

# How to critically read scientific papers

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# Learning Outcomes

At the end of the session, participants will be able to

- Be familiar with examples of studies from HDSS
- Understand ways to assess the methodological quality of scientific papers
- Critically evaluate the scientific papers for their methodological quality

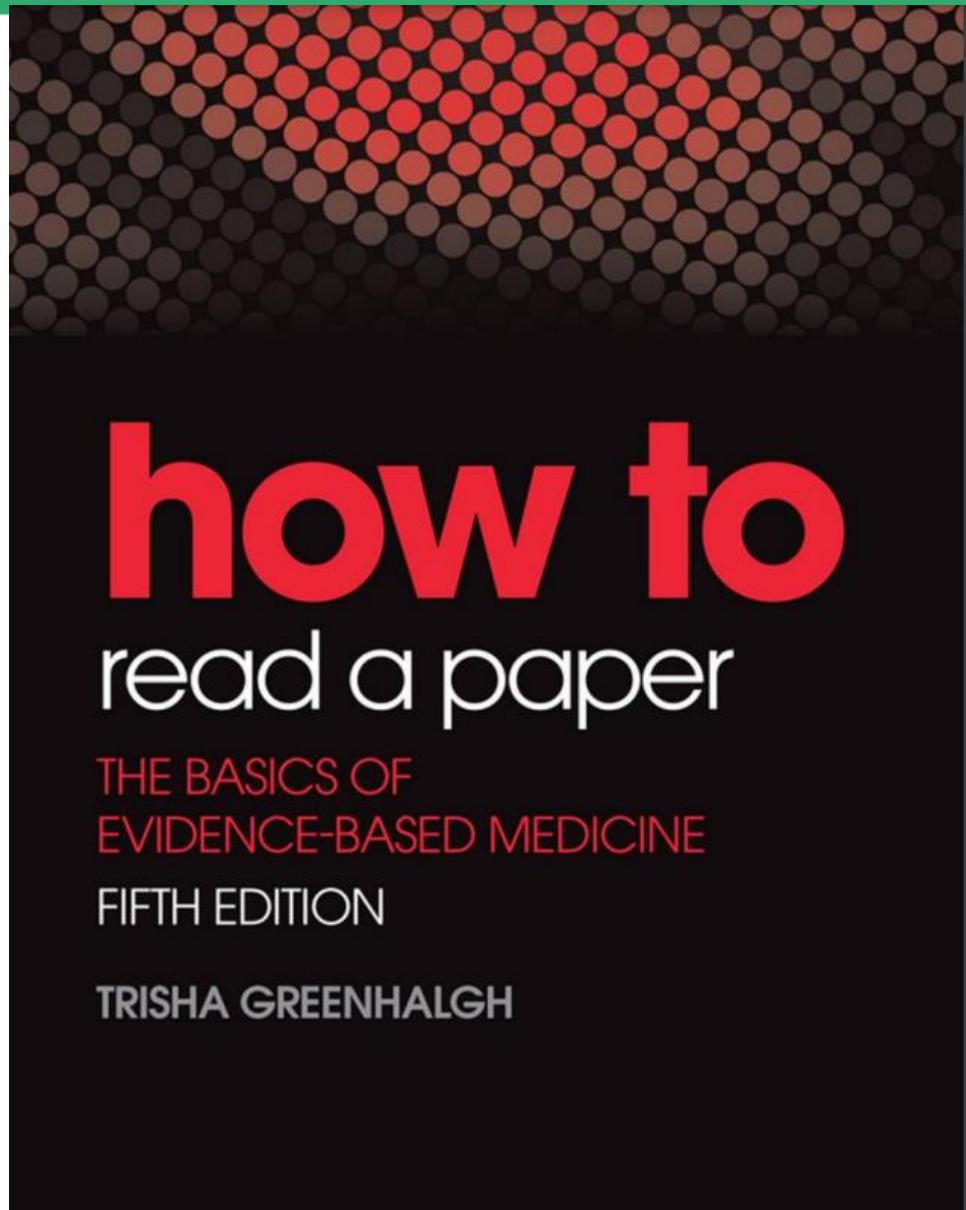
# Approach

- Power point presentation,
- Critical reading group exercise,
- Group presentations and discussion

# Reading material

[https://www.mazums.ac.ir/Dorsapax/Data/Sub\\_30/File/read%20papers.pdf](https://www.mazums.ac.ir/Dorsapax/Data/Sub_30/File/read%20papers.pdf)

