs are the broad

range of knowledge that can be assessed in a short period of time and improved marking compared with others methods such as short answer, essay. It is now recognized that MCQs are largely limited to assessment at the 'knowledge' level of Miller's Pyramid of competency. Sue Case and David Swanson are primarily credited for the development of the EMQ. Their work began in the 1980's but gained refinement and momentum primarily in the 1990s (Palmer and Devitt 2007).

Types of MCQs:

MCQs are a form of assessment in which respondents are asked to select one answer out of the choices from a list. The multiple choice format is most frequently used in medical education. Common features of the MCQ include a stem, which poses the question or provides the scenario and four or more options from which the examinee can select. There are four broad types of multiple choice formats; 'True/False, 'One-Best-Answer the Extended Matching Question, One answer. One-best-answer questions remain a widely used assessment tool (Tan and McAleer 2008). One-best answers are a form of assessment where the student selects the best possible answer from the list provided. This form of assessment has become popular in educational institutions. A large portion of curriculum is assessed in a short period of time requiring less effort on behalf of the student, although it takes a lot of effort and time spent by the examiner to make high quality one-best MCQs, as compared to descriptive questions. One-best MCQ is an efficient tool in identifying the strengths and weaknesses in students, as well as providing guidelines to teachers on their educational protocols (Tan and McAleer 2008). Properly constructed multiple choice questions assess higher-order cognitive processing of Bloom's taxonomy such as interpretation, synthesis and application of knowledge, instead of just testing recall of isolated facts (Carneson, Delpierre

et al. ; Case and Swanson 1998) Difficulty index (p-value), is to describes the percentage of students who correctly answered the item. It ranges from 0 - 100%. The high the percentage, to the easy item. The recommended range of difficulty is from 30 - 70%. Items having p-values below 30% and above 70% are considered difficult and easy items respectively (Miller, Linn et al. 2012). Discrimination index (DI), is used to describes the ability of an item to distinguish between high and low scorers (Fowell, Southgate et al. 1999). It ranges between -1.00 and +1.00. It is expected that the high-performing students select the correct answer for each item more often than the low-performing students. If this is true, the assessment is said to have a positive DI (between 0.00 and +1.00), indicating that students who received a high total score, chose the correct answer for a specific item more often than the students who had a low over all score. 7. Reliability and validity of MCQs in assessment of medical students in comparison to other assessment tools: Reliability and validity are the means by which we evaluate the value of psychological tests and measures.

Reliability of MCQs:

Reliability is degree to which instrument produces the same result with repeated admonitions. To what extend results will be free from error. High level of reliability of knowledge is measured using pre-test and post-test design. Reliability is about the consistency of a measure over time and the consistency of the items within the measure. MCQs can be. Considered to have a high level degree of reliability because they have objective scoring process. For MCQs to be considered reliable the value of correlation coefficients should be positive and usually more than 0, 07 (Considine, Botti et al. 2005).

Validity of MCQs:

Validity of instrument is degree to which the instrument measures what is supposed to measure. Validity is closely related to reliability because for instrument to be valid it must be reliable. Validity concerns the evidence that the measure actually measures what it is intended to measure. It also important to remember the instrument may reliable even when they are not valid .Factors that contribute to increased or to decreased difficulty MCQs include some bias, poor instrument ,ambiguous statement , inadequate time limit (Hathaway and McKinley 1951). Construct validity occurs when the theoretical constructs of cause and effect accurately represent the real-world situations they are intended to model (Louangrath 2013) .Construct validity is thus an assessment of the quality of an instrument. Convergent validity occurs where measures of constructs that are expected to correlate do so. Discriminate validity occurs where constructs that are expected not to relate do not. Convergent validity and Discriminate validity together demonstrate construct validity. Content validity occurs when the experiment provides adequate coverage of the subject being studied. Content validity is related very closely to good experimental design (Cozby and Bates 2012). Internal validity occurs when it can be concluded that there is a causal relationship between the variables being studied. External validity occurs when the causal relationship discovered can be generalized to other people, times and contexts. Conclusion validity occurs when you can conclude that there is a relationship of some kind between the two variables being examined (Cozby and Bates 2012). Criterion-related validity is the ability of the measure to predict a variable that is designated as a criterion. Face validity occurs where something appears to be valid (Considine, Botti et al. 2005).

The role of MCQs as assessment tool to improve students' learning out comes;

Multiple choice question tests can be useful for formative assessment and to stimulate students' active and self-managed learning. They improve students' learning performance and their perceptions of the quality of their learning experience (Haladyna and Downing 1993; Haladyna 1997). Because of this, assessors have questioned their use in higher education. You can design MCQ tests to assess higher order cognition (such as synthesis, creative thinking and problem solving), but the questions must be drafted with considerable skill if such tests are to be used for assessing lower order cognitive processes, such as the recall of factual information, and creative reasoning processes. When designing assessment for a course, first determine whether MCQ tests should be used at all, based on the learning objectives and outcomes of course. MCQ tests should never constitute the only or major form of summative assessment in university-level courses. MCQ tests can provide valuable assessment feedback on students' recall of the facts and concepts essential to higher order learning. When not to use MCQ tests Where the learning outcomes to be assessed are at a high cognitive level, the closed-ended nature of MCQ tests makes them particularly inappropriate for assessing originality and creativity in thinking (Considine, Botti et al. 2005).

Previous studies:

1. Multiple choice questions in Sudan Medical Schools: Teachers views

Multiple choice questions are considered to be the most objective, and valid tool for student evaluation. Reasons of popularity of MCQs among medical teachers include their ability to test factual recall, interpretation of sets of data and problem solving (Cox, Irby et al. 2007). Also MCQs test a wide area of knowledge and are of easy and objective scoring. With the rapid growth of medical schools in Sudan during the last years, large numbers of students, shortage of staff, MCQs seem a rather practical and even Authors great concern is to achieve at least

acceptable standards of student performance. This is prospective study. In this letter authors will discuss the views of teachers on MCQs as an efficient assessment tool in different medical schools in Sudan (Elfaki 2000).

The authors received replies from 52 teachers. The MCQs are usually (50%) prepared by the head of the department after collecting questions from every member. Some departments tended to depend on material from other schools. Few departments (10%) had regular meetings to discuss the MCQs construction and to update their question banks before examinations. There is an agreement for the need for the traditional essays as well as the MCQs in our evaluation system (70%). Problems of MCQs construction included improper wording, difficulty in writing proper items in certain topics, use of confusing figures in laboratory investigations, misprinting and weak grammatical structures. Problems other than construction included destroyed secrecy of MCQs stores, poor answering techniques and cheating. The major problem of the MCQ construction is the improper wording. Terms like 'always', 'invariable', or 'never' should be avoided totally, as the correct answer here is almost always the false response. Some MCQs problems are student-related. Cheating is a poorly studied real problem in our schools. In MCQs paper the cheating copying from a nearby student is easier than the essay paper, Some students use poor techniques in answering the MCQs. The situation is worse in the schools which depend on MCQs banks that are used repeatedly without updating or even rewording for years. There is a feeling, among teachers for the need for continuity of essay questions in conjunction with the MCQs. Abilities like organization of ideas, self expression and reasoning skills are better tested by essay questions than MCQs.

