

Research Paper

Writing a scientific manuscript: A step-by-step guide for beginners

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Abstract

Many young researchers find writing scientific publications exceedingly challenging, and few receive specialized instruction in the art of presenting their research results in written form. However, the publication is frequently required for job promotion, funding, academic qualifications, or all of the above. The basic processes of writing a scientific article are described here. We detail the basic components that an average article should contain, the elements that should be present in these sections, and some tips for making the entire product appealing and publishable.

Keywords: Scientific publications; Writing; Research; Article

1. Background

Every researcher has come face to face with a blank page at some point in their career, unsure of where to begin or what to write first. It is not easy to describe one's research work in a way that is understandable to others and suitable for publication. When you devote a significant amount of time, energy, and frequent money to your research, you become emotionally and intimately invested. Naturally, you believe in the worth of your study and its significance to the scientific community. However, the subjectivity that comes with a significant engagement can make it difficult to step back and think clearly about how to effectively communicate the study in a clear and intelligible manner, so that others – presumable non-experts in your field – can comprehend the interest of your findings.

Even now, the old adage "publish or perish" holds true. Many young researchers are under pressure to publish scientific papers to advance their careers, to validate funding requests, to justify prior funding allocations, or as a need for university qualifications such as a Masters's degree or Ph.D. thesis. However, many new doctors receive little, if any, instruction in the skill of writing a scientific article. For clinicians in particular, the clinical workload can be such that research and scientific writing are viewed as secondary tasks that are not an immediate priority, and to which only brief periods can be committed on an irregular basis. However, the competition

between all of the high-quality papers submitted to journals is already fierce, and it is thus critical to get the fundamentals right in order for your paper to have a chance of success. Don't you believe your work deserves to be reviewed on its scientific worth, rather than being rejected because of poor writing and a jumbled and confused data presentation?

With this in mind, we give a step-by-step guidance to producing a scientific article that is not limited to the field of geriatrics/gerontology, but can be used to the vast majority of medical fields. We will begin by outlining the main divisions of the article, followed by a more detailed description of the main features that should be included in each section. Finally, we will provide some suggestions for the abstract and title of the work. This handbook seeks to assist young researchers with minimal writing experience in producing a high-quality first draft of their work, which can then be circulated to co-authors and senior mentors for further refining, with the ultimate goal of publishing in a scientific journal. It is probably not thorough, and there are other great materials available in the existing literature¹⁻⁷ and online⁸.

2. Getting Started: What to Do Before Writing a Word

Before you write a single word of your essay, you must complete some preliminary work. Because it also acts as the background to the research subject you are writing about, this background work should normally have been completed by the time you are at the writing stage. All of the time you spend establishing the protocol for your project is time spent writing the article that will result from your project. Thus, when establishing the protocol, you most likely conducted an exhaustive literature study to establish the current level of knowledge on the topic and ensure the uniqueness of your research, and this can serve as the basis for your paper. It is beneficial to make notes of essential themes or words that you wish to incorporate in your paper, along with the appropriate references, while examining the literature. A reference management software tool (either free or commercially accessible) might be useful for organizing the vast volume of references that you are likely to wade through before sifting out the most relevant points.

Typically, you will also have the final results of your data's statistical analysis. This will serve as the foundation for your results section. Some of your results' graphical representations will be used as figures in the article, so it's a good idea to highlight the most relevant discoveries as you read through the data so you don't forget anything important.

Before you begin writing, you should decide which publication you want to submit your findings to. This has implications for formatting, but more significantly, for the orientation of your writing style, because the writing must be appropriate for the type of reader you are targeting. For example, are you aiming for a specialist journal with readers who are expected to be specialists in your field, or a general medicine magazine with readers who may be experts from other disciplines? This will have an impact on the amount and type of information you must include. Furthermore, the editorial policy of the desired journal should be considered. For example, in a particular field of expertise, some journals prefer publications detailing basic research, whilst others prefer more clinical work. The target journal is chosen based on a variety of considerations that are outside the scope of this article. However, you should at the very least ensure that your work falls within the scope of the publication you have chosen.

3. What are the key parts of a scientific paper?

The vast majority of scientific publications adhere to the "IMRAD" format, which consists of an introduction, methodology, results, and discussion. There are, of course, some exceptions to this rule, and you should always verify the guidelines for authors of the journal where you intend to submit your manuscript to ensure that this is the suggested format. We will only examine the IMRAD format in this article because it is the most commonly used.