More literature at the end of this slide



# Critical reading



## What is critical reading?

- It is the systematic and careful examination of written materials in order to make a judgment about its trustworthiness, value, and relevance to a specific subject /context
- Critical appraisal



## Why?

- Evidence based decision making
- Not all studies have the required methodological rigor
- Applicability of a research finding

# Tools for critical appraisal

Critical Appraisal Skill Program

<https://casp-uk.net/casp-tools-checklists/>

JBI critical appraisal tools

<https://jbi.global/critical-appraisal-tools>

Mixed method appraisal tool

<http://mixedmethodsappraisaltoolpublic.pbworks.com/w/page/24607821/FrontPage>

# Introduction to group work

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# Instructions for critical reading

- You will be divided into seven groups.
- All participants must critically read all the papers and report in the seminar
- Provide a brief summary of your paper, including:
  - What new knowledge the paper provides
  - Comment on strengths and weaknesses of the paper
  - Provide a brief final judgement on the paper
  - Suggest alternative ways of answering the same research question addressed in the paper
- Keep your presentation under 10 minutes

# Critical reading of a quantitative research paper

## Research question

- What is the research question or hypothesis the study intends to answer?
- How does the exposure relate to expected outcomes?
  - If appropriate, apply PECO
- Why is answering this question important for public health, policy, or implementation?

## Design

- What is the design of the study?
  - is it appropriate for the research question?
- What in the rationale and research question motivates this design?
- Could there be an alternative design to answer the research question? Why?

## Subjects and methods

- How were data collected? Was the method reliable?
  - How was information on the outcome collected and how was it assessed?
- Were there biases in data collection?
  - Approach used in selection? exclusion?
  - Representativeness?
- *If randomisation was applied, was the study adequately controlled? Was the randomisation truly random?*
- What statistical methods were used? Were they appropriate?
- What were the ethical issues in this study? ethics approval? and if applicable, from which review boards?

## Results

Do the results answer the research questions?

- If yes: Was the association in the expected direction?
- What was the confidence interval around the effect estimate, and what does this mean?
- Could the outcome be due to confounding factors or bias in the measurement of outcome?
- Was measurement of outcome valid and of good quality?
- Could confounding factors or biases have influenced findings?
- Was the length of follow up adequate? (continued for long enough, and was follow-up complete enough, to make results credible?)
- If applicable, could there be an effect in certain strata?

## Discussion

- Do the conclusions logically follow from the results?
- How do findings compare with previous research?
- What are the study's limitations? How do they affect interpretation?
- Do the results influence policy or practice? How can the findings be used in practice?
- What future research is needed?

# List of papers

1. The hazard of pregnancy loss and stillbirth among women in Kersa, East Ethiopia: A follow up study
2. Determinants of time to first marriage and birth intervals among women of child bearing age in Dabat Health and demographic surveillance system site, Northwest Ethiopia
3. Magnitude, trend, and causes of under-five mortality from Kilite-Awlaelo health demographic surveillance database, northern Ethiopia, 2009–2017
4. Effects of ambient heat exposure on risk of all-cause mortality in children younger than 5 years in Africa: a pooled time-series analysis
5. The effects of stillbirth and abortion on the next pregnancy: a longitudinal study
6. Young adult and middle age mortality in Butajira demographic surveillance site, Ethiopia: lifestyle, gender and household economy
7. Causes and trends of adult mortality in southern Ethiopia: an eight-year follow up database study

# Group work – Critical reading

Papers	Reviewers	Group to review & present	Group to review and ask
<b>The hazard of pregnancy loss and stillbirth among women in Kersa, East Ethiopia: A follow up study</b>	AO	AAU	AMU
<b>Determinants of time to first marriage and birth intervals among women of child bearing age in Dabat Health and demographic surveillance system site, Northwest Ethiopia</b>	DA	AMU	HwU
<b>Magnitude, trend, and causes of under-five mortality from Kilite-Awlaelo health demographic surveillance database, northern Ethiopia, 2009–2017</b>	GF	HU	AAU
<b>Effects of ambient heat exposure on risk of all-cause mortality in children younger than 5 years in Africa: a pooled time-series analysis</b>	AK	HwU	JU
<b>The effects of stillbirth and abortion on the next pregnancy: a longitudinal study</b>	AZ	JU	HU
<b>Young adult and middle age mortality in Butajira demographic surveillance site, Ethiopia: lifestyle, gender and household economy</b>	AT	MU	UoG
<b>Causes and trends of adult mortality in southern Ethiopia: an eight-year follow up database study</b>	NM	UoG	MU