
KEY FEATURES PROBLEMS: A MORE VALID WRITTEN EXAMINATION TO ASSES CLINICAL DECISION MAKING SKILLS

Sarkis K Strak

FRCP, Professor of Medicine, Department of Medicine, University of Basrah.

Student's assessment is perhaps the most critical of all tasks facing the teacher. Generally, teachers take such involvement quite seriously but, sadly, the quality of many assessment and examination procedures leave much to the desired.

When faced with developing an assessment, one must be quite clear about its purpose. Several purposes of assessment may be paraphrased as follows¹:

- Testing the student's mastery of essential skills and knowledge.
- Ranking students.
- Diagnosing student's difficulties.
- Evaluating the teaching methods and effectiveness of the teaching.
- Motivating students to study.

In planning for an assessment, it is clearly necessary to be aware of the variety of methods available, but most important is to combine more than one method for assessment. The types of assessment well known to every department of the medical colleges are essay, short answer, multiple choice questions (one best or true and false), extended matching, structured (written) which include patient management problem (PMP) and modified essay questions (MEQ), and lastly oral examination.

In the past few years, the Medical Council of Canada commissioned a project to create a new, more valid written examination of clinical decision-making skills². The project was undertaken because:

1. Numerous studies do not support the use of patient management problems (PMPs) to assess clinical decision making skill.
2. Research results on the characteristics of clinical decision-making skills offered guidance to develop new approaches to their assessment. In particular, research suggested that these skills are specific to the case or problem encountered and are contingent on the effective manipulation of a few elements of the problem that are crucial to its successful resolution.

The problem's key features was introduced by Bordage and Page³, following Norman et al⁴. A key feature is defined as a critical step in the resolution of a clinical problem, and a key features problems consists of clinical case scenario followed by questions that focus on the only those critical steps.

Steps in developing key-features problems

The steps in developing an examination consisting of key-feature problems are:

1. Define the domain of clinical problems to be sampled by the examination.
2. Develop a key feature problem for each clinical problem selected by:
 - a. Defining the clinical situation for the problem.
 - b. Defining the key features of each problem.
 - c. Selecting a clinical case to represent the problem and writing the case scenario.

- d. Writing examination questions for each case, in general, one question for each key feature.
- e. Selecting a suitable format for each question.

1. Domain definition

A precondition to assuring the content validity of a key-feature examination is the definition the domain of clinical problems being sampled by the examination. The definition of this domain is provided by the statements of discipline-based objectives that the medical college or its departments produced for their qualifying examination. This might be, similar to medical council of Canada objectives⁵. Within these objectives are lists of clinical problems for which a graduating student should be competent. The problems are presented according to varied taxonomies and can be multi-dimensional, of course each problem is accompanied by a list of pertinent diagnoses. Collectively the clinical problems and the accompanying diagnoses constitute the domain of clinical problems from which a sample was drawn for the key-feature examination.

2-A. Defining the clinical situation for the problem

The clinical situation refers to the way in which the problem would be presented by a patient to a physician, and the way in which it will be developed for presentation on the examination. Five clinical situations were defined:

- A single typical or atypical problem.
- A multiple problem or multi system involvement.
- An undifferentiated problem or complaint.
- A life threatening situation.
- Preventive care and health promotion.

One or more of clinical situations must be chosen for each problem. The ones selected will influence the definition of the key features for a problem. At the level of a graduating medical student, it is advisable to select only typical presentation of clinical problems.

B. Defining the key features of each problem

The next task after a clinical problem and what clinical situation has been selected for presenting the problem, the next task is to define clinical steps in the resolution of the problem its key features. The opportunity to present key features for review and refinement to colleagues or to other examination committee members is a necessary step in the process especially for those inexperienced in defining key features.

As a general approach to defining key features for a problem, it is useful to think of many cases of a problem and list key features common to those cases.

Typically two to three features are defined for a problem, up to five key features have been defined for some problems.

Each key feature statement can be seen to have two components:

1. Initial clinical information this can be signs or symptoms, diagnosis or laboratory test result.
2. Clinical task which is a critical step, decision, or action in the diagnosis and management of the problem.

The following are some examples of key features problem and four associated key features suitable for the Department of Medicine and Gynecology and Obstetrics. Other examples can be chosen by other departments.

Example problem 1 and 4 associated key features suitable for Department of Gynecology and Obstetrics.

For pregnant woman experiencing third-trimester bleeding with no abdominal pain, (the graduating medical student) should:

- 1- Generate placenta previa as the leading diagnosis.
- 2- Avoid performing a pelvic examination (may cause fatal bleeding).
- 3- Avoid discharging from an out patient clinic or emergency department.
- 4- Order coagulation tests and cross match.

Example problem 2 and 4 associated key features suitable for Department of Medicine.

For a middle age patient with acute myocardial infarction the student should

1. Know the changes of an early myocardial infarction.
2. Avoid discharging from casualty department and sending patient to CCU.
3. Know the complications of acute myocardial infarction.
4. Know the indications for thrombolytic therapy.

C. Selecting case and case scenario

After defining the problem's key features, the examiner can select a clinical case to represent the problem on the examination and write the case scenario. The case scenario can be very brief or be very long and contain clinical data derived from history taking and physical examination.