1. Multiple choice questions in Sudan Medical Schools:

Multiple choice questions (MCQs) have become a popular tool of evaluation among educators in the medical profession (Amr and Amin 2012). Effectiveness of MCQs is the ability of the educator to construct the questions based on criterion or norm references, serving goals and strategies of curriculum. There are 23 schools of medicine in Sudan, 20 of them established in the last 20-22years. The authors stressed mainly 2 problems related to the role of MCQs as an evaluation tool. Student related problems and Teacher-related problems. In general, the student related problems of MCQs such as (language constraints, technical, cheating.) are all well recognized and shared among most of the schools in many countries. The 2nd problem is a teacher related one. In Sudan, the majorities of these newly established schools of medicine are severely under staffed and depend greatly on part timers from other schools or Ministry of Health Staff. They are lacking the commitment, and most of them are not prepared for educator tasks and have very little experience. in medical educational concepts. With all these constraints and limitations, the MCQs effectiveness and efficiency can be compromised. Perhaps all the problems of construction of MCQs, improper wording, difficulty in writing, ambiguity and confusion. The staff should be well prepared for their tasks by intensive courses in medical education concepts, programs and evaluations to strengthen their educational abilities. With the rapid founding of medical schools in Sudan, there is a great need to assess the evaluation systems to assess the products of these schools. The current problem of understaffing is due to the proliferation of medical schools and mass migration of experienced staff after 1990 , the later cause is due to economical reasons (Ahmed, Hussein et al. 2000).

2. Evaluation of Modified Essay Questions (MEQ) and Multiple Choice Questions (MCQ) as a tool for assessing the Cognitive Skills of Undergraduate Medical Student. This study testing the cognitive skills of undergraduate medical student. The objective of this study

was to assess the effectiveness of both forms of questions in testing the different levels of the cognitive skills of undergraduate medical students. It is a retrospective study design in Qassim University from the years 2005 to 2009. No significant difference was found between MEQ and MCQ in relation to the type of questions (MCQs or MEQ). A well-constructed MCQ is superior to MEQ in testing the higher cognitive skills of undergraduate medical students (Palmer and Devitt 2007).

3. Assessment of higher order cognitive skills in undergraduate education: modified essay or multiple choice questions?

Reliable and valid written tests of higher cognitive function are difficult to produce. Modified Essay Questions (MEQs) are often used to assess higher order abilities than other forms of assessment, including multiple-choice questions (MCQs). This study was designed to assess the effectiveness of the MCQs to measure higher-order cognitive skills in an undergraduate medical student. This prospective study design in the Department of Surgery, University of Adelaide, lasted for two years. The modified essay question failed in its role of assessing higher cognitive skills. Well-constructed MCQs should be considered a satisfactory replacement for MEQs if the MEQs cannot be designed to adequately test higher order skills (Scouller 1998).

4. Assessment Methods of an Undergraduate Psychiatry Course at a Saudi University:

In Arab countries there are few studies on assessment methods in the field of psychiatry. The objective of this study was to assess the outcome of different forms of psychiatric course assessment among fifth year medical students at King Faisal University, Saudi Arabia. This was a cross-sectional survey carried out during the 2010–11 academic year, in two consecutive semesters. Different assessment methods were used in assessment. This study showed that; the results of the MCQs are the most important predictors of final scores, as they accounted for 69.7% of

student variability. These results are most likely due to the commonly observed relationship of a good quality MCQ test with other performance measures. It has been observed that general ability is the foundation of most performance measures and a well-constructed MCQ is the best estimator of this general ability (Scouller 1998).

5. Effectiveness of MCQ, SAQ and MEQ in assessing cognitive domain among high and low achievers Assessment is a very important component of medical course curriculum.

Medicine itself is a profession in which accurate and responsible assessment is of cardinal requirement. The assessment procedures have a powerful influence over learning process (Carneson, Delpierre et al. 1996; Higgins and Tatham 2003). Multiple choice questions (MCQ), short answer questions (SAQ) and modified essay questions (MEQ) are the commonly used tools for assessing cognitive domain of undergraduate medical students. The present study is designed to examine the performance of high achievers and low achievers in order to find out the effectiveness of MCQ, SAQ and MEQ, in assessing cognitive domain .retrospective study design. Duration of study two weeks prior to the test . Comparisons between different methods of assessment were done by paired t test. To assess the cognitive domain of undergraduate medical students and to cover the broad course it is important to use all the three assessment methods in definite proportion to offer greater variety. It is evident by the scoring pattern, which is almost similar in high and low achievers for these three methods of assessment (Haladyna and Downing 1989; Haladyna and Downing 1989; Haladyna, Downing et al. 2002).

7/ the multiple-choice test: writing the questions.

Disadvantages of multiple choice questions include the encouragement of cheating and the fact that they might be obscure or misleading. They have been found to test lower-level but not higher-level cognitive functions, like synthesis .Creating multiple choice items can also be

complicated and time consuming for teachers (Gronlund 1998; Collins 2005; Tarrant, Knierim et al. 2006).

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Problem Statement

Although The multiple-choice question (MCQs) is the most common type of written test item in medical education but the researcher noticed that the student achievement in the multiple-choice question MCQs is poor compared with essay as written assessment tool (Higgins and Tatham 2003). Many factors influencing student performance in clerkship MCQs examinations. Good MCQs construction affect student achievement, this requires a good knowledge of the content and understanding of the objectives of assessment as well as good skills in writing the items. Though there are many guidelines for writing good test items. Experience and effective feedback are essential in improving the results of quality MCQs designing.

Significance of the Study:

Multiple choice questions (MCQs) are one of the most reliable, easily administrable and valid modalities of assessment used in the field of medical education. Findings of this study are important for the academic staff to obtain good skills in writing items. The construction of good MCQs is a difficult job, the knowledge required to effectively set a good quality MCQs is much greater than that required to answer one. Findings of this study are important for the student because good MCQs construction improve student achievement and learning level of student. this study will be of great benefit to the different stakeholders including students , academic staff and school of medicine AUW. The study is also useful for researchers working in the field of student assessment.

Objectives

General Objective:

- To identify the factors influencing students' performance in MCQs examination final year in [pediatrics, obstetrics, surgery and medicine] in school of medicine AUW. 2012 - 2014

Specific Objectives:

6. To determine the opinion of medical students in School of Medicine AUW final year (batch 19) in MCQs as assessment tool.
2. To determine the opinion of academic staff in School of Medicine AUW in MCQs as assessment tool.
3. To compare the performance of the medical students in School of Medicine, AUW final year (batch 19) in MCQs with Short essay.
4. To identify the opinion of academic staff in School of Medicine AUW on the students' performance in MCQs.
5. To evaluate the processes adopted in constructing the MCQs exam final year in School Of Medicine AUW.

Materials and Methods

- This study is descriptive cross-sectional study design. The population of the study consist of 20 of academic staff in School of Medicine AUW, 5 teaching staff from each department [pediatrics, obstetrics, surgery and medicine] and students result of MCQs examinations at school of medicine AUW final year batch 19 in pediatrics, obstetrics, surgery and medicine departments during the period from 2012 to 2014 and students result of essay examinations at school of medicine AUW final year batch 10 in pediatrics, obstetrics, surgery and medicine.
- A questionnaire especially designed for the purpose of this study was used for data collection.
- Statistical package for social sciences was used to analyze data.

