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THE CLINICAL EXAMINATION- LONG CASE.
THE MOST VALID TEST IN A MEDICAL SCHOOL

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This article reflects the cumulative experiences of all the teachers- particularly the clinicians- in the Faculty of Medicine University of Gezira (FMUG) since its foundation in 1978. It also includes some of the comments of a large number of renowned external examiners who participated in the clinical examinations.

Acknowledgment

The authors acknowledge the contributions of experienced examiners in the FMUG; Osman Mohamed El Mustafa, Ahmed El Amin El Sheikh, Abdul Rahman Abdul Hafeez, Sayed Mohamed Ahmed, Osman Khalafalla Said, Ali Babiker Habour, Osman Taha Mohamed Osman, Abdulla Abdul Karim Gibrel . They reviewed the article and their constructive and valuable comments were all included.

Summary:

This article includes (1) the basic contents of a clinical examination long case (ii) the strengths of the examination which justify labeling it as the most valid (iii) guidelines for conduction of the examination (iv) guidelines for marking (v) the place of the short case and Objective Structured Clinical Examination (OSCE) in the end of course examination.

Introduction:-

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Almost all medical schools graduate their students after passing a number of clinical examinations[1]. In conventional medical schools the clinical examinations are limited to certain clinical disciplines in the final years and in some innovative medical schools students are subjected to clinical examinations at the end of system courses. Historically the clinical examination is composed of one or two (usually one) long case and few short cases. The following is a description of the long case examination since it tests all the objectives of a medical school.

The long case clinical examination:-

The student is given a PATIENT, with a medical problem. He should be able to demonstrate his abilities to manage that patient. He is expected to follow the standard format of patient's management which includes:

- perception: the student demonstrates the ability of using all senses to formulate an overall idea about the patient at the level of the first contact.
- History: takes full history with special emphasis on the affected system (s).
- Clinical examination: performs clinical examination systematically with emphasis on affected system (s), and demonstrates ability to elicit important clinical findings correctly. e.g. demonstrates how to examine the spleen and diagnose splenomegaly if the spleen is enlarged.
- Summary: presents a summary of the significant and relevant clinical findings in the history and examination and a logical interpretation of those findings and consequently makes a differential diagnosis.
- Investigations: suggests and justifies relevant investigations
- Management: outlines the management plan of his patient.

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- Complications: mentions the important possible complications, how to treat them and how to prevent them.

- Prognosis: gives a logical prediction of the future of the patient and his disease based on evidence and citing figures if possible.

- Rehabilitation: councils the patient about adaptation of his life with his disease especially if it is a chronic or serious disease; renal failure, cancer, amputation of a limb.

- Prevention: describes the methods of prevention of that disease considering the patient himself, his family or the community at large.

- Attitude: demonstrates excellent professional attitude throughout the history taking and clinical examination.

The long case clinical examination tests the followings:

- **Knowledge:**

The clinical examination tests knowledge acquired by the student during his study in the medical school; basic sciences, clinical sciences, behavioral and community sciences. It also tests ability of the student to integrate that knowledge and apply it in the management of his patient

- **Clinical skills**:

The examination tests the student on his ability to demonstrate physical signs; demonstrate how to perform examination and how to elicit correct findings.

- **Interpretation and integration of the clinical findings and results of investigations:** The examination tests the ability of the students to interpret the clinical findings and results of

investigation. He or she must be able to tell what a certain sign mean e.g. malena means an upper gastro intestinal bleeding, a diastolic murmur in the mitral area means mitral stenosis, high blood urea means renal impairment.

- **Clinical Reasoning:**

The student applies his knowledge in interpreting the clinical findings and the results of investigations. He applies his skills in clinical reasoning to make a logical explanation of the patient problem. He should be able to make a diagnosis and give reasons justifying the diagnosis. He should also provide scientific explanation for the whole problem e.g. liver cirrhosis leading to portal hypertension and consequently ascites and oesophageal varices.

- **Problem solving**:

Throughout his management the student applies his skills of problem based learning; identifying the problem, looking for more relevant information, making hypothesis and finally solving the problem.

- **Community oriented approach:**

The long case clinical examination is ideal in testing a student on using a community oriented approach when managing a patient. The student identifies the significant findings in the social history of his patient; socioeconomic status, cultural background and religious beliefs. Then he makes logical associations between the patient's social background and his disease and its management. Sometimes there is a direct correlation e.g. malnutrition and poverty, extra- marital sex and sexually transmitted diseases. The student councils his patient about his disease, compliance to treatment and acceptability of changing his style of life to suit his new condition. The Followings are some examples which highlights the effects of social background on the patient's management:

- schistosoma mansoni infection of a 30 years tenant in the Gezira Irrigated scheme; how could he avoid re-infection after treatment, knowing that he has to go back to his farm.

