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REGISTRARS

Mastering your Fellowship

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Abstract

The series, "Mastering your Fellowship", provides examples of the question format encountered in the written examination, Part A of the FCFP(SA) examination. The series aims to help Family Medicine registrars prepare for this examination. Model answers are available online.

Keywords: FCFP(SA) examination, Family Medicine registrars

This section in the *South African Family Practice Journal* aims to help registrars prepare for the FCFP(SA) Part A examination (Fellowship of the College of Family Physicians), and includes examples of the question formats encountered in the written examination, i.e. multiple choice questions (MCQs), extended matching question (EMQs), the modified essay question (MEQ) and critical reading paper (evidence-based medicine). Each of these question types is presented according to a theme. The MCQs are based on the 10 clinical domains of Family Medicine, the MEQs are aligned with the five national unit standards, and the critical reading section includes evidence-based medicine and primary care research methods. Please visit the Colleges of Medicine website for guidelines on the Fellowship examination: http://www.collegemedsa.ac.za/view_exam.aspx?examid=102

1. EMQ (extended matching questions): emergencies

For each of the following patients with disturbances in their acid-base balance, select the blood gas result that is most likely to fit the clinical picture:

1.1 A 50-year-old executive complains of indigestion and heartburn, which has worsened over the last six months. He took a commercial antacid solution every half hour the previous night for symptom relief.

1.2 A 20-year-old matriculation student performed really well in his examinations, and celebrated too much at the matriculation party by consuming alcohol in excess, which resulted in a "hangover." His father brought him to the emergency centre because of excessive vomiting. He appears to be dehydrated with dry mucous membranes, tachycardia, hypotension and poor capillary refill times.

1.3 A 23-year-old university student was anxious about her performance in the examinations. She felt numbness around her mouth and tingling in her hands, and went to the emergency centre because of chest pain.

The different blood gas result options are provided in Table 1.

Table 1: Blood gas result options*

Option	pH	PCO_2 (mmHg)	PO_2 (mmHg)	Base excess	Bicarbonate (mmol/l)
A	7.26	30	97	–8	16
B	7.46	30	99	4	23
C	7.48	51	98	–6	16
D	7.36	50	94	4	34
E	7.43	49	98	4	30
F	7.30	26	90	–8	16

*Normal values are as follows: pH = 7.35–7.45, PCO_2 = 35–45 mmHg (4.6–5.9 kPa), PO_2 = 80–100 mmHg (10.5–13.1), base excess = –2 to +2, bicarbonate = 18–28 mmol/l
PCO_2: partial pressure of carbon dioxide in arterial blood, $P0_2$: partial pressure of oxygen in arterial blood

2. MEQ (modified essay question): the family physician's role as capacity builder

You are working as a family physician in a district hospital. You are assessing a three-year-old boy with pallor and fatigue during the busy afternoon in the emergency centre, who was seen two days ago by the new community service medical officer (CSMO). The CSMO treated the child with ferrous sulphate and deworming medicine, and discharged him into the care of his mother, with advice to follow-up at the local clinic. Today, the mother is concerned about the child being breathless as well. On examination, the side-room haemoglobin test result is 7 g/dl, and you find a palpable spleen on abdominal examination. A subsequent in-patient workup in consultation with the level 2 paediatrician reveals a diagnosis of acute lymphoblastic leukaemia.

Address this learning opportunity as the CSMO's clinical mentor, by:

2.1 Describing your approach to providing feedback to the CSMO.

2.2 Describe four common pitfalls to avoid when providing feedback to this CSMO.

3. Critical appraisal of research

Answer the following questions on the methods used in the linked article: Vos CJ, Verhagen AP, Passchier J, Koes BW. Impact of motor vehicle accidents on neck pain and disability in general practice. Br J Gen Pract. 2008;58(554):624–629. [homepage on the Internet]. c2016. Available from: http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2529200/

Introduction (5 marks)

1. What is the study design of this article? (1 mark)
2. List two advantages and two disadvantages of this study design (4 marks).

