

## **MRCPsych Paper 3 Critical Review – Evidence-Based Practice Syllabic Content**

**Outcome:** To make the optimal use of current best evidence in making decisions about the care of patients

### **1. Translation of clinical uncertainty into an answerable question**

- 1.1. formulates clinical questions using the PECO(t) formula (Patient, exposure/intervention, comparison, outcome, time)
- 1.2. recognises and formulates different types of clinical questions:
  - 1.2.1. therapy
  - 1.2.2. harm
  - 1.2.3. aetiology
  - 1.2.4. prognosis
  - 1.2.5. diagnosis
  - 1.2.6. economic
  - 1.2.7. qualitative

### **2. Systematic retrieval of the best available evidence**

- 2.1. Knows the different sources of evidence
- 2.2. Describes the “hierarchy of evidence” as it applies to different types of questions
- 2.3. Describes what is meant by:
  - 2.3.1. publication bias; and
  - 2.3.2. language of publication bias
- 2.4. Describes the difference between the following electronic databases:
  - 2.4.1. Cinahl
  - 2.4.2. Cochrane Library
  - 2.4.3. EMBASE
  - 2.4.4. PsycINFO
  - 2.4.5. Pubmed
  - 2.4.6. Sigle
- 2.5. Knows how research is catalogued and strategies for efficient retrieval
- 2.6. Searches efficiently and effectively:
  - 2.6.1. PubMed (Medline); and
  - 2.6.2. The Cochrane Library.

### **3. Critical appraisal of the evidence**

#### **3.1. Basic epidemiology**

- 3.1.1. Describes what is meant by
  - 3.1.1.1. Systematic error (selection and measurement bias)
  - 3.1.1.2. Random error (chance)
  - 3.1.1.3. Internal validity and external validity
- 3.1.2. Describes sources of bias and strategies to overcome them
- 3.1.3. Describes what is meant by reliability, specifically:
  - 3.1.3.1. inter-rater reliability
  - 3.1.3.2. test-retest reliability
- 3.1.4. Describes what is meant by validity, specifically:
  - 3.1.4.1. construct validity
  - 3.1.4.2. content validity
  - 3.1.4.3. face validity
  - 3.1.4.4. criterion validity (concurrent and predictive validity)
- 3.1.5. Describes different approaches to sampling:
  - 3.1.5.1. simple random
  - 3.1.5.2. stratified random
  - 3.1.5.3. systematic
  - 3.1.5.4. cluster
- 3.1.6. Describes confounding and strategies to reduce the risk of confounding:
  - 3.1.6.1. Randomisation
  - 3.1.6.2. Restriction
  - 3.1.6.3. Matching
  - 3.1.6.4. adjustment using stratification or multivariable regression models
- 3.1.7. Describes allocation concealment and methods of randomization:
  - 3.1.7.1. Stratification
  - 3.1.7.2. Minimization
  - 3.1.7.3. Cluster
  - 3.1.7.4. Block
- 3.1.8. Knows how blinding can reduce measurement bias
- 3.1.9. Describes approaches for arguing a cause and effect relationship (Koch, Hill, Rothman, Susser)
- 3.1.10. Knows the benefits and weaknesses of different quantitative study designs to address different clinical questions:
  - 3.1.10.1. cross-sectional study design
  - 3.1.10.2. cohort studies
  - 3.1.10.3. case-control
  - 3.1.10.4. randomised controlled trials (parallel, equivalence, cluster)
  - 3.1.10.5. systematic reviews
  - 3.1.10.6. ecological survey
  - 3.1.10.7. no1 clinical trials.

