Research Skills

Module 10

Framework for technical evaluation of chosen articles

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Article Summary *(complete an Article Summary for each of the articles you selected from your literature search (between 5 and 15 articles) and attach it to the front of each of your articles. You can complete this by hand or type it in PowerPoint by copying this template.*

Author(s):
Title of article:
Date of publication:
Publisher:
Date accessed on internet (if applicable):
Internet URL (if applicable):

Research design (How was the research done?)

Tick the most applicable box

[ ] Experimental
[ ] Observational
[ ] Other, please specify:

Quantitative *Tick the most applicable box*	**Evidence level**
[ ] Meta-analysis	1
[ ] Systematic review	1
[ ] Randomised controlled trial	1
[ ] Cohort study	2
[ ] Case/Control study	3
[ ] Cross-sectional study	4
[ ] Case series	4
[ ] Case report	5
[ ] Editorials and/or opinions	5
[ ] Animal and/or laboratory studies	

Qualitative
Tick the most applicable box

[ ] Qualitative meta-synthesis
[ ] Ethnography
[ ] Grounded theory
[ ] Interpretative phenomenological analysis
[ ] Discourse analysis
[ ] Content analysis
[ ] Framework analysis

Tick the most applicable box	**Evidence level**
[ ] Generalisable studies	1
[ ] Conceptual studies	2
[ ] Descriptive studies	3
[ ] Single Case study	4

Target population:

Factor(s) being studied:

Response/participation rate: _____
Number of drop-outs: _____
If Controls were used, were they matched to the Cases or Intervention group? [ ] YES [ ] NO [ ] Don't know

Sample details

Total sample size:
Number of males (if known):
Number of females (if known):

Age range (if known):

Sampling method:
Tick the box that most applies
[ ] Simple random sample
[ ] Stratified random sample
[ ] Multi-stage sample
[ ] Convenience sample
[ ] Ad hoc sampling (volunteerism)
[ ] Systematic sampling
[ ] Free random assignment
[ ] Matched random assignment
[ ] Balanced assignment
[ ] Cluster sampling
[ ] Purposive sampling
[ ] Snowball sampling

Inclusion and Exclusion criteria **(This information can usually be found in the Methods section of the article.)**

Inclusion criteria describe the attributes/characteristics of study participants that were essential for their selection to participate. The purpose of using inclusion criteria is to try to remove the influence of specific confounding variables by not introducing them to the sample.

What was the inclusion criteria used? (If none used, write "none used".)

Exclusion criteria describe the characteristics that made a person/subject ineligible to participate in the study or required the removal of their data from the study, such as failure to adhere to pre-test requirements, or changes to health and lifestyle habits during the study that would affect the factor under study.

What was the exclusion criteria used? (If none used, write "none used".)

Data collection method(s)

Tick the box(es) that apply

[ ] Self-completion questionnaire
[ ] Interview based questionnaire
[ ] Structured interview
[ ] Unstructured interview
[ ] Focus group(s)
[ ] Observation
[ ] Experiment

What outcomes or variables were measured/collected and how?

1.

2.

3.

4.

5.

6.

7.

8.

Statistical analysis (To answer these questions read the Methods section of the Abstract at the beginning of the article, and the Methods section in the article, and look at the tables of data in the Results section of the article.)

What statistical software was used?

Was the data normally (parametrically) distributed? [ ] YES [ ] NO (This is often stated in the Methods section of the article or the other way to know is to look at the size of the standard deviation s(SD) in the Results section and if the value of the SD is around half or more of the mean (the average), then the data is not normally distributed. This does not make the data wrong or bad, it just means that analysis techniques that assume normality such as means, standard deviations, t-tests and Pearson correlations, should not be used unless it is also stated that the data was transformed in some way such as a log transformation to make its distribution more normal (fit the bell curve shape when graphed). Methods suitable for data that is not normally distributed (termed non-parametric), include techniques that use the median, interquartile range, percentiles, Z-tests, chi-square tests, Spearman correlations, and logistic regression.)

What type of statistical analysis was conducted? ***Tick the boxes below which apply. You can tick as many boxes as apply as usually more than one method of statistical analysis is used.***

Descriptive

[ ] Mean (assumes normal distribution)
[ ] Median
[ ] Mode
[ ] Range
[ ] Inter-quartile range
[ ] Percentiles
[ ] Standard deviation (assumes normal distribution)
[ ] Standard error (assumes normal distribution)
[ ] Other, please specify: _____

Inferential

[ ] T-Tests (assumes normal distribution)
[ ] Z-tests
[ ] Chi-Square
[ ] Pearson Correlation (assumes normal distribution)
[ ] Spearman Correlation
[ ] Regression
[ ] Analysis of variance (ANOVA)
[ ] Receiver Operating Curve
[ ] Hypothesis testing (assumes random sample)
[ ] Other, please specify: _____

Statistical analysis (To answer these questions read the Methods section of the Abstract at the beginning of the article, and the Methods section in the article, and look at the tables of data in the Results section of the article.)