Method (16 marks)

3. What is/are the aim(s) of this study? (2 marks)
4. Calculate the response rate of the participants in this study (1 mark).
5. List any four exclusion criteria in this study (2 marks).
6. Define the standard deviation (SD) of the mean (1 mark).
7. What is the difference between the "reliability" and "validity" of a study? (2 marks)
8. Comment on the potential pitfalls of "oral consent" having been obtained from participants at the onset of this study (2 marks).
9. What percentage of the area is equivalent to 2 SDs before and after the mean in a normal (Gaussian) distribution? (1 mark)
10. Define odds ratio (OR), and how you would interpret it in a quantitative study (4 marks).

Results (15 marks)

11. How many patients were initially recruited for the study? (1 mark)
12. What was the age range of the male participants in the study? (1 mark)
13. How many participants in the sample were unemployed? (1 mark)
14. How many patients with neck pain following a motor vehicle accident did not have a headache? (1 mark)
15. What variables in Table 2 (in the linked article) are statistically significant, and what do they mean? (5 marks).
16. Focus on the multivariate analysis in Table 3 (in the linked article). What prognostic factors significantly correlate with continuous neck pain after one-year follow-up, and what do they mean in terms of the OR? (6 marks)

Study strengths and limitations (7 marks)

17. List the limitations (weaknesses) of this study (7 marks).

Take home message (7 marks)

18. What has this study added to your knowledge on the topic? (2 marks)
19. What issues should you consider before accepting the findings and implementing the recommendations of this study? (5 marks)

Model answers to the questions

Question 1

1.1 *Short answer:* Answer E

Long answer: 1.1 is indicative of metabolic alkalosis, which is commonly associated with:

- Loss of gastric acid from vomiting.
- Diuretic use, resulting in hypokalaemia.
- Burns, causing volume depletion.
- Antacid overdose.
- Primary hyperaldosteronism.

However, the patient in 1.1 was taking excessive antacids, which accounted for his raised bicarbonate level.

1.2 *Short answer:* Answer F.

Long answer: The assessment based on the clinical scenario in 1.2 suggests that the patient had hypovolaemia, resulting in lactic acidosis. The low partial pressure of carbon dioxide in the arterial blood (PCO_2) must have been the compensatory response. It is likely that the anion gap would have been high, if measured. Persistent vomiting may initially lead to metabolic alkalosis, but hypovolaemia and shock result in lactic acidosis. The PCO_2 and bicarbonate were abnormal in the same direction. Therefore, is less likely to be a mixed acid base disorder.

Causes of metabolic acidosis are subdivided into wide gap and normal gap anion metabolic acidosis.

The four main causes of wide gap anion metabolic acidosis are:

- Lactic acidosis.
- Renal failure.
- Ketoacidosis.
- Poisons (ethylene glycol, methanol and ethanol).

Causes of normal anion gap anion metabolic acidosis include:

- Infusing fluids with high concentrations of chloride.
- Diarrhoea or gastrointestinal fistulas.
- Renal tubular acidosis.

1.3 *Short answer:* Answer B.

Long answer: The primary disorder in 1.3 is acute respiratory alkalosis (low carbon dioxide or CO_2) due to hyperventilation. There was no time for metabolic compensation. The patient should have been given reassurance and asked to slow down her breathing. Some advocate breathing into a paper bag so that CO_2 is re-inhaled and the PCO_2 is normalised. Respiratory alkalosis results from hyperventilation. Other causes of respiratory alkalosis include:

- Salicylate overdose.
- High altitude.
- Pregnancy.
- Pain and anxiety.
- Inappropriate ventilator settings.

This question tests the following competency in the agreed unit standard 2 (available at http://www.collegemedsa.ac.za/view_exam.aspx?examid=102), i.e. evaluate a patient according to the bio-psycho-social approach. This includes taking a history, conducting an examination and assessment, and making a diagnosis in the setting of acute, chronic and emergency care.

When preparing for the FCFP (SA) Final Paper 1, note that EMQs or type R MCQs have four key components, *viz.:*

- A theme.
- An option list.
- A lead-in statement.
- At least two items.