Thus, your article should include an introduction, a methods section, a results section, and a discussion (in that sequence). The abstract, which is essentially a synopsis of the important sections, and, of course, the title will be added to this. There must be a list of bibliographic references, tables, and legends for any figures at the end. Finally, there may be some extra optional elements, such as acknowledgments, conflicts of interest, or the contributions of the writers. Below, we'll go through each of these sections in detail, detailing the key aspects to remember when writing them.

3.1. The introduction sections

The beginning is crucial in capturing the reader's interest (Table 1). During the review process, the beginning should get the reviewer "hooked," wanting to read more and wondering, "How come I never thought of this?" Thus, in this section, you will explain why you conducted your research, what you hoped to achieve with it, and how it contributes to the current body of information on this topic.

In concrete words, you should begin by briefly explaining what is already known about this issue, using suitable sources. You should then reduce the field somewhat and indicate the regions where there is still some uncertainty, noting any earlier (and possibly contradictory) evidence as needed. This will logically lead to a statement of an explicit knowledge gap that your research seeks to address. This is a critical component in demonstrating the value of your effort. After explaining how your study will add anything new and beneficial, you should clearly articulate your working hypothesis, followed by your objective(s), and, in a nutshell, the technique used to reach these aims (Table 1).

In the background, the reasons for conducting your research should be evident to the reader and supported by the current state of scientific knowledge with suitable references. It is not necessary to cite every article in the literature on the topic; a careful selection of the most pertinent publications is sufficient. Similarly, it is not necessary to state universal facts that appear overly simplistic or self-evident. However, you should aim to strike a good balance between important background information and unnecessary detail. In this regard, you should keep in mind the audience you want to reach. This will be determined by the readership profile of the publication to which you plan to submit your research, as described above. If you are writing for a specialty journal, your background can be more extensive and technical than if you are writing for a non-specialist audience in your profession.

Table 1 Outline of the main features of the Introduction section, with examples.

Feature	Example
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Background describing what is known on the subject	Percutaneous coronary intervention is the cornerstone of therapy for acute coronary syndromes, but may be associated with procedure-related complications
What is not known? What elements are still subject to controversy? What is the exact gap in the knowledge that your study hopes to fill? Cite any existing data, especially conflicting data that indicate uncertainty	It remains unknown whether. . . To date, it has not been proven. . . No study to date has investigated the effect of. . . There are few data to quantify. . . The effect of. . . on. . . remains unclear
Objective (_ working hypothesis) Cite the exact parameter you plan to measure Cite the type of patient population or clinical context Cite any secondary objectives	We hypothesized that the administration of. . . would reduce/increase. . . in the context of. . . We aimed to identify/assess/evaluate/investigate. . . Through a prospective, single-/multicenter, observational/interventional. . . study

The introduction should lead logically to the identification of the knowledge gap that you aim to fill. This is your chance to highlight the increased value of your study or the fresh knowledge it will yield. Will your findings have an impact on clinical practice? Will they help the scientific community as a whole reach an agreement on a previously contentious topic by giving hard evidence in one side or the other? This is your opportunity to make a sales pitch for your content, using suitable terminology, of course.

Try to avoid deviating from the topic at hand as much as possible. Every sentence should have a specific function. Many journals put a limit on the length of the introduction, with a maximum number of words or pages allowed, so you'll have to concentrate. You should carefully review the directions for writers of your desired journal for any recommendations about the proper length for the introduction. In the lack of precise standards, it is thought that the introduction should be one to one and a half pages long.

The phrasing of your purpose is critical, and you should take the time to think about it carefully. The goal must be specified explicitly, as well as the particular parameter you want to evaluate and how you intend to do it. The purpose of your study, as stated in the article, is the same as the purpose indicated in your study protocol (remember – every research project should have a written protocol before beginning!). It is beneficial to select one formulation for your purpose and apply it throughout the work, i.e. in the introduction, results, discussion, abstract, and even partially in the title. Do not be concerned about appearing repetitious; repetition is not always a bad thing in an article. It at least shows the reader that you know what you're talking about, and utilizing the same terminology throughout avoids any uncertainty.