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- pulmonary tuberculosis in a 20 years old worker who is poor, illiterate and living far away from hospital, could he be able to comply with the long term treatment of TB.

- Juvenile diabetes mellitus in a 10 years old girl from a poor family living in a small village where there is no electricity.

- A young lady with cancer breast who will prefer mastectomy to excision of tumor because she cannot come regularly for further treatment after excision.

- **Attitude :**

The clinical examination is perhaps the only examination in which the attitude of the student towards his patient could be tested objectively. Essential attitudes which should be observed and scored by the examiners include; introducing himself, obtains a verbal consent, greets the patient, stands on the right side of the patient, positions the patient comfortably, keeps his hands free and warm, communication skills, respect of the patient, showing sympathy and avoiding offending questions. There is a consensus among doctors that a good attitude is essential for the practice of the medical profession and hence there must be emphasis on evaluating it during a clinical examination. fortunately the medical students in the Sudan are at an advantage of being trained and examined in a very homogenous society where the cultural background of the student, the patient and the examiners are almost identical and hence it is rare to come across a student with an odd attitude. The majority of the patients could communicate in simple Arabic language.

- **The clinical examination tests the educational objective of a medical school. Valid test.**

- The main educational objectives of a medical school is to graduate a highly qualified doctor who will be able to : diagnose treat and prevent medical problems using a community oriented problem

solving approach, supervise and teach other members of the health team, observe the code of medical ethics and continue learning after graduation.

- The long case clinical examination described above satisfies all the requirements of testing the student on the educational objectives of a medical school.

It really tests what the school wants to test-Valid test.

One of the goals of assessment in medical education remains the development of reliable measurements of student's performance which have a high predictive value for subsequent clinical performance after graduation[2].

Guidelines to improve validity and reliability of a clinical examination:

- The ideal clinical examination is very valid but unfortunately there are a lot of pitfalls and shortcomings associated with the practical conduction of the examination. Those shortcomings affect the validity adversely and few of them make the examination totally invalid e.g. spending most of the examination talking with the student about his father, uncle, tribe!!

- Unfortunately the reliability of the clinical examination is rather low when compared with other instruments like Multiple Choice Questions (MCQs) and OSCE. The most important factors affecting the reliability of the examination are the inter-case variability and the inter-rater variability. The inter-case variability is very difficult to eliminate. Practically students are examined on different patients with different medical problems-easy and difficult. If the student does excellent on one case it should not mean that he will perform the same on a different problem and that will affect the predictive validity of the examination. So the student must be examined on at least 10 patients to make the

examination really valid. However, a day will never come when a final medical student is examined on 40 patients- 10 for each discipline! In an attempt to reduce the inter-case variability effect, the examination cases should be of common problems which the students usually see during training.

The inter-rater variability is another important factor affecting reliability and validity of the examination. It could be reduced by using a structured check list and independent scoring.

The following are practical guidelines to conduct a clinical examination- long case and the authors believe that the guidelines shall improve the reliability and consequently the validity of the examination.

1. **The Patient:**

Choose a fit patient who can tolerate the examination and whose medical problem will NEVER be adversely affected. The patient should have enough clinical findings- history and examination. Do not choose normal patients without abnormal findings, expecting the student to demonstrate only the procedure .e. g how to perform a knee jerk reflex. In real life situations doctors normally see sick patients who need appropriate management.

Choose a patient who could communicate satisfactorily. Explain clearly to the patient that he or she will be used for examination and that he or she is unlikely to benefit from the examination and then obtain a verbal consent of the patient to participate in the examination. Patients who refuse to participate should not be forced to do so. Avoid comments like "you are a patient in a teaching hospital and hence you must accept!!" Selected patients should be treated nicely; offered comfortable transport, decent waiting room and good food and drinks and some one should look after their regular medications.

All over the world there is a problem of scarcity of patients for clinical examinations and the Sudan is not an exception. Medical schools should be flexible when dealing with

this problem and adopt the most feasible solutions available to them to encourage patients to accept the clinical examination. The most effective approach is that internal examiners should examine on their own patients. This approach improves the acceptability of the patients since they see the examination as a continuum of their care. Patients imported from different hospitals are usually reluctant to cooperate. Also patients are motivated when they know that the examiners are of high calibre. Another effective method is to invite out-patients to participate in the exam. e. g. a known case of Parkinsonism, paraplegia or Down's syndrome. It is amazing to know that those patients are usually willing to participate even without incentives.

