* [Scientific Writing in Health Sciences](C:\\Users\\ehsan\\Documents\\GitHub\\ScientificWriting\\_book\\)
* [Preface](file:///C:\Users\ehsan\Documents\GitHub\ScientificWriting\_book\index.html)
  + [Background](file:///C:\Users\ehsan\Documents\GitHub\ScientificWriting\_book\index.html#background)
  + [Goal](file:///C:\Users\ehsan\Documents\GitHub\ScientificWriting\_book\index.html#goal)
    - [More details of the aims](file:///C:\Users\ehsan\Documents\GitHub\ScientificWriting\_book\index.html#more-details-of-the-aims)
    - [Format](file:///C:\Users\ehsan\Documents\GitHub\ScientificWriting\_book\index.html#format)
  + [Implication](file:///C:\Users\ehsan\Documents\GitHub\ScientificWriting\_book\index.html#implication)
  + [Pre-requisites](file:///C:\Users\ehsan\Documents\GitHub\ScientificWriting\_book\index.html#pre-requisites)
  + [Version history](file:///C:\Users\ehsan\Documents\GitHub\ScientificWriting\_book\index.html#version-history)
  + [Contributor list](file:///C:\Users\ehsan\Documents\GitHub\ScientificWriting\_book\index.html#contributor-list)
  + [License](file:///C:\Users\ehsan\Documents\GitHub\ScientificWriting\_book\index.html#license)
* [**1** Introduction Section](file:///C:\Users\ehsan\Documents\GitHub\ScientificWriting\_book\introduction-section.html)
  + [**1.1** Funnel shape](file:///C:\Users\ehsan\Documents\GitHub\ScientificWriting\_book\introduction-section.html#funnel-shape)
  + [**1.2** Examples](file:///C:\Users\ehsan\Documents\GitHub\ScientificWriting\_book\introduction-section.html#examples)
    - [**1.2.1** Example 1](file:///C:\Users\ehsan\Documents\GitHub\ScientificWriting\_book\introduction-section.html#example-1)
    - [**1.2.2** Example 2](file:///C:\Users\ehsan\Documents\GitHub\ScientificWriting\_book\introduction-section.html#example-2)
    - [**1.2.3** Importance of a ‘hook’](file:///C:\Users\ehsan\Documents\GitHub\ScientificWriting\_book\introduction-section.html#importance-of-a-hook)
  + [**1.3** Common pitfalls](file:///C:\Users\ehsan\Documents\GitHub\ScientificWriting\_book\introduction-section.html#common-pitfalls)
  + [**1.4** Tips:](file:///C:\Users\ehsan\Documents\GitHub\ScientificWriting\_book\introduction-section.html#tips)
* [References](file:///C:\Users\ehsan\Documents\GitHub\ScientificWriting\_book\references.html)
* [Contact](https://ehsank.com/)

# [Communicating Scientific Research Findings in Health Sciences](file:///C:\Users\ehsan\Documents\GitHub\ScientificWriting\_book\)

# Chapter 1 Introduction Section

A scientific research paper generally follows the format similar to IMRaD (Introduction, Methods, Results and Discussion). The introduction section sets the stage for the entire paper and introduces the topic of interest to the audience. This first section provides a broad context of the issue under investigation, summarizes what is known and unknown, and tries to convince the readers why this particular study is needed and how it will be a valuable addition to the knowledge.

There are several guidelines or models suggesting how to best structure the introduction section for a research paper ([Cals and Kotz 2013](#ref-cals2013effective); [Bahadoran et al. 2018](#ref-bahadoran2018principles); [Heard 2016, 84–88](#ref-heard2016scientist)). Typically, a well-written introduction section will contain a broader background information on the topic, a summary of key existing knowledge relevant to the specific problem, the gap in the knowledge (rationale), and the research question and/or the hypothesis. Though In addition, though not essential, some authors opt to briefly describe the study design and methods briefly.

## 1.1 Funnel shape

To better organize these main components of the introduction section, it may be useful to have an outline or a skeleton of the section. One approach could be adopting a “funnel shape” or an inverted pyramid shape to organize the components. Based on the funnel shape, the introduction section has five key elements: big picture, what is known, what is unknown, research question and methods/design (see Figure [1.1](file:///C:\Users\ehsan\Documents\GitHub\ScientificWriting\_book\introduction-section.html#fig:funnel)).

Figure 1.1: The typical funnel shape of an Introduction section.