Materials and Methods

Study design:

This study is descriptive cross-sectional study design.

Study area

Ahfad University for Women in Sudan Is nonprofit women's university in Omdurman that was founded in 1966. The school's mission is to provide quality education for women to strengthen their roles in national and rural development. School of Medicine was founded in 1990, the current batch is 19.

Study population:

The population of this study was final medical students and clinical staff of the School of Medicine, AUW, and Omdurman, Sudan.

Study sample:

The sample included all teaching staff from the clinical departments (pediatrics, obstetrics, surgery and medicine). The total number of full time academic staff in clinical departments was twenty; all were included in the study. All final year medical students batch 19 were selected to fill the questionnaire. Scores of the final MCQ exam in 4 clinical departments namely pediatrics, obstetrics, surgery and medicine for these 145 students were entered into SPSS and 96 scores

were randomly selected. Because essay as written assessment tool is not used in final written exam in large number of medical school for many years the above results were compared with last essay exam for final year medical students' batch ten.

The characteristics of the staff and students samples are shown in table 1, 2, 3, 4 and 5.

Gender	Number	%
Male	8	40
Female	12	60
Total	20	100.0

Table (1) illustrates the distribution of the sample of academic staff according to Gender.

Degree	Number	%
Master/MD	16	80
Ph. D.	4	20
Total	20	100

Table (2) illustrates the distribution of the sample of the academic staff according to Scientific Degree.

	Frequency	Percent%	Valid Percent%
< 5yrs	2	10.0	10.0
5-10yrs	5	25.0	25.0
10-15yrs	9	45.0	45.0
more than 15yrs	4	20.0	20.0
Total	20	100.0	100.0

Table (3) illustrates the distribution of the sample of the academic staff according to Years of experience in University teaching.

Job title	Frequency	Percent%
Lecturer	4	20.0
Assistant professor	5	25.0
Associate professor	9	45.0
Professor	2	10.0
Total	20	100.0

Table (4) illustrates the distribution of academic staff according to Professional title.

Batch NO	Number	Percent%
10	140	49.1
19	145	50.9
Total	285	100

Table (5) illustrates the distribution of the sample of the students according to Batch

Study Instruments:

Two especially designed questionnaires were used for data collection.

The first one was designed to collect data from academic staff of AUW Faculty of Medicine in the following area:

- Personal data: include (department, gender, scientific degree, professional degree).
- Years of experience.
- Received training in student's assessment. ?
- If prefer MCQs as assessment tool compare to essays?
- Is MCQs the best tool for student's assessment?
- If he use to sit as a group for MCQs construction. ?
- If he usually evaluate your questions?

- If he has MCQs bank?
- What do you think of the students' achievement in MCQs compared to essay?
- Is the time allowed for answering the MCQs enough?
- How do you rate/mark the MCQs as a tool for assessing knowledge-interpretation?

The second one was designed to collect data from student of AUW Faculty of Medicine in the following areas :

Do you prefer the MCQs compare to essay?

Do you understand the question enough before answering it in MCQs? .

Do you usually answer all the questions in the MCQs exam?

Do you usually use guessing in difficult question during the MCQs examine?

IN MCQs assessment which one do you prefer to have ?

Do you think MCQs is the best assessment tool for your knowledge compare to essay ?

Do you think MCQs is the best assessment tool for your knowledge compare to essay?

Is the time allowed for answering the MCQs enough?.

The two questionnaires were then reviewed by experts to check content validity. The reviewers' comments were taken into consideration when preparing the final version of the questionnaires.

Study technique:

The 2 questionnaires were filled by the academic staff and medical students after explaining the purpose of the study and the contents of the questionnaires. After taking permission from the Dean School of Medicine, AUW examination records were fetched for the MCQs score for batch19. All 145 scores were entered into SPSS software and 86 were randomly selected. The

questionnaire was the filled by the students. Then the result scores were entered into SPSS software and out of 145 score, 96 were selected.

Statistical Analysis:

Data was entered and analyzed using SPSS software version 16. Frequencies were calculated. Chi square test was used to compare between categorical data. Student t test was used to compare numerical means. Significance level was set at $p < 0.05$.

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Result

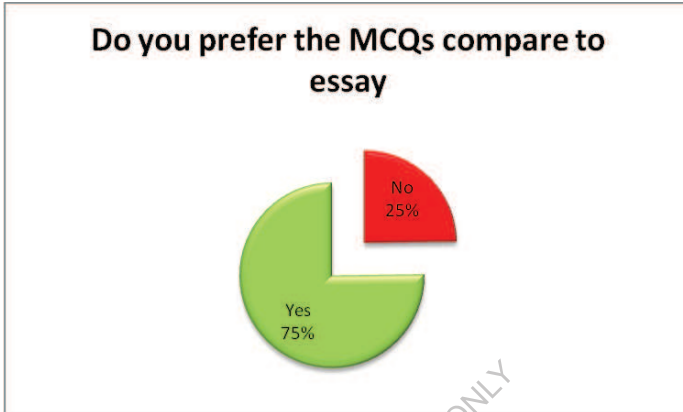


Figure (1) students' preference for the type of examination

The above figure 1 shows that the majority of medical students in School of Medicine, AUW prefer MCQ exam as a tool of assessment.

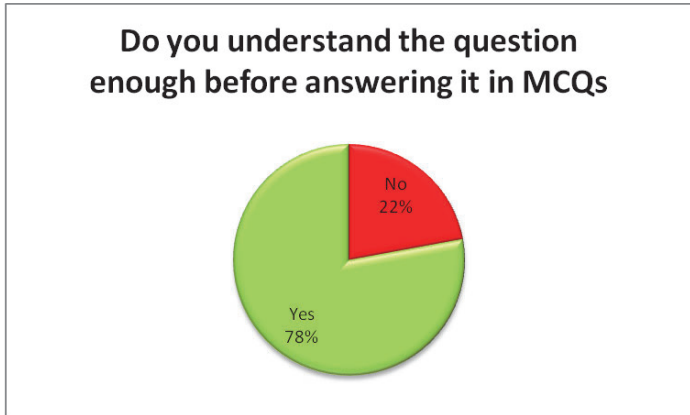


Figure (2) Understanding MCQs question before answering.

Figure two showed that understanding MCQ question before answering was reported by 78% of medical students in School of Medicine, AUW.

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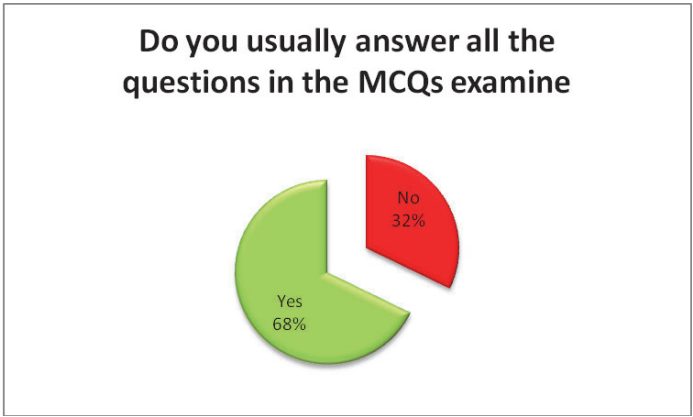


Figure 3 answering MCQ question by the students.