It is the opinion of most practicing clinicians that patients should be rewarded financially in order to motivate them participate in a clinical examination. The incentives could be in the form of cash money, jumping the waiting list of operations or exempting them from the hospital fees. Doctors should not be harassed about those incentives if they really help in motivating patients.

The authors believe that patients will always cooperate if they have optimum care and respect by the students and their teachers during the training period.

In an attempt to overcome the problem of scarcity of patients for a clinical examination, some medical schools introduced simulation of patients; a normal person acts as a patient after receiving intensive training in giving history, responding to questions and acting physical signs like abnormal gait, abnormal speech, tremors, tenderness etc. Simulations can hardly replace a patient because it has a lot of limitations and deficiencies. It might be adequate in history taking but it is inadequate for clinical examination because it cannot have important clinical signs which medical students are expected to elicit: enlarged liver, ascites, heart murmurs, irregular pulse, pregnancy, goitre, breast lump, madura foot, crepetaions and rhonchi etc. It is imperative that a clinical examination of an undergraduate student should include common abnormal clinical findings and in the absence of those abnormal findings, the examination is invalid, testing the student on normal

subjects. A main disadvantage of simulation is that it is really unsuitable for a clinical examination in paediatrics. Simulation is a deficient subject for clinical examination and the authors suggest that it should not be used in the Sudan.

2. Examiners:

All examiners should be well informed about the academic regulations of that particular medical school whose students are taking the examination. Examiners MUST conform strictly to those academic regulations and should never violate them; however they could make comments at the end of the examination. External examiners must see the rest of the components of the examination (MCQs, essays, OSCE etc). Examiners must be specialists in the subject matter of the examination. Teachers in medical schools- full time or part- time are always preferred to consultants without experience in teaching or examinations. Examiners should have enough years of experience as stated in the academic regulations of the medical school and they should be able to judge what the optimum level of the graduates should be.

A good tradition in medical schools is invitation of external examiners to participate in the clinical examination. Recently this participation has been legislated by the Sudan Medical Council as a requirement for accreditation of the results of that examination. In practice the external examiners system is perceived as a very useful system for maintaining and improving the quality of graduate doctors and ensuring an optimum level of all graduates. The external examiners validate the teaching and assessment methods of the medical school.

The examination panel should include at least two examiners, **NEVER** one examiner. It is advisable to have one external and one internal, one old and one young. Although the panel could have more than two examiners (ideal two), it is unwise to have many examiners in one panel because it makes the examination not reliable.

3. Students

A detailed time- table of the clinical examination (dates, time, panels, place) must be provided to students in due time as stipulated in the academic regulations. The conduct of the examination and the scoring system must be clearly explained to all the students before the start of the examination. Although the results of the written examination must be ready to calculate the final results, those results should not be shown to examiners before the clinical examination to avoid bias- hallo effect.

4. Duration

The total duration of examination is 60 minutes; 15 minutes for history taking, 15 minutes for examination and 30 minutes for discussion. The duration of examination must be FIXED for all students and examiners are advised to spend the WHOLE time in examining the student; too short or too long clinical examinations are not valid and not reliable – the full allotted time for the examination should be given to the student.

5. Venue

The conveners of the examination prepare the venue properly. The venue must be QUIET, clean and organized. Disturbance and interruptions are strictly forbidden. Food and refreshments should never be served during the examination; only during the breaks. Examination panels are supplied with all instruments relevant to the examination. Examiners are instructed to switch off their mobile phones.

Examiners and students must be punctual and reach the examination venue 30 minutes before the start of the examination. All panels start and end at the same time. Time is observed by a time-keeper who allows a gap of 5 minutes between students. The conveners observe confidentiality throughout the examination.

Clinical examinations are now normally conducted in offices near the wards or in the wards. Although that is convenient to the patients, the internal examiners are often distracted by the patients and their relatives. The authors suggest that examination halls must be built

in teaching hospitals to be used for clinical examinations. The hall includes comfortable waiting rooms for students and patients, examination cubicles and a control room.