Patient scenarios provide excellent formats for stems in Family Medicine. The lead-in generally begins with a phrase, such as "For each of the following patients…". Often, sets are organised around presenting symptoms, signs, diagnosis, investigations and management. In this example of an EMQ, the introductory phrase reads: "For each of the following patients with disturbances in their acid base balance…". The second part of the lead-in describes the task and the option set: "…select the blood gas result that is most likely to fit the clinical picture". The normal format of the EMQ is to define the theme, list the options, have the lead-in and then describe the stems. However, owing to the electronic marking system employed by the College of Medicine in South Africa, the format appears similar to that used for the single best answer questions. However, the essential elements of the EMQ remain the same.

Further reading:

- Kloeck WGJ, editor. A guide to the management of common medical emergencies in adults. 10th ed. Johannesburg: Academy of Advanced Life Support, 2015.
- Case SM, Swanson DB. Constructing written test questions for the basic and clinical sciences. 3rd ed. Philadelphia: National Board of Medical Examiners, 2001.

Question 2

The family physician is ideally placed within the facility or subdistrict to mentor and provide in-service clinical training to junior colleagues and the primary healthcare team. Often, the family physician is also tasked with the supervision of undergraduate and postgraduate students.

2.1 This scenario revolves around the need to conduct "a learning conversation" with the CSMO (clinical mentoring role). This conversation is facilitated by applying the clinical teaching tool of feedback. Feedback involves the recognition and identification of the gap between observed performance (an inadequate clinical evaluation) and the expected goal (an appropriate evaluation to identify the serious cause of the presenting complaint).

In this scenario, the CSMO failed to recognise the need for further assessment and workup of a child with splenomegaly and anaemia (the expected goal). Incorrect clinical management can lead to a delayed diagnosis and increased morbidity or mortality. Two of the family physician roles apply, namely those of clinical mentor and clinical governance. You are required to provide feedback to this CSMO in order to change his or her behaviour and clinical practice.

The following principles apply when providing feedback:

- *Process:* Feedback should be constructive and provided in an appropriate setting, while allowing the learner to provide input. You should both listen attentively and focus on the positive aspects. It is advisable in this scenario to complete the clinical management of the patient, then meet with the CSMO in a private space or room. First check both party's emotional and mental state. Check if the CSMO is ready to receive feedback (for example, is he or she post call?), and if you are ready to provide feedback (are you angry or disappointed as a result of the scenario?). Avoid delaying giving the feedback as timely feedback is more effective. Aim to be well-intentioned and supportive.
- *Content*: A "positive critique feedback sandwich" approach could be used. Start by asking the CSMO what went well, then list the positive aspects, for example: "It was good that you asked the mother to return with her child if he did not improve after the initial treatment". Next, ask the CSMO to identify specific areas for improvement, followed by your assessment. It is important to be specific when providing feedback. Avoid: "This patient received substandard care". Rather suggest: "An anaemic child requires a thorough clinical examination, with specific emphasis on an examination of the liver and spleen, as well as an assessment of the cause and type of anaemia".

Feedback should be based on observed behaviour as this adds to the credibility of your assessment. For example, you could tell the CSMO: "I have noticed that you have a very clear way of talking with the parents of paediatric patients, especially when explaining the management plan and safety netting".

Feedback without action is not feedback. The CSMO and you should agree on an action plan to address the gap. Ideally, he or she should direct the learning agenda. Encourage self-assessment and self-problem-solving. It may be that the CSMO is unable to suggest a practical solution to address the identified gap. You could make suggestions and mention alternatives as to how he or she could refine his or her approach to managing anaemia in children. For example, you could agree on the CSMO presenting this case for discussion during the level 2 paediatrician's next outreach visit, together with a review of the paediatric anaemia workup algorithm. This will provide an ideal platform for the CSMO to present his or her experience and freshest thinking on managing these paediatric patients.

Consider a written report or contract following the feedback session. This could be used to strengthen your relationship with the CSMO, and provide a base for follow-up conversations.

