Scientific reporting
Guidelines for observational research

Outline

Before you start: foundation of a good paper

- **Identify the theme/message**: Decide the single main idea you want readers to remember after reading your paper.
    - **Good example**: “In Kenya, risk factors for hypertension are complex and vary across groups, so one general prevention strategy will not work.” Keep this message in mind while writing every section of your paper.
    - **Bad example:** Hypertension is bad in Kenya (Too simple, no scientific value); My study will talk about hypertension and some factors (Vague and unfocused); Hypertension is rising everywhere in the world (Not specific to your research)
- **Know your audience:** You are writing for other scientists, doctors, and public health experts. They are busy and want information quickly and clearly.
- **Create an outline:** The structure of your paper. What is the logical flow from introduction to conclusion that follows the AIMRD structure: Abstract, Introduction, Methods, Results, Discussion. This saves a lot of time and makes the writing stronger.

Section 1: Title

Purpose: To accurately describe the paper's content in <20 words. It is the first filter for potential readers.

Key Components:

- The main topic / variables: smoking and diabetes
- The sample population studied: adolescent mothers
- The study design e.g. cross-sectional study

Best practices:

- **Be specific:** Don’t use jargon or abbreviations.

- **Be concise:** Keep it as short as possible without losing essential information.

Example:

- **Good:** "Sociodemographic Determinants of Hypertension Among Kenyan Adults: A National Cross-Sectional Analysis"
    - **Why it's good:** It clearly states the topic (sociodemographic determinants of hypertension), the population (Kenyan adults), and the study design (national cross-sectional analysis).
- Bad: Hypertension in Kenya.

Why it's bad:

- **Too vague** — doesn't specify *which aspect* of hypertension (risk factors? outcome? prevalence?)
- **No sample population** — doesn't tell us who is being studied (adults? adolescents? urban vs rural?).
- **No study design** — we don't know if it's a survey, experiment, qualitative study, or review.
- **Uninformative** — could describe hundreds of different papers.

Section 2: Abstract

Purpose: To provide a short, powerful summary of the entire paper. Many researchers will decide whether to read your full paper based on the abstract alone.

Structure (most common format):

1. **Background:** (1-2 sentences) Briefly state the problem and the reason for your study.

- *Example:* "Hypertension is a major public health concern in sub-Saharan Africa. Understanding its local determinants is crucial for effective prevention, yet comprehensive national data from Kenya is limited."

2. **Methods:** (2-4 sentences) Briefly explain what you did.
    - *Example:* "We performed a cross-sectional analysis using data from the 2022 Kenya Demographic and Health Survey. The study included 31,354 adults aged 15-54. We used multivariable logistic regression to identify sociodemographic factors associated with self-reported hypertension."
3. **Results:** (3-5 sentences) State the most important findings with numbers (e.g., prevalence, odds ratios, CI).
    - *Example:* "The overall prevalence of hypertension was 5.8%, and was significantly higher in women than men (7.8% vs 3.3%; $p<0.001$). After adjusting for other factors, the odds of hypertension increased with age (OR 15.61 for ages 45-49 vs 15-19), female sex (OR 3.19), and higher wealth (OR 2.25 for the richest vs the poorest quintile)."
4. **Conclusion:** (1-2 sentences) State your core message and its importance. What do the results mean?
    - *Example:* "Sociodemographic risk profiles for hypertension in Kenya are distinct and complex. These findings highlight the need for targeted public health interventions tailored to specific high-risk groups rather than general national campaigns."

Keywords: about 3–6 (simple and specific keywords)

Section 3: Introduction

Purpose: To give the reader the background information needed to understand your study and to convince them that your research is important and necessary. Think of it as a funnel, starting broad and ending with your specific research question.

Structure:

- **Paragraph 1: The broad problem.** Start with the global or regional importance of your topic.
    - *Example:* "Hypertension is a leading global cause of premature death and disability, with a rising burden in low- and middle-income countries..."
- **Paragraph 2: Specific context.** Bring the focus to the specific country, population, or problem area. What is already known?
    - *Example:* "In Kenya, rapid urbanization and lifestyle changes have fueled an increase in non-communicable diseases like hypertension. Previous local studies have shown..."
- **Paragraph 3: Knowledge gap.** What is missing from existing research? What question remains unanswered? This justifies your study.
    - *Example:* "However, most prior research has been limited to specific regions or has not used recent, nationally representative data. Therefore, a comprehensive understanding of the sociodemographic factors across the entire country is lacking."
- **Paragraph 4: Your objective/s.** State clearly what you aimed to do in this study.
    - *Example:* "The objective of this study was to identify the sociodemographic determinants associated with hypertension among men and women in Kenya using data from the 2022 national survey."

Section 4: Methods

Purpose: To describe exactly how you conducted your research. Another scientist should be able to read this section and repeat your study. It is about transparency and reproducibility.

Best practice: Use subheadings to organize the information. Always write in the past tense.