Figure three showed that 68% of medical students in School of Medicine, AUW tried all MCQ questions in any exam.

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Do you usually use guessing in difficult question during the MCQs examine	Frequency	%
No	21	14.5
Yes	123	84.8
Total	144	99.3
Missing	1	0.7
Total	145	100.0

Table (6): the use of guessing by students in answering MCQ.

Table six showed that 85% of medical students guessed answers in difficult questions.

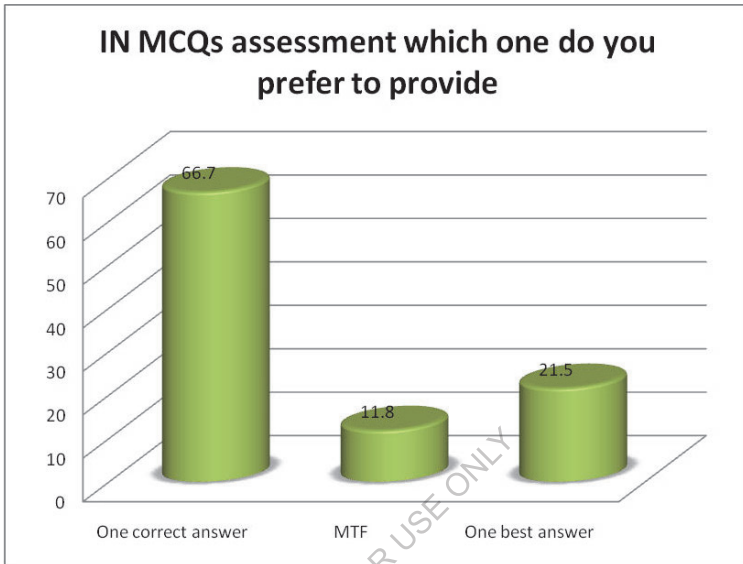


Figure 4 : type of MCQS preferred by students.

Figure four showed that the majority (66.2%) of those medical students preferred to be examined by the one correct answer type of MCQ.

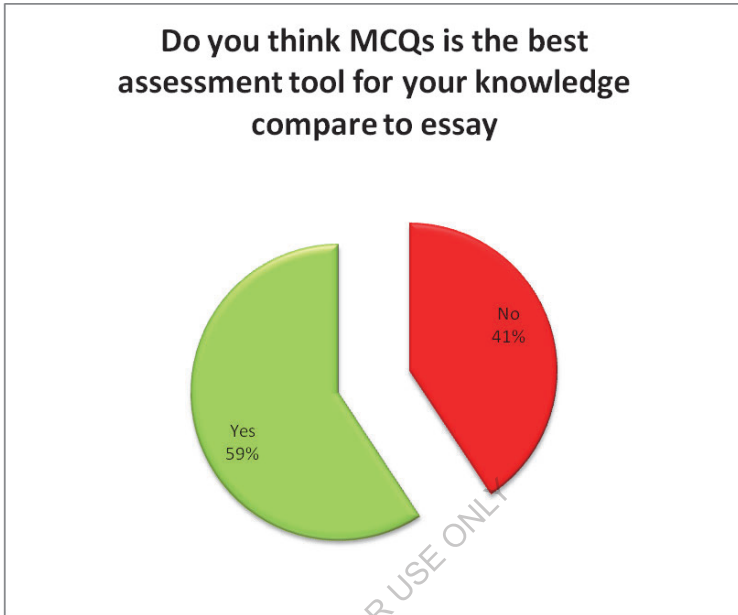


Figure 5: students' opinion about MCQ as a good assessment tool compared to essay

When students asked about MCQ as a good assessment tool compared to essay (59%) of them answered yes as in figure 5.

Are the instructions language written in the first page of the MCQs answer paper quit understandable	Frequency	%
Poor	1	.7
Below average	5	3.4
Average	23	15.9
Good	70	48.3
Above average	43	29.7
Total	142	97.9
Missing	3	2.1
Total	145	100.0

Table 7 students understanding of the instructions at the first page.

Table seven showed that (78%) of students agreed that instruction language of the answer paper is good or above average for understanding.

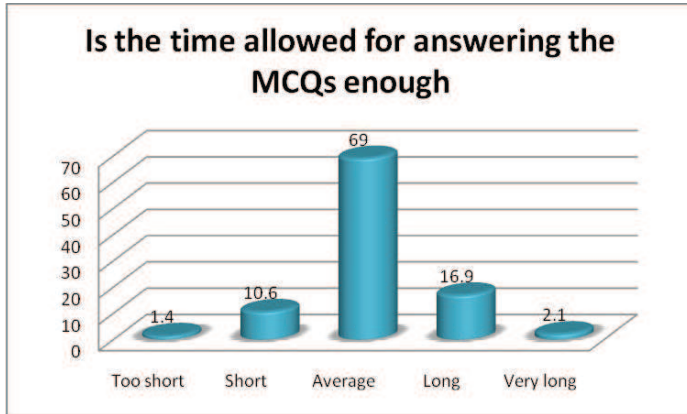


Figure 6: students' opinion about the adequacy of time to complete MCQ exam.

Figure 6six showed that (69%) of students answered that the time adequacy to complete MCQ exam is adequate.

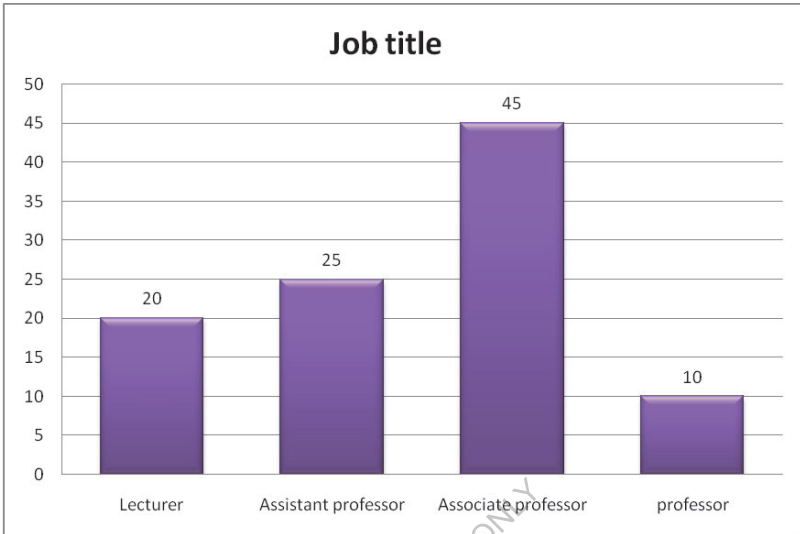


Figure 7 : the distribution of staff of School of Medicine, AUW according to the academic title.

Figure seven showed that 45% of the staff of School of Medicine, AUW (n=20) were associate professors, 25% were assistant professors, 20%are lecturer while only 10% were professors.