2.2 Mention any four of the following pitfalls.

Pitfall 1: Not spending enough time on initiation

The CSMO should be clear that this conversation with you involves feedback which focuses on his or her learning, i.e. a positive consequence. He or she should recognise the advantage of this learning opportunity. If a positive approach is not emphasised, he or she may not be able to recognise or believe in his or her ability to improve his or her clinical practice. This approach could be likened to the clinical skill of breaking bad news. Begin by preparing the other party for what you are about to say.

Pitfall 2: Phrases which minimise the effectiveness of feedback

Try and avoid the following types of phrases:

- *Obligation:* "It's my job to tell you this".
- *Standing on high moral ground:* "It's for your own good!"
- *Minimising:* "Don't worry. It happens".
- *Colluding:* "You're probably right. Perhaps I am overreacting".
- *Avoidance:* Taking too long to get to the point and covering irrelevancies.

Pitfall 3: Chat versus challenge

Feedback sessions should challenge the learner to face his or her learning needs and rise to a higher level of excellence. This is not a simple conversation aimed to console a colleague. By being specific, you will help the CSMO to focus on specific aspects for improvement. Also be open to being challenged yourself. Create a space for open dialogue.

Pitfall 4: Rescuing too soon

As good people, we may wish to avoid causing others distress. This is especially true when having a difficult conversation with a participant who expresses his or her emotions. We may feel tempted to avoid discussing the "full truth" or rephrasing important remarks. Remember the process and content principles of providing effective feedback.

Pitfall 5: Dampening down key constructive messages by overplaying the positive aspects

Sometimes, especially with the positive-negative-positive sandwich method of feedback, it can result in a mixed message being given. For example: "You have a good bedside manner, but your approach to managing the anaemia was inadequate. However, overall, you manage children well". A better approach would be: "You have a good bedside manner, but I wonder if you allowed enough time in the consultation to assess the abdomen and look for causes of the anaemia. I realise that the emergency centre environment is fast paced, but let's see if you can remain focused on your clinical method when eliminating serious causes for common symptoms. Does this sound reasonable?"

Pitfall 6: Overemphasising the negative

Avoid concentrating on the person's weak points. Remember to identify and highlight areas of strength which the CSMO could develop further.

Pitfall 7: Providing feedback on behaviour you have not observed

Avoid hearsay. This could lead to a breakdown of trust in the relationship. Remember that there are two sides to a story.

This question tests the following competency in the agreed unit standard (unit standard 4): http://www.collegemedsa.ac.za/view_exam.aspx?examid=102. This states that family physicians should be able to "facilitate the learning of others regarding the discipline of Family Medicine, primary health care and other health-related matters" as follows:

Demonstrate the role of the family physician as a teacher, mentor or supervisor by:

- Describing relevant principles of adult education and learning theory.
- Assessing the learning needs of others and planning educational activities.
- Conducting effective learning conversations in the clinical setting (clinical mentoring).
- Using educational technology effectively.
- Making an effective educational presentation.
- Facilitating small group learning.
- Eliciting course evaluation and feedback from participants and students.
- Applying the principles of student assessment.
- Applying evidence to the content and methods of teaching.

Further reading:

- Mash B. How to mentor a colleague. In: Mash B, Blitz J, editors. South African family practice manual. 3rd ed. Cape Town: Van Schaik, 2015; p. 600–602.
- Mehay R, editor. The essential handbook for GP training and education [homepage on the Internet). c2015. Available from: http://www.essentialgptrainingbook.com/
- Boud D. Feedback: ensuring that it leads to enhanced learning. Clin Teach. 2015;12(1):3–7.

Question 3

This question was used in the March 2015 FCFP(SA) written examination.

Answer the following questions on the methods used in the linked article: Vos CJ, Verhagen AP, Passchier J, Koes BW. Impact of motor vehicle accidents on neck pain and disability in general practice. Br J Gen Pract. 2008;58(554):624–629. [homepage on the Internet]. c2016. Available from: http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2529200/

Introduction (5 marks)

1. **What is the study design of this article? (1 mark)**

   This was a prospective cohort study, with one-year follow-up.