- **Study Design and Data Source:**
    - *Example:* "This was a cross-sectional study using data from the 2022 Kenya Demographic and Health Survey (KDHS). The KDHS is a nationally representative survey that collects data on health and population..."
- **Participants:**
    - *Example:* "The study population included men aged 15-54 and women aged 15-49 who participated in the KDHS. After excluding participants with missing data on hypertension status, the final analytical sample was 31,354."
- **Variables:**
    - Define all variables used. Clearly distinguish between your outcome variable and your explanatory variables.
    - *Example:* "The outcome variable was hypertension status, assessed by the self-reported question... Explanatory variables included age (categorized in 5-year groups), sex (male, female), education level (no education, primary, secondary, higher)..."
- **Statistical Analysis:**
    - Describe the statistical tests you used in the order you used them.
    - *Example:* "Descriptive statistics were used to summarize participant characteristics. We used chi-square tests to assess bivariate associations. A multivariable logistic regression model was built to calculate adjusted odds ratios (ORs) and 95% confidence intervals (CIs) for the association between sociodemographic factors and hypertension. All analyses were performed using Stata version 16.0, and a p-value <0.05 was considered statistically significant."

- **Ethical considerations:**
    - *Example:* "The original KDHS survey received ethical approval from the relevant institutional review board. All participants provided informed consent before participation."

Section 5: Results

Purpose: To present your findings objectively. **Do NOT interpret the results here.** Just describe the results.

Structure:

1. **Describe the Study Sample:** Start by describing your participants.
    - *Example:* "Table 1 shows the sociodemographic characteristics of the 31,354 participants. The mean age was..., and 53.9% were female."
2. **Present main findings:** Report the results of your statistical analyses, often in the same order as your methods. Refer to your tables and figures.
    - *Example:* "The overall prevalence of self-reported hypertension was 5.8% (Table 1). The results of the multivariable logistic regression are shown in Table 2. After adjusting for other variables, female sex was significantly associated with higher odds of hypertension (OR 3.19; 95% CI 2.82-3.61) compared to male sex."

Best practices:

- Use tables and figures for complex data, and describe the main points in the text.
- Start sentences with the finding, not the table number.
    - **Good:** "Hypertension prevalence increased significantly with age ($p<0.001$) (Figure 1)."

    - **Less good:** "Figure 1 shows that hypertension prevalence increased with age."
- Report key statistics in the text (e.g., percentages, ORs, CIs/p-values).

Section 6: Discussion

Purpose: To interpret your results. What do your findings mean? How do they relate to other research? What are the implications?

Structure:

1. **Summary of Main Findings:** (1 paragraph) Start by restating your most important findings in simple language.
    - *Example:* "This nationwide study found that older age, female sex, higher socioeconomic status, and certain ethnicities were independently associated with a higher risk of hypertension in Kenya."
2. **Interpretation and comparison:** (1-2 paragraphs) Discuss your key findings one by one. Compare them to other studies. Are your results expected or surprising? Why?
    - *Example:* "The finding that higher wealth and education are associated with increased odds of hypertension is notable, as it contrasts with findings from high-income countries where hypertension is often linked to lower socioeconomic status. This may reflect lifestyle changes associated with wealth in urbanizing African settings..."
3. **Strengths and limitations:** (1 paragraph) Be **honest** about your study's strengths and weaknesses.
    - *Example:* "The primary strength of this study is its large, nationally representative sample. However, a key limitation is the cross-sectional design, which prevents us from determining causality. Furthermore, the

reliance on self-reported hypertension may underestimate the true prevalence by missing undiagnosed cases."

4. **Implications:** (1 paragraph) Explain the importance of your findings for public health, clinical practice, or future research.
    - *Example:* "Our results suggest that public health strategies for hypertension in Kenya must be targeted. For instance, screening programs could prioritize women and specific ethnic groups. Further research should explore the underlying lifestyle and dietary factors driving these associations."

Section 7: Conclusion

Purpose: To provide a brief, final summary of the study's core message and its importance.

Best Practice:

- Keep it short (<10 sentences).
- Do not introduce any new information.
- Do not make statements not supported by your findings.
- End with a strong, confident statement as the take-home message.

Example:
"In conclusion, this study reveals distinct and complex sociodemographic patterns of hypertension risk in Kenya. These findings underscore the critical need for tailored, context-specific public health interventions to combat the growing burden of this condition."

Section 9: References

Best Practice:

- Use **reliable scientific sources** (e.g. peer-reviewed journals, WHO reports, National surveys e.g. DHS).

- Do **not** cite personal blogs, random websites, or Social media resources.
- Use **one reference style only** (e.g. APA or IEEE)
- Every source in the text **must appear in the reference list**, and vice versa.
- How many references:
    - Introduction: 10-12 references
    - Methods: 1–3 references (data source, survey details, statistical method)
    - Discussion: ~10–15 (mainly to compare your findings with other studies).

Examples:

APA Style:

Ghose, B. (2023). Household wealth gradient in low birthweight in India: A cross-sectional analysis. Children, 10(7), 1271. https://doi.org/10.3390/children10071271

IEEE Style:

[1] B. Ghose, "Household wealth gradient in low birthweight in India: A cross-sectional analysis," Children, vol. 10, no. 7, p. 1271, 2023. doi: 10.3390/children10071271.

Nature Style:

Ghose B. Household wealth gradient in low birthweight in India: a cross-sectional analysis. Children. 2023 Jul 24;10(7):1271. doi: 10.3390/children10071271.