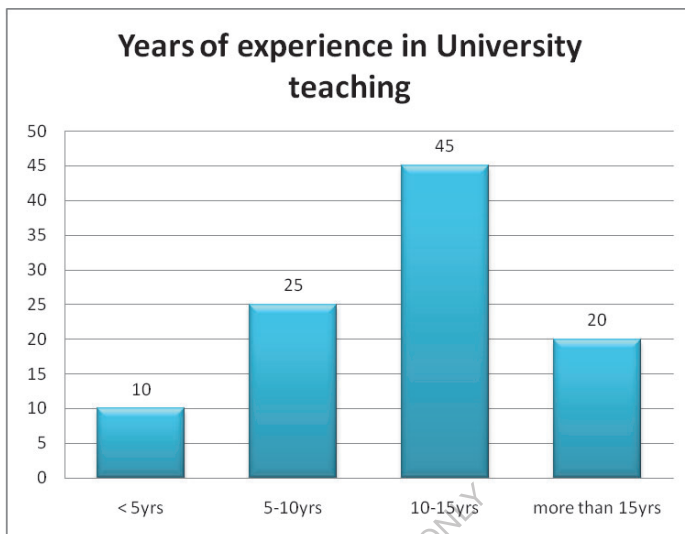


Figure 8: years of experience of the academic staff of School of Medicine, AUW.

Figure eight illustrates that (45%) of the academic staff had 10-15 years of experience while (25%) had 5-10 years of experience.

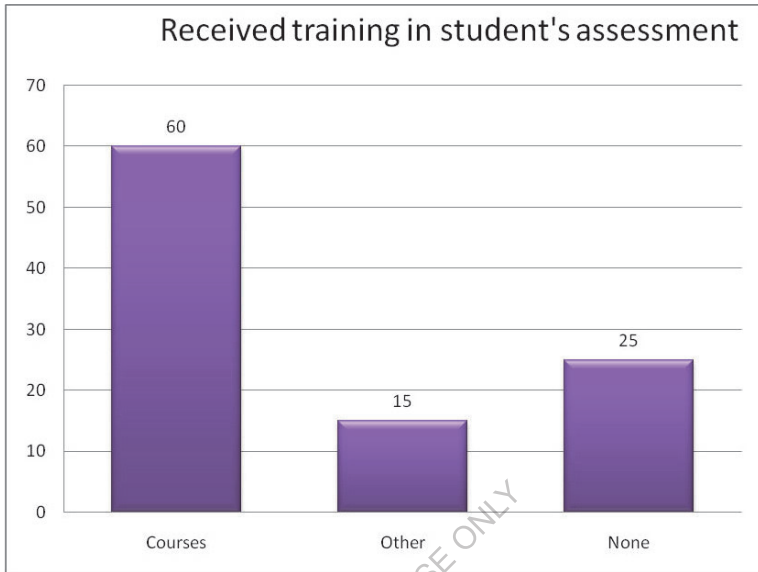


Figure 9: type of training in students' assessment received by the academic staff of School of Medicine, AUW.

About 75% of staff received some sort of training in students' assessment (figure 9).

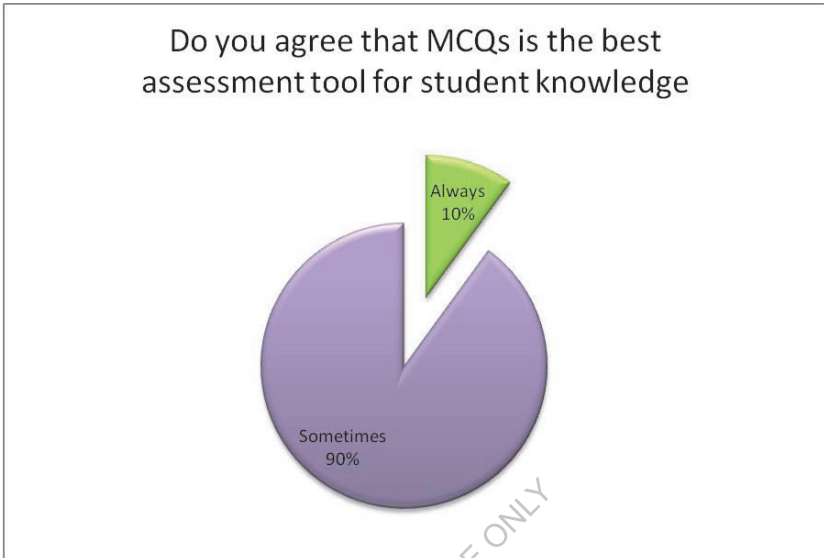


Figure 10: the Staff opinion about MCQs as assessment tool.

A total of 90% of the academic staff of the School of Medicine, AUW, stated that MCQs sometimes is the best assessment tool for student knowledge.

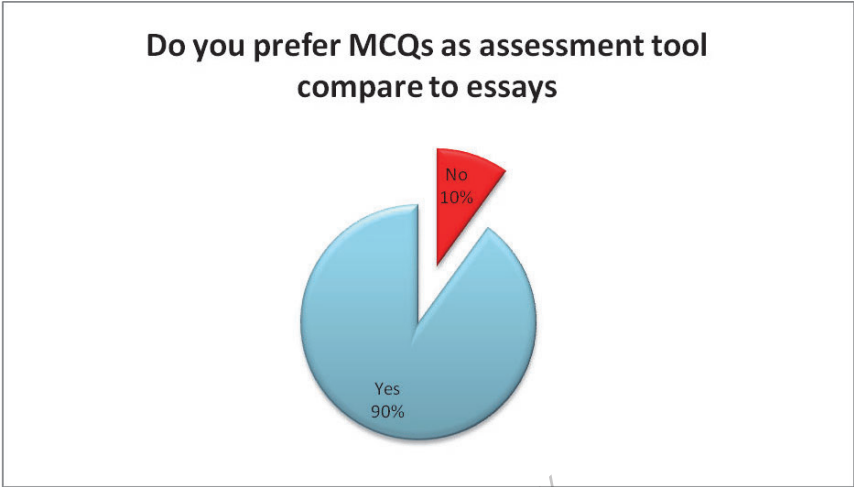


Figure 11: the Academic staff preference for the type of examination.

The majority (90%) of the academic staff preferred MCQs as assessment tool compared to essay.

if YES is it: comprehensive	Frequency	Percent	Valid Percent
Always	10	50.0	62.5
Sometimes	5	25.0	31.3
Often	1	5.0	6.3
Total	16	80.0	100.0
Missing	4	20.0	
Total	20	100.0	

Table 8: Academic staff opinion about the comprehensiveness of the MCQ exam.

The above table showed that (50%) of the academic staff thought that MCQs was always comprehensive.

Is MCQs the best tool for student's assessment	Frequency	Percent	Valid Percent
Agree	3	15.0	15.8
Dis-agree	2	10.0	10.5
Sometimes	14	70.0	73.7
Total	19	95.0	100.0
Missing	1	5.0	
Total	20	100.0	

Table 9: The staff perception for MCQs as an assessment tool.

The above table shows that (70%) of the staff of School of Medicine, AUW answered that MCQs sometimes is best tool for student's assessment.



Figure 12: own MCQs exam construction by staff of School of Medicine, AUW.

The above figure showed that 95% of staff constructs their own MCQs.

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Figure 13: the construction of MCQs by academic staff as a group work.

The above figure showed that (55%) of academic staff answered yes that they used to sit as a group for MCQs construction while (40%) of them answered sometimes.