6. Examination

1. **How to conduct a clinical examination**. Usually the student is left alone with his patient to take history (non observed). He is allowed 30 minutes for that. Then the clinical examination and discussion are conducted under direct observation of the examiners. The authors advocate observed examination where the whole examination- history, examination and discussion- must be conducted under direct observation of the examiners because the examiners could test the student's skills in history taking and obtaining relevant findings. The examiners test the abilities of the student in obtaining findings and test that those findings are relevant and correct. Skills of history taking include: asking relevant questions in a logical sequence and elaborating on relevant areas and organizing questions in such a way that he could make a hypothesis and differential diagnosis. The second advantage of taking the history in front of the examiners is that the examiners could rate the student's attitude, objectively while taking the history. Examples of attitude to be observed are: introducing oneself, greeting the patient, obtaining verbal consent, communication skills, respect to patient and showing sympathy to his problem. The third advantage of this system is to eliminate cheating because some students are helped by some examination organizers. The main disadvantage of taking history in front of the examiners is that the student might be stressed by the presence of the examiners, however there is evidence from some medical schools who adopt the system of taking history under observation showing that students tend to be used to it without undue stress.

Examiners are not allowed to interrupt the student while taking history except in very rare situations. The examiners must observe the student carefully and listen to him or her attentively so that they could rate the student's performance objectively. The examiners rate the student performance on attitude, skills of history taking and correct findings. Since the

examiners are expected to rate the student objectively they should never be distracted while he is taking the history.

After finishing history taking the student is allowed 15 minutes to perform clinical examination under observation. He performs clinical examination of the affected system (s) in detail and summary examination of other systems. He demonstrates clinical skills of physical examination and he is expected to elicit correct physical signs. It is worth mentioning here that the aim of physical examination is not only to demonstrate skills and procedures but to elicit correct findings e.g. jaundice, irregular pulse, goitre, heart murmurs, hepatomegaly, ascites, breech presentation, hydrocephdus breast lump etc.

The student summarizes all his relevant findings in the history and examination and makes a logical interpretation of all those findings and use them to suggest a differential diagnosis. Then he suggests relevant investigations and gives a management plan. Finally the student discusses the complications, prognosis and prevention of that medical problem.

Students should be examined on patients who have a number of abnormal clinical findings in the history and examination. Students should not be examined on NORMAL subjects to be tested only on how to perform the examination and demonstrates steps and procedures of examining a system or an organ. In real life situation doctors normally manage patients with abnormal findings.

The whole examination should be on the case presented to the student; history, examination and discussion. Examiners are advised to concentrate on the case and not to deviate to a different medical problem. Such a deviation will affect the validity of the long case clinical examination and practically converts the clinical examination into an oral examination which is now condemned by the majority of teachers in medical schools.

2. **How to rate a student in a clinical examination**. The clinical examination is normally divided into two sections (i) history and examination (ii) discussion. The authors suggest the following time allotted and weightage of the examination component:

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- **History** :Time allotted: 15 minutes : weight: 20 marks

- **Examination** : Time allotted: 15 minutes: weight:20 marks

- **Discussion**: (summary + discussion): time allotted: 30 minutes :

  weight:60 mark

  - **Summary** : time allotted:10minules weight:20marks

  - **Discussion**: time allotted:20 minutes : weight:40 mark

The above mentioned schedule of time and weight is a guide to examiners to budget the examination time. The weightage must be adapted to the academic regulations of the particular medical school. Usually the student is examined by two examiners. Each examiner is provided with a separate assessment form for each student. Areas on which a student has to be assessed are: (i) recording of performance related to history taking and examination and (ii) discussion which includes: correctness of findings, logical interpretation of findings, differential diagnosis, investigations, plan of management, complications, prognosis and prevention. The two examiners must divide the areas of discussion amongst themselves e.g. one examiner asks the student for 15 minutes about: summary of relevant findings, correctness of findings, logical interpretation of findings and differential diagnosis, and the other examiner asks the student for 15 minutes about relevant investigations, management plan, complications, prognosis and prevention. The examiners may interchange the areas while examining the next student. While one examiner is asking the student the co-examiner should NEVER interrupt him because that will disturb the sequence of questions and will confuse the student. Each examiner has to rate the student on all the areas (history, examination and discussion) independently i.e rate the student while taking history and performing examination and rate the student while answering questions in the discussion and while his co-examiner is asking questions. At the end of the examination each examiner gives his score out of 100 and then they calculate the final score of the student, the average of the two scores. It is imperative that the two examiners should

concentrate on the student performance throughout the examination so that they could rate him objectively and fairly. Except in very rare situations examiners are not allowed to interrupt the student during history taking and clinical examinations. When the examiners fail a student they must write clear and precise comments on the student's performance because medical schools usually provide feedback to those students.