1. **1. Big picture**: the broad opening of the funnel shape represents how the introduction section should start with the big picture. The big picture introduces the general context of the work and provides an overview of “why this topic or issue is important.” For a research paper in population and public health, it is a good idea to present the broader background information on the topic. This may include the magnitude of the problem and/or the burden of disease (e.g. statistics, rates, burden, cost). The big picture should provide the audience with an understanding of the topic in question, generally related to the outcome or the explanatory variable from the public health perspective.
2. **What is known**: from the big picture, the author narrows down to a more specific research area under investigation. This part should outline the existing knowledge of the research area by providing a summary of evidence, usually including the landmark studies and recent studies. This summary should be cited with the most comprehensive and current knowledge on the subject. Remember that the key existing evidence summarized in this part should be directly relevant to your specific study and informs your research question. These summaries can be about the particular exposure or disease of interest (e.g., intervention or outcome elements of the PICOT framework) ([Thabane et al. 2009](#ref-thabane2009posing)).
3. **What is unknown**: as the funnel narrows down further, this part should present a synthesis of why the issue is important (in the big picture), what is already known, and what is unknown to convince the audience why we need this specific study. This part can include the gap in the knowledge, any inconsistencies in the literature, gap in the methodology or the need for a different or better methodology. While describing what is unknown, the author would highlight the importance of conducting the present study and persuade the readers why doing this analysis was needed (rationale), and likely who would be benifitted by this study. For example, if there is a previous study that answered the same research question, a clear and compelling argument why the updated information is needed.
4. **Research question**: following the identification of the gap in the knowledge, this part outlines the specific purpose of the study. It should include the study objective and/or hypothesis that can meet the identified need or help fill the gap in the knowledge.
5. **Methods/design**: as the last stage of the funnel, this part can briefly introduce the approach used to answer the research question. This can include the study design or methods, however, a brief summary is sufficient as the methodological approach will be described in depth in the methods section.

## 1.2 Examples

### 1.2.1 Example 1

The first example is taken from [Nisingizwe et al.](#ref-nisingizwe2020perceived) ([2020](#ref-nisingizwe2020perceived)). You can download the open access PDF from [here](https://bmcpregnancychildbirth.biomedcentral.com/track/pdf/10.1186/s12884-020-2775-8.pdf).

Table 1: A study about the association between perceived barriers to health care access and inadequate antenatal care visits ([Nisingizwe et al. 2020](#ref-nisingizwe2020perceived))

| **Elements** | **Location in the Introduction section** | **Comments** |
| --- | --- | --- |
| Big picture | 1st paragraph (“Maternal and neonatal mortality …”) | Authors introduce the public health problem of interest, maternal and neonatal mortality by presenting the magnitude of the problem and the burden of disease. This paragraph highlights the importance of the public health problem. |
| What is known | 2nd paragraph (“Timely and frequency of ANC …”) | The authors describe the more specific research area, the relationship between receiving adequate antenatal care (ANC) and barriers to healthcare |
|  | 3rd paragraph (“However, the country’ maternal and neonatal death rates …”) | The authors provide a summary of existing knowledge that is relevant to the study and how it informs the research question |
| What is unknown | 4th paragraph (“To date, there is a paucity …”) | The authors present what is unknown, the relationship between perceived barriers to health care and inadequate ANC visits in Rwanda. In addition, they identify previous studies and the gaps in the knowledge. The clear identification of the gaps supports the stated rationale for conducting this particular study. |
| Research question | 4th paragraph (“Therefore, this study aims …”) | Following the identification of the gap in the knowledge, the authors present the specific purpose of the study. |
|  | 5th paragraph (“We hypothesized that …”) | The authors present the hypothesis behind the research question. |
|  | 5th paragraph (“This study will contribute to …”) | the authors include a brief key implication to convince the audience how this research paper will add value to the field of study. |
| Methods/design |  | The authors have not included a specific section summarizing the methodological approach used in the study to answer to the research question. However, the rationale for the study. However, in the 4th paragraph, they indicated that the study will use “2015 DHS data” which provides a “country representative sample”. |

### 1.2.2 Example 2

The first example is taken from [Basham and Karim](#ref-basham2019multimorbidity) ([2019](#ref-basham2019multimorbidity)). You can download the open access PDF from [here](https://www.tandfonline.com/doi/epub/10.1080/22423982.2019.1607703).