Were any confounders identified by the authors? [ ] YES [ ] NO (Confounders are factors that impact on the result(s) obtained but were not part of question/factor under investigation, and can often be linked to a bias in the sample design, or measurement method, or the type of people responding to a survey or volunteering to participate in an experiment. The most common confounders are variables such as age and sex because these can change a persons responses/outcomes independently of the factor under study.)

If confounders were identified, what were they and what was done to adjust for them/cancel out their impact on the results obtained?

1.

2.

3.

4.

5.

Did you identify any confounders that were not identified by the authors of the study? [ ] YES [ ] NO

If you did identify one or more confounders, what were they?

Results (This information can be found in the Results section of the abstract of the article and the Results section and Discussion section of the full article.)

What were the main results/main findings of the study? Include P values, Standard Deviations and Confidence Intervals for the results obtained, if they were included in the article.

	Variable name	Result	Standard Deviation (SD)	Confidence Interval (CI)	P value
1.					

What does this mean? _____

2.					

What does this mean? _____

3.					

What does this mean? _____

4.					

What does this mean? _____

5.					

What does this mean? _____

Conclusions

What were the conclusions of the study?

Do you believe the author(s)' conclusions were supported by the results obtained? (Look back at your results sheet and check if the results support the conclusions/claims made by the authors.) If "yes", then write why they were supported. If "no", then write why they were not supported.

Looking at the results, what alternative conclusions (if any) would you make?

Bias (Details of this can sometimes be found in the Methods or Discussion section of an article, otherwise it is something that you form your own suspicions/belief about while reading the article. It is not unusual for authors to not state the presence of bias, as they want their article to be published and therefore want the research to appear perfect.)

Source of descriptions of bias: Indrayan, A. VARIETIES OF BIAS TO GUARD AGAINST. MedicalBiostatistics.com. Available from: http://www.medicalbiostatistics.com/Types%20of%20bias.pdf

Tick the boxes which apply.

[ ] **Bias in concepts**: Lack of clarity about the concepts that are to be used in the proposed research. This gives an opportunity to the investigators to use subjective interpretation that can vary from person to person. Sometimes the logic used can be faulty and sometimes the premise itself of the logic can be incorrect.

[ ] **Definition bias**: The study subjects should be sharply defined so that there is no room for ambiguity. Blurred definition gives room to the assessor to use subjective interpretation that can affect the validity of the study.

[ ] **Bias in design**: This bias occurs when the case group and control group are not properly matched, and the confounding factors are not properly accounted for at the time of analysis.

[ ] **Bias in selection of subjects**: This occurs when the subjects included in the study are not truly representative of the target population. This can happen either because the sampling was not random, or because sample size is too small to represent the entire spectrum of subjects in the target population. Studies on volunteers always have this kind of bias.

[ ] **Instruction bias**: When unclear or no instructions are prepared, the investigators use discretion and this can vary from person to person, and from time to time.

[ ] **Bias due to confounder**: Failure to take proper care of the confounders so that any difference or association cannot be fully ascribed to the antecedent factors under study.

[ ] **Interviewer bias**: Interviewer bias occurs when one is able to elicit better response from one kind of respondent relative to another.

[ ] **Observer bias**: This bias occurs when the observer unwittingly (or even intentionally) exercises more care about one type of responses or measurements such as those supporting a particular hypothesis than those opposing this hypothesis.

[ ] **Instrument bias**: This bias occurs when the measuring instrument is not properly calibrated or designed. A scale may be biased to give a higher reading than actual, or lower than actual.

[ ] **Hawthorne effect**: If a subject knows that he is being observed or being investigated, their behaviour and response can change.

[ ] **Recall bias**: There are two types of recall bias. One type of recall bias arises from better recall by respondents of recent events than those events occurring a long time ago. The second type of recall bias occurs because emotionally/psychologically significant events are easier to recall than events of lesser significance or non-significant events.

[ ] **Response bias**: If the subjects/respondents are able to exchange notes, the response to questions might alter, in some cases might even be uniform. Response bias also comes under information bias.

[ ] **Repeat testing bias**: In a pre-test-post-test situation, the subjects/respondents tend to remember some of the previous questions and they may remove previous errors in post-test, and thus do better. Observer may also acquire expertise second or third time to elicit correct response. Conversely fatigue may set in repeat testing that could alter the response.

[ ] **Digit preference**: It is well known that almost all of us have a special love for digits 0 and 5. Measurements are more frequently recorded ending with these digits. A person of age 69 or 71 is very likely to report their age as 70 years. Another manifestation of digit preference is in forming intervals for quantitative data.

[ ] **Bias due to nonresponse**: Some individuals selected as participants may refuse to cooperate/participate from the beginning or may drop-out of the study. Non-respondents create two types of impacts on the responses. First, they are generally different from those who respond, and their exclusion can lead to biased result. Second, Non-response reduces the sample size which can decrease the power of the study to detect differences or associations.