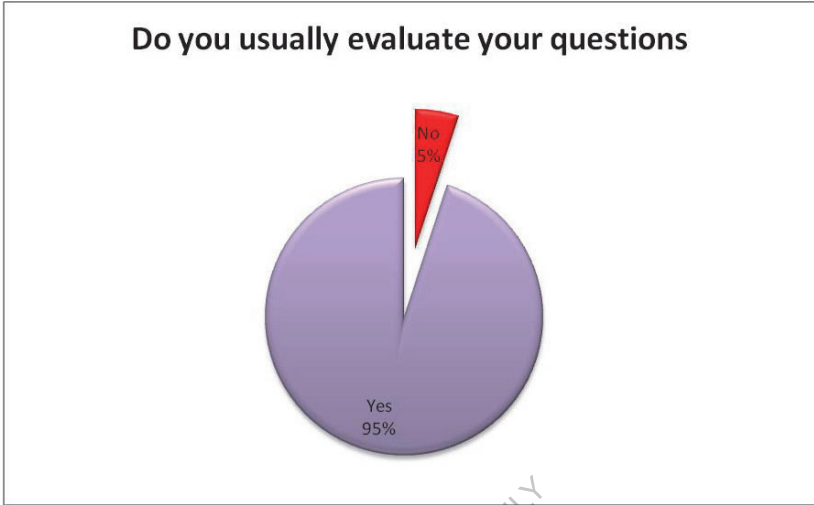


Figure 14: the evaluation of questions by academic staff.

The above figure showed that 95% of the staff of School of Medicine, AUW used to evaluate their questions.

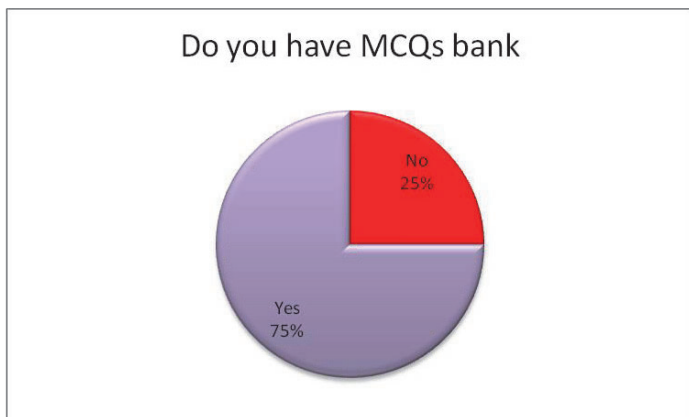


Figure 15: the Availability of MCQs bank.]

The above figure shows that 75% of the academic staff had department MCQs bank.

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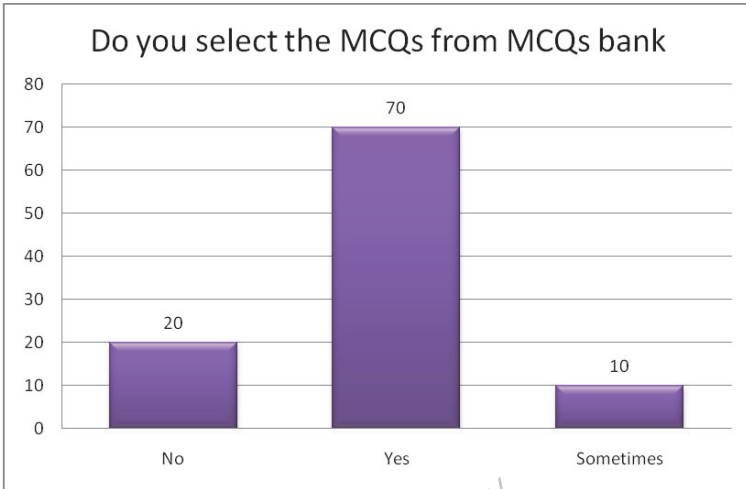


Figure 16: the selection of the MCQs from MCQs bank by academic staff.

The above figure showed that 70% of the academic staff used to select MCQs from MCQs bank.

the MCQs meet the objectives of courses	Frequency	Percent	Valid Percent
Yes	19	95.0	100.0
Missing	1	5.0	
Total	20	100.0	

The MCQs meet the objectives of courses.

In assessment which types of MCQs you prefer to construct	Frequency	Percent	Valid Percent
One best answer	11	55.0	64.7
MTF	5	25.0	29.4
One correct answer	1	5.0	5.9
Total	17	85.0	100.0
Missing	3	15.0	
Total	20	100.0	

Table 10: staff preference of MCQ type.

The above table shows that 64.7% of the staff of School of Medicine, AUW preferred to construct one best answer type of MCQ while only 5% preferred to construct one correct answer.

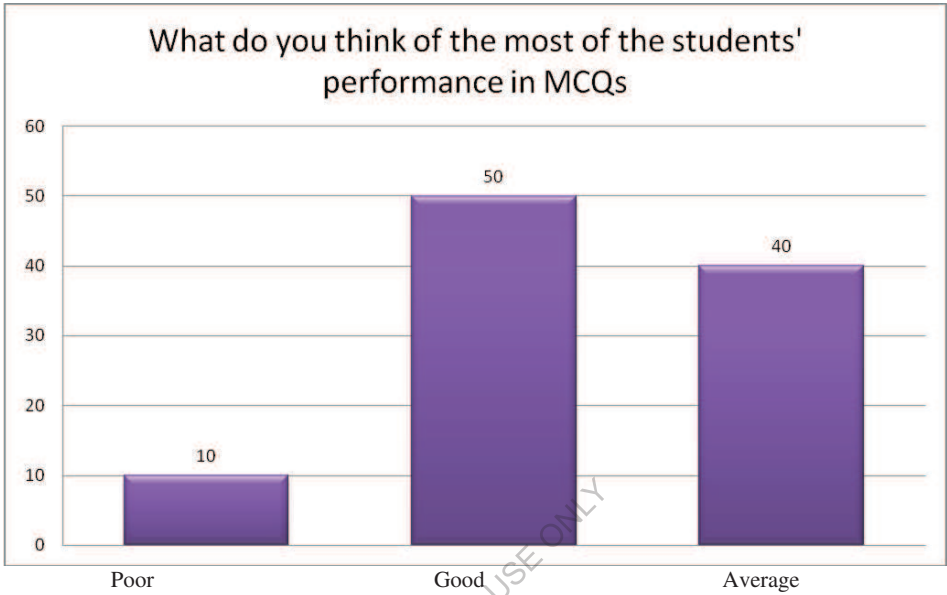


Figure 17: the students' performance in MCQs in the opinion of the academic staff School of Medicine AUW .

The above figure shows that 90% of the academic staff School of Medicine AUW commented on students' performance in MCQs as good or average.

