COMMITTEE FOR EXAMINATIONS

Guideline for Critical Analysis Problems

The Royal Australian & New Zealand College of Psychiatrists

The following is provided as a guide to the knowledge that may be assessed in the CAP component of the written examinations. In some areas, the level of knowledge that may be tested may also be indicated.

1. Ethical issues in trial design and methodology

2. The attributes, advantages and disadvantages (including potential for bias) of different types of research studies:
- 2.1 Retrospective, prospective, cross-sectional
- 2.2 Descriptive observational studies (e.g. case reports, clinical audit, surveys, qualitative research studies)
- 2.3 Analytic observational studies (e.g. case-control, cohort)
- 2.4 Experimental studies (e.g. randomized controlled trials (including methods of randomization), open trials, cross-over trials)
- 2.5 Economic analyses (e.g. cost-effectiveness)
- 2.6 Systematic reviews and meta-analyses

3. Randomisation:
- 3.1 Methods
- 3.2 Designs

4. Controls and blinding:
- 4.1 Selection
- 4.2 Types

5. Bias:
- 5.1 Sources
- 5.2 Types
- 5.3 Strategies to minimize
- 5.4 Consequences

6. What information regarding trial methodology and analysis should be reported, and limitations to the validity, reliability and generalisability of the results, e.g.:
- 6.1 Recruitment
- 6.2 Drop-outs
- 6.3 CONSORT plots

7. Basic descriptive statistics:
- 7.1 Type of data (e.g. nominal, ordinal)
- 7.2 Ratios (e.g. SMR, OR, prevalence, incidence)
- 7.3 Mean
- 7.4 Median
- 7.5 Mode
- 7.6 Descriptions of range
- 7.7 SD and SEM
- 7.8 Confidence intervals
- 7.9 Distribution (e.g. normal/non-normal)

8. Concepts around probability and significance:

8.1 Power
8.2 Type I and II errors
8.3 Effect size

9. Analytic statistics; hypothesis testing, comparing one or more groups; choice and interpretation of appropriate tests (parametric and non-parametric): (In Depth Knowledge or Working Knowledge required as shown)

9.1 Dependent and independent variables (IDK)
9.2 T-test (IDK)
9.3 Chi square (IDK)
9.4 Mann-Whitney U test (WK)
9.5 Wilcoxon's rank sum (WK)
9.6 McNemar's test (WK)
9.7 ANOVA (WK)
9.8 Kruskal-Wallis ANOVA (WK)
9.9 ANCOVA (WK)
9.10 MANOVA (WK)
9.11 Bonferroni correction (IDK)

10. Measures of association, when each is appropriately applied and how to interpret the result: Reliability and validity of measures

10.1 Kappa
10.2 Regression
10.3 Correlation (e.g. Spearman's)
10.4 Odds ratios

11. How to interpret the results of a survival analysis (e.g. Kaplan-Meier curve, Cox Proportional Hazards Model). Note: an understanding of the principle of the test and how to interpret the results is required, rather than an in-depth knowledge of the test itself.

12. Medical applications of statistical analysis:

12.1 NNT
12.2 NNH
12.3 PPV
12.4 NPV
12.5 Sensitivity
12.6 Specificity

13. The reporting of findings:

13.1 Ability to read and understand tables of results
13.2 Ability to apply the statistical measures reported in Tables and Figures to the interpretation of findings (e.g. using reported confidence intervals, effect sizes, odds ratios, probability levels to identify significant findings)
13.3 Ability to interpret Forest Plots, Survival Curves and other commonly used graphical representations of statistical analyses that have employed the tests referred to in this syllabus

14. The application of findings to clinical practice:

14.1 Effect of bias on reliability and generalization of results (inc publication bias)
14.2 Validity of a study (design, methodology, measures used, subjects etc.)
14.3 Importance of findings
14.4 Generalisability of findings
14.5 NHMRC levels of evidence

15. Qualitative research

15.1 When is qualitative research appropriate or best approach
15.2 Is the method appropriate to the research question being asked
15.3 Methodologies (phenomenological, hermeneutic, grounded theory, ethnographic/participant observation and others)
15.4 Sampling: method and justification (e.g. purposive, extreme, homogeneous, opportunistic); sample sizes; recruitment
15.4 Data collection (clear and transparent process; flexibility and responsiveness to social context) The means of data generation must be specified. Data may derive from interview, participant observation, examination of documents, etc.
15.5 Reflexivity
15.6 "Thick" description (provides context; interviewer experience and attitudes as process)
15.7 Analysis (appropriateness; examples chosen; moving from data to interpretation)
15.8 Discussion: aim is to make logical generalizations to a theoretical understanding of a similar class of phenomena
15.9 Transferability (i.e. whether another informed person following the same decision trail would arrive at similar conclusions). Related notions of auditability, credibility, trustworthiness.

References

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4. NHMRC (2000) *How to Use the Evidence: Assessment and Application of Scientific Evidence*. Canberra: Commonwealth of Australia. Available at: www.nhmrc.gov.au/publications/synopses/cp65syn.htm

5. NHMRC (2009) *NHMRC levels of evidence and grades for recommendations for developers of guidelines*. Canberra: Commonwealth of Australia. Available at: http://www.nhmrc.gov.au/guidelines/resources-guideline-developers

6. Kuper A, Lingard L, and Levinson W (2008) Critically Appraising Qualitative Research. *BMJ* 20 Sept. 687-9. doi:10.1136/bmj.a.1035.

7. Cote L and Turgeon J (2005) Appraising qualitative research articles in medicine and medical education. *Medical Teacher* 27(1):71-75

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