Table 1: A study about prevalence of multimorbidity in northern vs. southern Canada ([Basham and Karim 2019](#ref-basham2019multimorbidity))

| **Elements** | **Location in the Introduction section** | **Comments** |
| --- | --- | --- |
| Big picture | 1st paragraph (“Multimorbidity is common among …”) | The public health problem of interest, multimorbidity, is introduced along with the magnitude of the problem and the burden of disease. |
| What is known and unknown | 2nd paragraph (“Northern Canada, which …”) and 3rd paragraph (“The equivocacy of findings …”) | The more specific research area, the multimorbidity in Canadian provinces and territories, is contextualized. The authors provide a summary of relevant previous studies and highlights the gaps within these previous studies. The synthesis of the “big picture,” “what is known” and “what is unknown” elements supports the rationale for this particular study. |
|  |  |  |
| Research question | 3rd paragraph (“The primary aim of this study …”) | Following the identification of the need for this particular study, the authors present the specific research question and the hypothesis. |
| Methods/design | 3rd paragraph (“This study describes multimorbidity …”) | The authors briefly mention the methodological approach used in the study. |

We have looked at the key elements of an introduction section of a scientific article in population and public health research. The introduction section provides the general context of the topic (big picture), the narrower research area and what is known, the gap in the existing knowledge, the specific purpose of the study and a summary of the methods and design.

### 1.2.3 Importance of a ‘hook’

As the author and researcher, you have the knowledge of the whole “story” of your study from start to end. Hence, you can plan the introduction strategically. The introduction section introduces the public health problem to the audience and tries to capture their interest to continue reading. When you think of a newspaper or magazine article, the writer aims to grab the readers’ attention with a “hook” at the beginning. In a scientific article, although you don’t necessarily want to give out all the findings and the implications of the study initially, you should utilize the introduction section to incite the readers’ and reviewers’ interest. By clearly outlining the key components, the introduction section should convince the audience why the issue under investigation is critical to address for population and public health and how this particular study is novel and valuable.

## 1.3 Common pitfalls

* Common pitfalls in the introduction section include incomplete, inaccurate or outdated reviews of the literature on the topic. For example, including literature that was tangentially related or within the same field, but not directly related to the problem may result in incomplete and confusing review of the background knowledge. Including inadequate, incomplete or outdated information may result in the rejection of the paper.
* Not adequately explaining the importance or the relevance of the current knowledge to the study aims will be less effective in engaging readers on how this study is relevant and novel or different from what is already known.

## 1.4 Tips:

Arguably, clear aim(s) and rationale of the study objectives are the most important aspects of the introduction section. Take time to think about the justification of the current study.

Provide key references that are pertinent to describe the background knowledge and what is known and unknown.

Including an excessive amount of literature in the introduction can be distracting. A lengthy introduction can also make the readers lose interest. Be mindful that you will have an opportunity to contextualize your research in the literature by comparing with other studies in the discussion section. The introduction should be focused on setting the tone for what is coming next.

If you already have a general idea of the target of journals you want to submit to, the introduction can be tailored to the target audience. For example, if you are interested in submitting to journals with a heavier focus on the methodology or epidemiology, you may want to highlight the novelties in the methodology. If you are interested in submitting to clinician-focused or subject-specific journals, you would emphasize the aspects that may be of greater interest to the audience of these journals.

### References

Bahadoran, Zahra, Sajad Jeddi, Parvin Mirmiran, and Asghar Ghasemi. 2018. “The Principles of Biomedical Scientific Writing: Introduction.” International Journal of Endocrinology and Metabolism 16 (4).

Basham, C Andrew, and Mohammad Ehsanul Karim. 2019. “Multimorbidity Prevalence in Canada: A Comparison of Northern Territories with Provinces, 2013/14.” International Journal of Circumpolar Health 78 (1): 1607703.

Cals, Jochen WL, and Daniel Kotz. 2013. “Effective Writing and Publishing Scientific Papers, Part III: Introduction.” Journal of Clinical Epidemiology 66 (7): 702.

Heard, Stephen B. 2016. The Scientist’s Guide to Writing. Princeton University Press.

Nisingizwe, Marie Paul, Germaine Tuyisenge, Celestin Hategeka, and Mohammad Ehsanul Karim. 2020. “Are Perceived Barriers to Accessing Health Care Associated with Inadequate Antenatal Care Visits Among Women of Reproductive Age in Rwanda?” BMC Pregnancy and Childbirth 20 (1): 1–10.

Thabane, Lehana, Tara Thomas, Chenglin Ye, and James Paul. 2009. “Posing the Research Question: Not so Simple.” Canadian Journal of Anesthesia/Journal Canadien d’anesthésie 56 (1): 71–79.