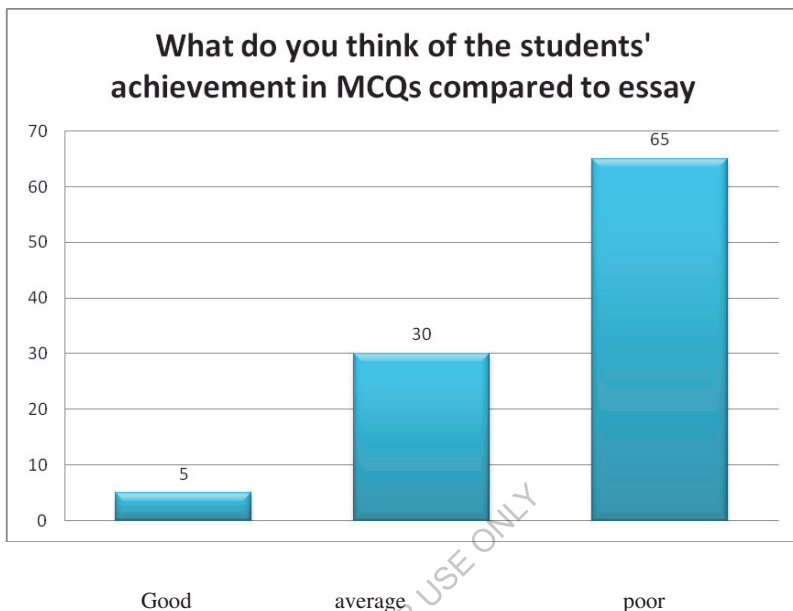


Figure 18: students' achievement in MCQs compared to essay.

The above figure showed that 95% the academic staff School of Medicine AUW commented on students' achievement in MCQs compared to essay as poor or average.



Figure 19: the use of penalty in marking MCQs by the Academic staff School of Medicine AUW.

The above figure showed that 90% of the academic staff of School of Medicine, AUW was not used penalty wrong answers in MCQs.

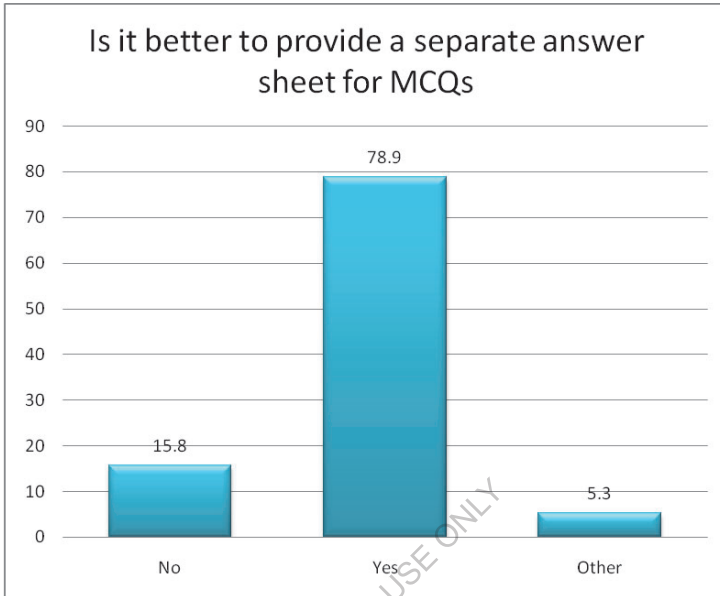


Figure 20: the use of a separate answer sheet for MCQs exam.

The above figure shows that 78, 9% of the staff of School of Medicine, AUW used to provide a separate answer sheet for MCQs exam.

How do you rate the coverage of MCQs the different courses regarding their general frame concept and vital points	Frequency	Percent	Valid Percent
Poor	2	10.0	10.5
Average	15	10	78.9
Good	2	75	10.5
Total	19	95.0	100.0
Missing	1	5.0	
Total	20	100.0	

Table 11: the coverage of MCQs in different courses regarding their general frame concept and vital points.

The above table showed that 75 % of the staff rated the coverage of MCQs the different courses regarding their general frame concept and vital points by good.

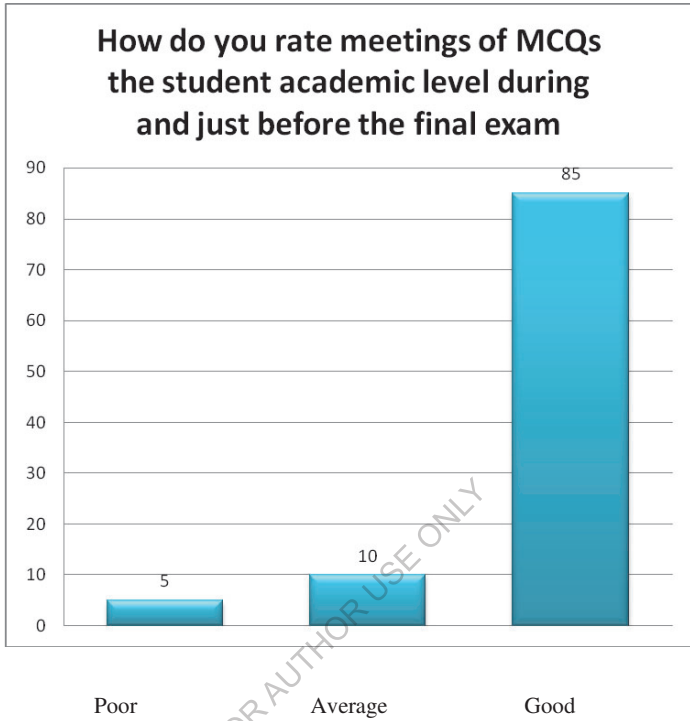


Figure 21: the meetings of MCQs to the student academic level during and just before the final exam.

The above figure showed that 85% of the staff rated meetings of MCQs to the student academic level during and just before the final exam as good.

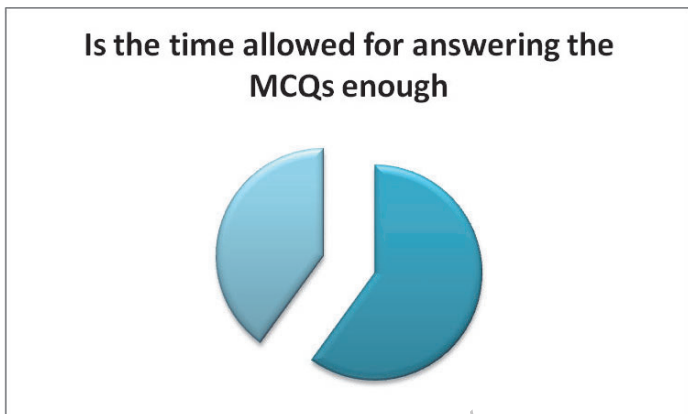


Figure 22: The academic staff opinion about the adequacy of time to complete MCQs exam.

The above figure showed that 60% of the academic staff commented on the adequacy of time to complete MCQ exam as average while (40%) of them as long .No one of them commented on the adequacy of time to complete MCQs exam by short.

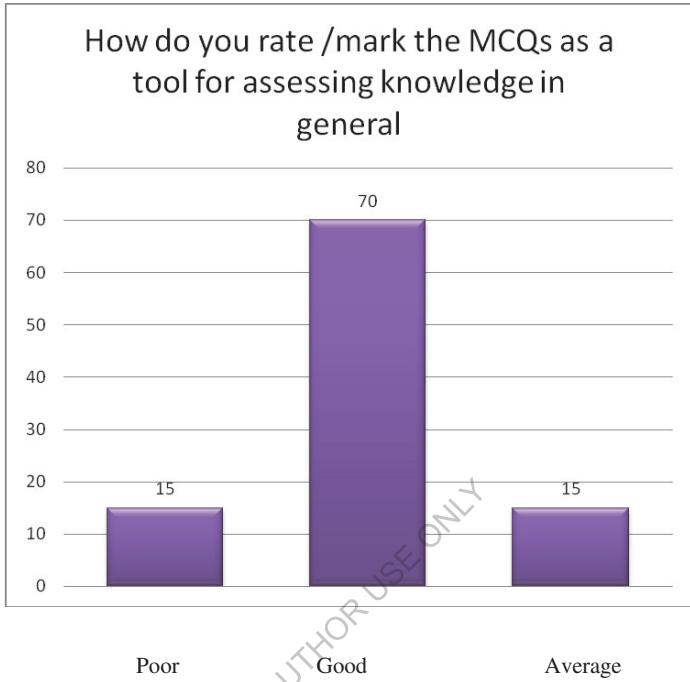


Figure 23: MCQs as an assessment tool for knowledge in general.