## **3.2. Basic biostatistics**

### **3.2.1.** Knows that there are different types of data:

- 3.2.1.1. Categorical (ordinal, nominal, dichotomous)
- 3.2.1.2. Continuous

### **3.2.2.** Interprets summary measures

- 3.2.2.1. Proportion
- 3.2.2.2. Mean
- 3.2.2.3. Median
- 3.2.2.4. Mode
- 3.2.2.5. Range
- 3.2.2.6. interquartile range
- 3.2.2.7. standard deviation

### **3.2.3.** Interprets simple tabular presentations:

- 3.2.3.1. 2x2 table
- 3.2.3.2. frequency table
- 3.2.3.3. frequency distribution

### **3.2.4.** Interprets graphical presentations:

- 3.2.4.1. bar chart
- 3.2.4.2. histogram
- 3.2.4.3. pie chart
- 3.2.4.4. scatter plot
- 3.2.4.5. box plot

### **3.2.5.** For studies evaluating diagnostic accuracy, estimates the characteristics of a test:

- 3.2.5.1. sensitivity
- 3.2.5.2. specificity
- 3.2.5.3. likelihood ratios (positive and negative)

### **3.2.6.** For studies evaluating diagnostic accuracy, estimates the characteristics of a sample

- 3.2.6.1. Prevalence
- 3.2.6.2. positive predictive value
- 3.2.6.3. negative predictive value

### **3.2.7.** For studies evaluating diagnostic accuracy, applies the results of a test to another population using likelihood ratios and nomograms

### **3.2.8.** Interprets Receiver Operating Characteristic Curves

### **3.2.9.** Describes what is meant by:

- 3.2.9.1. prevalence
- 3.2.9.2. cumulative incidence
- 3.2.9.3. incidence rates

### **3.2.10.** Interprets "survival" curves

- 3.2.10.1. median "survival"
- 3.2.10.2. relative survival
- 3.2.10.3. Kaplan-Meier plots

### **3.2.11.** Interprets mortality statistics

- 3.2.11.1. crude death rate, death rate, mortality rate
- 3.2.11.2. age adjusted death rate
- 3.2.11.3. standardized mortality ratio

- 3.2.11.4.
- 3.2.12. Calculates and interprets measures of treatment impact:
  - 3.2.12.1. odds ratios
  - 3.2.12.2. absolute risk reduction
  - 3.2.12.3. absolute benefit increase
  - 3.2.12.4. relative risk reduction
  - 3.2.12.5. relative benefit increase
  - 3.2.12.6. number-needed to treat
  - 3.2.12.7. number needed to harm
- 3.2.13. Knows what is meant by sampling variability and the use of the standard error in statistical inference
- 3.2.14. Describes what is meant by hypothesis testing (null and alternative hypotheses).
- 3.2.15. Describes hypothesis testing as applied to parametric and non-parametric data.
- 3.2.16. Describes when to use and able to interpret (but not calculate) hypothesis tests using:
  - 3.2.16.1. the chi-square test
  - 3.2.16.2. fisher's exact test
  - 3.2.16.3. McNemar's test
  - 3.2.16.4. t-test (paired and unpaired)
  - 3.2.16.5. ANOVA
  - 3.2.16.6. ANCOVA
  - 3.2.16.7. Wilcoxon matched pairs signed rank test
  - 3.2.16.8. Mann-Whitney U test
  - 3.2.16.9. Kruskal-Wallis test.
- 3.2.17. Interpret and explains confidence intervals for:
  - 3.2.17.1. means
  - 3.2.17.2. proportions
  - 3.2.17.3. differences between means
  - 3.2.17.4. differences between proportions
- 3.2.18. Knows what is meant by:
  - 3.2.18.1. Type I error
  - 3.2.18.2. Type II error
  - 3.2.18.3. power
  - 3.2.18.4. sample size
- 3.2.19. Describes the advantage of confidence intervals over  $p$  values
- 3.2.20. Interprets correlation coefficients and their significance:
  - 3.2.20.1. Spearman's
  - 3.2.20.2. Pearson's
- 3.2.21. Interprets the results from regression analysis:
  - 3.2.21.1. simple linear
  - 3.2.21.2. multiple
  - 3.2.21.3. logistic
- 3.2.22. Knows what is meant by Intention to Treat Analysis and understand different ways of handling missing data:
  - 3.2.22.1. Last observation carried forward
  - 3.2.22.2. sensitivity analysis
  - 3.2.22.3. multiple imputation
  - 3.2.22.4. best case analysis

- 3.2.22.5. worst case analysis
- 3.2.23. Describes the role and limitations of meta-analysis to improve power and robustness of research
- 3.2.24. Describes the difference between fixed and random effect models
- 3.2.25. Recognise statistical heterogeneity:
  - 3.2.25.1. visual inspection of forest plots
  - 3.2.25.2. chi-square test
  - 3.2.25.3. Galbraith plot
- 3.2.26. Describes the role of sensitivity analysis in meta-analysis.