2. **List two advantages and two disadvantages of this study design (4 marks)**

   The two advantages and any two of the disadvantages (1 mark each) in Table 2 apply.

Table 2: The advantages and disadvantages of the study design

Advantages	Disadvantages
• The investigator was able to control data collection as the study progressed and could check the outcome event • Estimates of the risk obtained were true (absolute) risks for the studied groups • Many different disease outcomes could be studied simultaneously	• It was costly to execute (expensive) • It was a long time to wait before the results could be obtained • Only those risk factors defined and measured at the start of study could be used

Method (16 marks)

3. **What is/are the aim(s) of this study? (2 marks)**

   The aims of the study were to compare the differences in perceived pain and disability in patients with acute neck pain due to an motor vehicle accident versus other self-reported causes (1 mark), and to identify prognostic factors for continuous neck pain (1 mark).

4. **Calculate the response rate of the participants in this study (1 mark)**

   The response rate of the participants in this study is calculated as follows: 187/200 x 100 = 93.5%.

5. **List any four exclusion criteria in this study (2 marks)**

   Neck pain due to known vascular or neurological disorders, neoplasm, rheumatic conditions, cervical disc herniation and referred pain from internal organs (any of these 4 represent a ½ a mark each).

6. **Define the SD of the mean (1 mark)**

   It is the square root of the variance (it measures how much variation or dispersion exists from the average or mean of the expected values).

7. **What is the difference between the "reliability" and "validity" of a study? (2 marks)**

   Reliability refers to the reproducibility and consistency of the instrument (1 mark). Validity is an assessment of whether an instrument measures what it aims to measure (1 mark).

8. **Comment on the potential pitfalls of "oral consent" having been obtained from participants at the onset of this study (2 marks).**

   Obtaining only oral consent from the participants in the study can be unreliable as a participant may argue that his or her actions were misunderstood, and that he or she did not actually wish to consent to the study (1 mark).

   In addition, without written documentation signed by the participants, there is no proof that informed consent was given for participation in the study (1 mark).

9. **What percentage of the area is equivalent to 2 SDs before and after the mean in a normal (Gaussian) distribution? (1 mark)**

   The percentage of area equivalent to 2 SDs is equivalent to 95.4% of the distribution.

10. **Define odds ratio (OR), and how you would interpret it in a quantitative study (4 marks)**

    Definition (1 mark)

    OR is the odds of exposure in the diseased group divided by the odds of exposure in the non-diseased group. (An alternate answer is that OR is the odds of the risk factor in the diseased group divided by the odds of the risk factor in the non-diseased group).

    Interpretation: (3 marks)

    If the diseased group has lower odds, the OR will be less than 1 (not linked to disease, i.e. preventive) (1 mark).

    If the non-diseased group has lower odds, the OR will be more than 1 (exposure strongly linked to disease, i.e. harmful) (1 mark).

    If there is no difference between the two groups, the OR will be exactly 1 (i.e. no association between the exposure and disease) (1 mark).

Results (15 marks)

11. **How many patients were initially recruited for the study? (1 mark)**

    Two hundred and forty-nine patients with acute neck pain were initially recruited, of whom 190 responded. Three did not meet the inclusion criteria, so 187 formed the final cohort (sample).

12. **What was the age range of the male participants in the study? (1 mark)**

    ± 14.9 years, i.e. the age range was 28.3–58.1 years for the male participants.

13. **How many participants in the sample were unemployed? (1 mark)**

    (sample) – 148 (employed) = 39 (unemployed).

14. **How many patients with neck pain following a motor vehicle accident did not have a headache? (1 mark)**

    187 (sample) – 117 (those with a headache) = 70 (those without a headache) (1 mark).

15. **What variables in Table 2 (in the linked article) are statistically significant, and what do they mean? (5 marks)**

    The mean age (p = 0.007) (½ mark). The mean age of the motor vehicle accident subgroup (34.8 years) was younger than that for the remaining cohort (41.5 years) (½ mark).

    The percentage on sick leave (p = 0.037) (½ mark). More patients in the motor vehicle accident subgroup (36) were on sick leave than those in the remaining cohort (26) (½ mark).