The common elements of any case scenario should be the patient's age and gender, the patient's presenting condition or reason for seeking care, followed by whatever clinical details are required prior to the presentation of the first questions.

This is a case scenario for the patient with vaginal bleeding

A 24-year-old G3P2 31 weeks pregnant, comes to the casualty department at 8.00 pm complaining of bright red vaginal bleeding for the past two hours. The pregnancy has been uneventful as were the previous ones. She has not had any contractions in abdominal pain. The fetus is moving as usual.

The B.P is 110/70 pulse is 92/min. the examination of the abdomen reveals a uterine height of 31 cm., with a soft non tender uterus. The fetus is in breech position and has a heart rate of 150/min. no active bleeding has occurred since she arrived 25 minutes ago.

A case scenario for the patient with chest pain

A 40-year-old man presented to the casualty department with retro sternal chest pain of two hours duration. The pain has not relieved on taking sublingual tablets and was associated with sweating and vomiting. His BP was 110/70 pulse 100/min regular other examination was unremarkable. His ECG showed no Q waves but ST elevation in leads II, III and AVF.

D. Writing examination questions

Generally one examination question tests for one key feature, on some occasions a question may be used for more than one feature as shown here regarding vaginal bleeding problem.

Q1. What is your leading diagnosis at this time, list only one diagnosis, and write normal if you judge the patient's situation to be within normal limits.
This tests for key feature I

Q2. What steps would you include in your immediate assessment and management of this patient?

List as many as appropriate

1. -----
2. -----
3. -----
4. -----
5. -----

This tests for key features 2,3&4

Regarding the patient with chest pain.

Q1. What diagnosis would you consider? This question tests for key feature 1.

Q2. With respect to your diagnosis, the following steps you should consider regarding the management of this patient: select up to three;

1. Discharge the patient home after his pain is relieved.
2. Keep in the casualty for one hour and repeat the ECG.
3. Admit to general medical ward.
4. Admit to coronary care unit.
5. Give non-steroidal anti-inflammatory drug for his pain.
6. Avoid using thrombolytic therapy.
7. Start thrombolytic therapy.

This question tests for key features 2 and 4. Key feature 3 can not be tested using the same scenario above, a second scenario can be written.

While you are preparing to undertake the steps above, the patient develops fast irregular pulse rate.

Q3. Select up to 3 causes for his irregular pulse.

1. Ventricular tachycardia.
2. Ventricular fibrillation.
3. Atrial fibrillation.
4. Multiple ventricular ectopics.
5. Sinus tachycardia.
6. Atrial flutter with variable block.

This tests for key feature 3.

As noted above, the question 1 and 2 cover all the key features which are listed in the patient with vaginal bleeding. Similarly question 1, 2 and 3 cover all the key features which are listed for the patient with chest pain.

The instruction "select only one" is used in questions requesting a single definitive answer, for example one

leading diagnosis. The instruction "select up to 3" as in above examples, the answers should be limited to the requested numbers. While in "select as many as appropriate" is used for instruction where it is useful to determine how many appropriate necessary actions an examinee might take, and not to include in appropriate and unnecessary actions. A maximum allowable number of responses are stipulated in the questions scoring key.

E. Question format

Two formats of questions are recommended for key-feature problems: short answer "write in" (WI) and "short menu" (SM). In the WI format, examinees supply their responses as in question I in a patient with chest pain. In SM format, examinees select their responses from prepared lists of options presented with individual questions as in questions 2 and 3 in a patient with chest pain. The number of options in these lists varies to what the questions are tending. The number can range from a few as two to as many as 15-20. The lists of option must, of course, contain all keyed responses plus incorrect responses and common misconceptions to reduce guessing effects as illustrates in questions 2 and 3 in patient with chest pain. It is recommended that the use of WI format be limited to questions that test in diagnosis and treatment, which is not the case for questions testing issues of history and physical examination, to which examinees can phrase responses in many equivalent ways.

In conclusion, key feature problems provide a great deal of flexibility on issues of question format, and multiple responses to questions. They are worthy of consideration by medical colleges in Iraq or clinical departments as an adjunct to current written methods of assessing clinical decision making skills.

References

1. W.A. Mehrens and I.I. Lehmann's Measurement and evaluation in education and psychology A hand book for Medical teachers (Second edition) MTP press Limited; 1985:86-88.
2. Page, G., and Bordage, G, The Medical Council of Canada's Key Features Project: A more Valid Written Examination of Clinical Decision-making Skills. *Acad, Med*, 70(1995):104-110.
3. Bordage, G., and Page, G. An Alternate Approach to PMPs: The Key Features Concept. In *Further Developments in Assessing Clinical Competence*, I. Hart and R. Harden, eds., pp. 57-75. Montreal, Quebec, Canada: Can-Heal Publication, 1987.
4. Norman, G., et al. A Review of Recent Innovations in Assessment. In *Directions in Clinical Assessment. Report of the First Cambridge Conference on the Assessment of Clinical Competence*, R. Wakeford, ed., pp. 8-27. Cambridge, England: Office of the Regius Professor of Physic, Cambridge University School of Clinical Medicine, Addenbrooke's Hospital, 1985.
5. Bamber, J., ed, Objectives of the Medical Council of Canada Qualifying Examination. Ottawa, Ontario, Canada Medical Council of Canada, 1992.