The assessment form (check list) used must be simple, clear and short and must be explained to all examiners before the start of the examination. Complicated and detailed forms are difficult to use, affect the validity of the examination and hamper the clinical freedom of experienced examiners and change the whole exam into monotonous procedures. In real life situation patients having the same medical problem e. g. diabetes mellitus might be different in many aspects and hence each one need a specific approach of management. The assessment forms are used to improve the reliability of the examination by reducing the inter-rater variability and inter-case variability and hence they ensure fairness on the student and the institute. A student who does well on the component of history and examinations and does poor in the discussion deserves to be rated high in history and examination and low in discussion. It is unfair on such a student to rate him only on the discussion and base the final judgment on that. When the examiners concentrate on the performance of the student and use the assessment form properly they can confidently rate the student as high as 90% or as low as 10%.

3. Guidelines for marking system:

There are two types of marking systems, closed marking system and open marking system. Examiners are familiar with the closed making system. In the closed making system the grades are predetermined by the examiners or more commonly by the academic regulations of the medical school. Usually the system includes the following grades: failure not to be raised, failure could be raised, clear pass, credit and distinction with a narrow margin between 45 and 65.

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A student who scores a grade of failure not to be raised will fail the end of course examination even if his aggregate is above the pass level. The closed marking system has one advantage, it reduces the inter-rater variability and hence improves the reliability of the clinical examination. It is commonly used as the final result of students who fail and that is really unfair because it ignores the achievements of the student in the other components of the examination- MCQs, Essays and OSCE. The student is examined for one hour only in the clinical examination and for more than 5 hours in the other components. Moreover, the other components test the student on a wide range of knowledge and cognitive skills which are unlikely to be tested in the clinical examination. Validity of the end of course examination depends on the coverage of course contents which could only be achieved by a number of components. If the other components are not considered in the final assessment of the student, it is only fair that they should not be used.

The authors recommend the open marking system in which the student could be rated anything between 10 and 90. The only disadvantage is that it suffers a great deal of inter-rater variability and hence affects the reliability of the examination, however the use of assessment forms (checklists) properly almost eliminate that disadvantage. The final result of the student is calculated by the aggregate of all components. Examiners are usually spectacle about passing a student by aggregate when he fails the clinical examination and they may go beyond that and describe such a student as unsafe! Releasing safe doctors is ensured by giving the clinical examination a big weight and rating the student objectively according to the check list and hence an unsafe student in unlikely to pass by aggregate if he is rated very low in the clinical examination.

It might appear contradicting when we say that the clinical examination long case is the most valid test in a medical school and at the same time that it should not be used solely for making a judgment on the student's final result of the end of course examination. As a test it is the most valid but an end of course examination must be composed of more than 3-4 components to ensure coverage of contents and test students on medical problems which

are not feasible in a clinical examination e.g. coma, postpartum hemorrhage, myocardial infarction , head injury etc.

Having described the long case in details, it is worth saying few words about the short case and the OSCE

Short case examination

This is an integral part of all clinical examination except obstetrics. The student is usually examined on 2.-3 short cases for 10-15 minutes for each case. He is tested mainly on demonstrating skills, making a diagnosis or outlining the management. As such it lacks comprehension, clinical reasoning, problem solving and community orientation. Time is too short to assess relevant knowledge in depth and rate the student attitude objectively. The short case is a suitable station in an OSCE examination. It lacks most of the advantages of the long case. However it improves the validity of the examination by increasing the clinical cases presented to the student and improving coverage. When used examiners must be aware of its limitations. it is NEVER a substitute for a long case.

Objective structured clinical examination (OSCE)

In an attempt to improve the reliability of the clinical examination the OSCE is used by some medical schools instead of the clinical examination (first introduced by Hardem and Gleeson 1979). In the OSCE all the students are examined on the same patients, reliable examination. The OSCE also improves the validity by testing the students on a larger number of clinical problems; coverage of contents. It is also considered in the solution of scarcity of patients for clinical examinations. It is meant to reduce the inter-rater variability and inter-case variability. However it lacks most of the advantages of the long case, comprehension, clinical reasoning, problem solving, community orientation, and attitude. It needs extensive preparations and rigorous structuring and it limits the clinical freedom of experienced examiners. Patients feel bored to be examined by whole class. The authors

suggest that it should not replace the long case examination since we can always have enough suitable cases for clinical examination if they are motivated, respected and well looked after.

Conclusion

The clinical examination – long case- is an old examination in medical schools and all medical doctors are familiar with it. The basic contents of the examination have not changed very much through the ages, however a lot of improvements in its conduction have been introduced to make it more valid and more reliable. Attempts have been made to replace it by OSCE and substitutes simulations for patients; both of them are very deficient and suffer a lot of limitations and can hardly test the enormous contents of the long case examination. Hence the exam is there to stay and it is hoped that the guidelines presented in this article will improve its reliability and validity.

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