Previous period of neck pain (p = 0.015) (½ mark). Fewer patients in the motor vehicle accident subgroup (45) experienced a previous period of neck pain, compared to those in the remaining cohort (65) (½ mark).

Additional headaches (p = 0.001) (½ mark). More patients in the motor vehicle accident subgroup (86) experienced additional headaches, when compared with those in the remaining cohort (56) (½ mark).

The mean Neck Disability Index (NDI) total score (p = 0.018) (½ mark). The mean NDI score in the motor vehicle accident subgroup (16.6) was higher than that for the remaining cohort (13.7) (½ mark).

16. **Focus on the multivariate analysis in Table 3 (in the linked article). What prognostic factors significantly correlate with continuous neck pain after one-year follow-up, and what do they mean in terms of the OR? (6 marks)**

Pain in the upper part of the neck = OR of 1.63 [95% confidence interval (CI):1.25–2.12] (1 mark).

Interpretation: The odds of continuous pain were approximately two times that in those with upper part neck pain (1 mark).

Duration of complaints ≥ 2 weeks (at first consultation) = OR of 5.31 (95% CI: 2.24–12.6) (1 mark).

Interpretation: The odds of continuous pain were five times that in those who complained for ≥ 2 weeks (1 mark).

Motor vehicle accident = OR of 5.34 (95% CI: 1.90–15.0) (1 mark). *Interpretation:* The odds of continuous pain were five times that in those with a history of motor vehicle accidents (1 mark).

CIs are important in the interpretation of ORs with respect to whether or not they include 1. Therefore, the model answer should include the CIs. The OR is not significant if the CI includes 1, which is the value reflecting "no effect" (no statistically significant correlation between the prognostic factor and continuous neck pain after one-year follow-up).

Study strengths and limitations (7 marks)

17. **List the limitations (weaknesses) of this study (7 marks)**

The sample size was small. Therefore, the external validity may be limited (1 mark).

The absence of a third subgroup for comparison purposes of patients with acute neck pain following a non-motor vehicle accident-related injury (1 mark).

The results may be flawed by non-response (i.e. the non-responders were mainly younger males) (1 mark).

Owing to selective non-response and incomplete follow-up, the generalisability of the results is limited (1 mark).

Only patients with a self-reported cause of neck pain in the current episode were included in the study (1 mark).

The exclusion of patients who did not have sufficient knowledge of Dutch from the study (selection bias) (1 mark).

Possible selection bias and overrepresentation of those with whiplash injuries in the study owing to its emotionally charged concept (1 mark).

Take-home message (7 marks)

18. **What has this study added to your knowledge on the topic? (2 marks)**

Neck pain as a consequence of a motor vehicle accident is more prevalent than other self-reported causes (1 mark).

Pain in the upper part of the neck, and complaints lasting ≥ 2 weeks enhance the possibility of long-lasting neck pain being experienced (1 mark).

19. **What issues should you consider before accepting the findings and implementing the recommendations of this study? (5 marks)**

Is this issue important to my practice? – Important to the practice (1 mark).

Are the findings valid? – Validity of the findings and results (1 mark).

To what extent are my patients similar to the study population? – Similarity to practice population (1 mark).

If I chose to change my practice, would the change be acceptable to my practice population? Acceptability to practice population (1 mark).

Would it be feasible (considering the availability of resources) to implement the changes? – Feasibility to implement the change (1 mark).

Further reading:

- Pather M. Continuing professional development. In: Mash B, editor. Handbook of family medicine. 3rd ed. Cape Town: Oxford University Press Southern Africa, 2011; p. 406–429.
- Davies HTO, Crombie IK. What are confidence intervals and p-values? University of Oxford, Medical Sciences Division [homepage on the Internet]. 2009. c2016. Available from: http://www.medicine.ox.ac.uk/bandolier/painres/download/whatis/what_are_conf_inter.pdf
- Resources. Centre for Evidenced Based Health Care [homepage on the Internet]. c2016. Available from: http://www.cebhc.co.za/teaching-resources/

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