The above figure showed that 70% of the staff of School of Medicine, A UW rated MCQs as assessment tool knowledge in general as good.

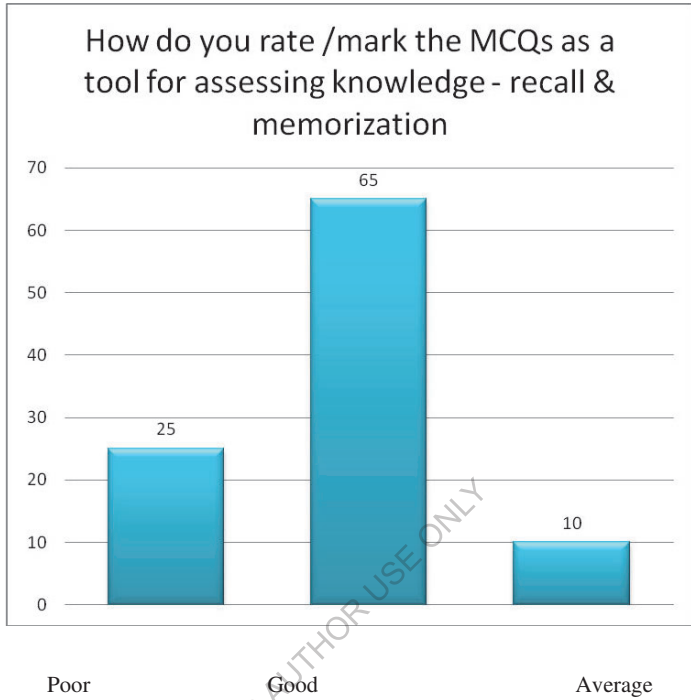


Figure 24: MCQs as a tool for assessing knowledge - recall and memorization.

The above figure shows that 90% of the staff of School of Medicine, AUW rated MCQs as an assessment tool for assessing knowledge - recall and memorization as good.

Discussion

The performance of students in MCQs exam is usually less than in short essay (Paxton 2000). It was clear that 75% of the of medical students in School of Medicine, AUW preferred MCQs exam as a tool of assessment and 55,2% of those medical student prefer to be examined by MCQ as a assessment tool compared to essay and they prefer the one correct answer of MCQs type. Seventy eight percent of the of medical students in School of Medicine, AUW answered by good understanding of the instructions at the first page of MCQS exam and their opinion about the adequacy of time to complete MCQs exam 84.2% of students answered by average or long time for exam. In the Sudan Multiple choice questions (MCQs) examinations are well established and widely used in a large number of medical schools. Multiple choice questions are considered to be the most objective, and valid tool for student assessment. Reasons of popularity of MCQs among medical teachers include their ability to test factual recall, interpretation of sets of data(Collins 2006).A well constructed MCQ is superior to MEQ in testing the higher cognitive skills of undergraduate medical students (Olayemi 2013). Multiple choice question is a better test of cognitive skills than the modified essay question as 60% of the MCQs tested the higher cognitive skills and only 40% of MEQs(modified essay questions) addressed the cognitive level III of modified Bloom's taxonomy .The modified essay question failed in its role of consistently assessing higher cognitive skills whereas the MCQ frequently tested more than mere recall of knowledge(Bodkha 2012) .Forty five percent of the staff of School of Medicine, AUW were associate professors, assistant professors are 25%, lecturer is 20% and professors are 10%. Sixty percent of academic staff School of Medicine, AUW received courses in students assessment and only 15% of them had certification in students assessment. Although MCQs is

difficult in construction ninety percent of academic staff School of Medicine choose MCQs sometimes as best assessment tool for student knowledge. Ninety percent of the staff of School of Medicine, AUW prefers MCQs as assessment tool compare to essay. Fifty five percent of the staff used to sit as a group for MCQs construction, 95% of them evaluate their questions. The majority of Staff had MCQs bank and 70% of them select MCQs from MCQs bank with reconstruction of questions to avoid repeat ion of the questions. When the staff of School of Medicine, AUW were asked whether the MCQs meet the objectives of courses 95% of them were answered yes. The majority of staff opinion in students performance in MCQ exam were average. Among staff of Medical school, AUW 70 % were rated the MCQs as a tool for assessing knowledge in general by good, 65% of them rate the MCQs as a tool for assessing knowledge – recall and memorization by good. These results are consistent with Scouler et al results, the MCQ examination was perceived as assessing higher levels of intellectual skills and abilities such as analysis, application and comprehension(Carneson, Delpierre et al. ; Case and Swanson 1998) .On comparing means of final medical student scores between MCQ and essay among different clinical departments in School of Medicine, AUW, there was overall significant difference in scores $P=0.001$ as well as in pediatrics $P < 0.001$ and obstetric $P= 0.011$ departments whereas there was no significant difference in surgical $P= 0.074$ and medical $P= 0.238$ departments. The difference is not justifiable it need further assessment. These results are not consistent with the most important finding of study on student performance in multiple choice and long essay questions. The overall significant difference in scores as well as in pediatrics' and obstetric departments indicated that students who performed well in the MCQs were also likely to do well in the essays, these results are consistent with the most important finding of study on student performance in multiple choice and long essay questions, there was a

statistically significant overall correlation between student performance on MCQ and essay examination.

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Conclusion and Recommendations

Summary of important results:

- The majority of medical students in School of Medicine, AUW final year prefer MCQ exam as a tool of assessment, and they prefer to be examined by MCQs compare to essay.
- Medical students in School of Medicine, AUW final year prefer to be examined by the one correct answer of MCQs Type.
- The majority of academic staff in School of Medicine, AUW prefer MCQs as assessment tool.
- More than half of the staff of School of Medicine, AUW prefer to use One Best answer of MCQs types.
- The MCQs meet the objectives of courses by the opinion of (95%) of academic Staff in School of Medicine, AUW.
- Comparing means of final medical student scores between MCQ and essay Among different clinical departments in School of Medicine, AUW, there was Overall statistically significant difference in scores as well as in pediatrics' and Obstetric.
- There was no statistically significant difference in surgical and medical departments.

- From research result we found that 75% of academic staff in School of Medicine, AUW received some sort of training in student's assessment. So to increase academic staff experience in students' assessment in others school of medicine which suffering from un experience and under staff by attending workshops and courses in medical education.
- To use MCQs as assessment tool early in education as in primary schools.

Suggestions for Further Studies:

- Impact of multiple choice questions as assessment tool on medical Students learning.
- Validity and reliability of a multiple choice questions as assessment tool.

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