[ ] **Attrition bias**: Differential non-response in various groups. The pattern of non-response can differ from one group to the other.

[ ] **Bias in handling outliers**: No objective rule is available to label a value as outlier except a guideline that the value must be far away from the mainstream values. If the duration from HIV infection to development of AIDS is mostly between 6 and 10 years, some researchers would call 16 years as outlier and exclude it on the suspicion of being wrong reporting, and some would include in their calculation. Some would not exclude any outlier, however different it might be. Thus the results would vary.

[ ] **Recording bias**: Two types of errors can occur in recording. One bias arises due to inability to properly decipher the notes on participant sheets. Second is due to carelessness of the investigator such as number reversals and incorrect recording of values and responses when the dependence is on memory that can fail to recall the correct response/code/value.

[ ] **Bias in analysis**: This bias can be of two types. First is the gearing of analysis to support a particular hypothesis. For example, while comparing pre- and post- values such as blood iron level before and after weekly supplementation of iron, the increase may be small that will not be detected by comparison of means. But it may be detected when evaluated as proportion of subjects with level <10 mg/dl before and after supplementation. The second can arise due to differential P-values. When P = 0.055, one researcher can straight refuse to say that it is significant at 0.05 level and the other can say that it is marginally significant. Some researchers may change the level of significance from 5 percent to 10 percent if the result is to their liking.

[ ] **Bias due to lack of power**: Statistical tests are almost invariably used to check the significance of differences or associations. The power of these tests to detect difference or association depends to a large extent on the number of subjects included in the study (the sample size). If the study is conducted on small sample, even a big difference cannot be detected, leading to a false negative conclusion. When conducted on an appropriate number of subjects, the conclusion can change.

[ ] **Interpretation bias**: This bias is the tendency among some research workers to interpret the results in favour of a particular hypothesis ignoring the opposite evidence. This can be intentional or unintentional.

[ ] **Reporting bias**: Researchers are human beings. Some can create a report such that it gives the anticipated result yet still is based on the evidence. It is easy to suppress the contradictory evidence by not talking about it.

[ ] **Bias in presentation of results**: Scale for a graph can be chosen to depict a small change look like a big change, or vice-versa. The second is that the researcher may merely state the inconvenient findings that contradict the main conclusion but does not highlight them in the same way as the favourable findings.

[ ] **Publication bias**: Many journals are much too keen to publish reports that give a positive result regarding efficacy of a new regimen, compared to the negative trials that did not find any difference. If a 'vote count' is done on the basis of the published reports, positive results would hugely outscore the negative results, although the fact may be just the reverse.

[ ] **Any other bias** that you believe is present that was not included in the list? Please specify: _____

External and Internal validity

External validity (outside the study): based on the purpose for which the study will be used, does the study ask an appropriate research question? Closely connected with generalisability or applicability of the study findings – does the same thing happen in other settings?

Does the study have external validity? If "yes", then write why the study has external validity. If "no", then write why the study does not have external validity.

Internal validity (inside the study): does the study answer the research question in a manner free from bias - was the research done right? Frequently referred to as assessments of methodological quality.

Does the study have internal validity? If "yes", then write why the study has internal validity. If "no", then write why the study does not have internal validity.

Source: www.indiana.edu

What are the limitations of this study?

What are the weaknesses of this study? What has been done poorly or could have been done better?

What are the strengths of this study? What has been done well?

Based on your Article Summary, do you believe the results published in this article to be reliable?

[ ] YES [ ] NO

Author, Date, Name of paper **(Who did it? When was it done? What was its name?)**	*Research methodology* **(How was it done?)**	*Data collection method*	Statistical analysis	*Key results & Conclusions (***What happened and what did they find out?)**	*Strengths & Weaknesses* **(What was done well and what needs improvement?)**
Author(s): Date: Title:	Research design: Target population: Factor being studied: Sample size: Males: Females: Total: Ages: Response rate: [	[ ] Self-completion questionnaire [ ] Interview based questionnaire [ ] Structured interview [ ] Unstructured interview [ ] Focus group(s) [ ] Observation [ ] Experiment What outcomes were measured and how?			Bias: Representativeness of the sample: Statistical power:

CASP Quality checklist

Screening questions

1. Was there a clear statement of the aims of the research?
2. Is a qualitative methodology appropriate?

Is it worth continuing?

Detailed questions

3. Was the research design appropriate to address the aims of the research?
4. Was the recruitment strategy appropriate to the aims of the research?
5. Were the data collected in a way that addressed the research issue?
6. Has the relationship between researcher and participants been adequately considered?
7. Have ethical issues been taken into consideration?
8. Was the data analysis sufficiently rigorous?
9. Is there a clear statement of findings?
10. How valuable is the research?

Source: Samsi, K. Critical Appraisal of Qualitative Research. Available from: https://www.kcl.ac.uk/sspp/policy-institute/scwru/pubs/2012/conf/samsi26jul12.pdf