### **3.3. Basic Health Economics**

- 3.3.1. Describes the basic differences between direct and indirect costs and the ways in which they can be estimated
- 3.3.2. Knows what is meant by:
  - 3.3.2.1. cost-effectiveness
  - 3.3.2.2. cost-utility analysis
  - 3.3.2.3. cost-benefit analysis
  - 3.3.2.4. cost-minimisation
- 3.3.3. Knows what is meant by a quality or disability adjusted life year and the rationale for using these measures
- 3.3.4. Describes opportunity cost
- 3.3.5. Describes different approaches to discounting
- 3.3.6. Knows what is meant by the term 'sensitivity analysis' in the context of an economic evaluation

### **3.4. Qualitative Methods**

- 3.4.1. Knows when to apply qualitative research methodologies:
  - 3.4.1.1. grounded theory
  - 3.4.1.2. phenomenological
  - 3.4.1.3. ethnographic
- 3.4.2. Describes additional approaches to sampling in qualitative studies:
  - 3.4.2.1. Purposive
  - 3.4.2.2. Convenience
  - 3.4.2.3. Snowball
- 3.4.3. Describes different approaches to data gathering in qualitative studies:
  - 3.4.3.1. focus groups
  - 3.4.3.2. interviews
- 3.4.4. Describes the role of qualitative methodologies in instrument (i.e. screening, diagnostic, outcome measure) development
- 3.4.5. Describes methods for validating qualitative data:
  - 3.4.5.1. triangulation
  - 3.4.5.2. member checking
- 3.4.6. Describes methods for minimising bias:
  - 3.4.6.1. reflexivity
  - 3.4.6.2. bracketing
- 3.4.7. Describes methods of analyzing data
  - 3.4.7.1. content analysis
  - 3.4.7.2. constant comparison
- 3.4.8. Describes data saturation

### **3.5. Guideline and protocol development**

- 3.5.1. Describes the process for developing NICE and SIGN guidelines
- 3.5.2. Describes the advantages and limitations of guidelines and protocols

### **3.6. Critical appraisal**

- 3.6.1. Diagnostic questions
  - 3.6.1.1. Describes the STARD statement for reporting studies of diagnostic accuracy
  - 3.6.1.2. Critically appraises cross-sectional studies as used to address questions of prevalence and diagnostic accuracy.
- 3.6.2. Prognosis questions
  - 3.6.2.1. Critically appraise cohort studies as used to address prognostic questions
- 3.6.3. Therapy, harm and aetiology questions
  - 3.6.3.1. Describes the CONSORT statement: recommendations for improving the quality of reports of parallel-group randomized trials.
  - 3.6.3.2. Critically appraises randomised controlled trials, cohort and case control studies as used to address therapy, harm and aetiology questions.
- 3.6.4. Economic evaluations
  - 3.6.4.1. Critically appraises economic evaluations
- 3.6.5. Qualitative analysis
  - 3.6.5.1. Critically appraises qualitative research
  - 3.6.5.2. Critically appraises mixed methods research
- 3.6.6. Systematic reviews and meta-analysis
  - 3.6.6.1. Describes the QUORUM statement for Improving the quality of reports of meta-analyses of randomized controlled trials
  - 3.6.6.2. Critically appraises a systematic review
- 3.6.7. Guidelines and protocols
  - 3.6.7.1. Critically appraises clinical practice guidelines

## **4. Application of the results in practice**

- 4.1 Describes strategies for enabling the patient to make an informed decision

## **5. Evaluation of performance**

- 5.1 Describes audit, change planning, feedback, and other elements of PDSA (Plan, Do, Study, Act) cycles, and their implications for clinical governance

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