Finally, a note about the tense to employ in the introduction. For many academics, English is not their first language, which adds another layer of difficulty to the writing process. You should strive to use any resources that are accessible to you to improve the quality of your written English. Many large organizations have translators or scientific writers on staff who can translate or revise your content. Those who are not fortunate enough to have such resources should refer to important articles in high-quality journals for examples of the desired format. (Table 2) provides suggestions for the tense to use in the introduction.

Table 2 Suggestions for the tense to use when writing your introduction section.

Aim	Tense	Example
Aim Tense Example To describe the current state of knowledge	Present	Cancer is a common disease
To describe observations previously published by others	Past (imperfect)	Smith et al. showed that drug A reduced the rate of death, whereas drug B did not
To describe a process that began at some unspecified time in the past, and is not yet complete	Present perfect	Several researchers have investigated the effect of drug A on this disease
To describe something that has not happened yet	Present perfect	It has not yet been determined whether. . .
To formulate your hypothesis	Past tense for first verb Present tense for second	verb We hypothesized that drug A increases the risk of bleeding
To formulate your objective. . .	Past tense	We aimed to measure

3.2. The section on methods

The objective of the methods section is to describe exactly what you did and how you did it in enough detail that any average reader with the same tools at their disposal could replicate your study. Every result you plan to include in your results section must have a method described – that is, you cannot present the outcomes of a test or analysis that was not mentioned in the methods. If details of any or all procedures have previously been published elsewhere, a concise synopsis with a reference to the relevant publication would suffice.

Begin by defining the study's design (prospective/retrospective, randomized or nonrandomized, double-blind or open-label, controlled, crossover, factorial, etc.). Any uncommon methodology used in the study's design should be explained, either by suitable references or guidelines, or by an explanation of the specific circumstances necessitating your particular approach. The description of who or what you researched, i.e. the study population, will come next (animals, human subjects, cells. . .). For the majority of doctors, the study population will consist of human subjects, hence the inclusion and exclusion criteria should be specified. Procedures for identifying eligible patients (consultations, new admissions, daily rounds, staff meetings, case review meetings, and so on) should also be established.

It should be highlighted that the procedures for retrospective research should begin with a description of the study's source data, namely the inclusion and exclusion criteria and the final number of case records and/or patients selected. However, in prospective studies, the methods should detail inclusion and exclusion, but the ultimate number of patients included is considered a result and should be mentioned in the results section, not the methods.

Following the description of the study population, you can go on to describe all of the procedures utilized to measure all of the primary parameters reported in your study. The major and secondary endpoints, as well as the techniques used to measure them, must be specified.

This is crucial since the primary endpoint selection is critical to the study's success. It is the only criterion that allows you to draw formal conclusions about the study's outcome, thus it must be properly chosen. Again, this will have been well examined during the planning process. This emphasizes how good discussion and thought throughout the design stage of your research topic substantially facilitates the composition of your paper.

Returning to the procedures, each blood test, intervention, operation, questionnaire, imaging technique, and so on should be documented, with the manufacturer details (manufacturer's name, city, and country of company) provided when necessary for any unique equipment or tests performed. To describe why each measurement was collected, use short sentences. Subtitles can also be used to divide the techniques section into relevant subsections, such as demographic data, angiographic measures, treatment, and so on.

A brief remark about ethical considerations must be included in the methods section, explaining simply that ethics committee approval for the study was obtained (or if not, explain why). You must also ensure that written informed consent was acquired from all subjects, or, where appropriate, their next of kin or surrogate. In the case of randomized clinical studies, it is also a good idea to mention that the study has been registered with an approved clinical trial database (e.g., www.clinicaltrials.gov), and to include the registration number. Most journals require the name of the ethical committee as well as the date of approval, and some may even demand the file number. There may also be differing opinions on where to include all of this information. Again, for advice, consult the directions for authors of your desired journal.

Finally, the statistical analysis should be detailed in the final paragraph of the techniques section. Standard statements concerning data presentation should come first; for example, quantitative, regularly distributed data are presented as means standard deviation, and non-normally distributed data as median [interquartile range], and qualitative data as number (percentage). The exact statistical procedures employed should next be listed – which test was used for whatever type of variable; the type of multivariate analysis utilized and the variables included in it; the approach used for survival analysis...The sample size reason can be given here, along with the working hypothesis for the frequency and variance of the outcome, the difference you expect to see, and the alpha and beta risks utilized in your calculations. The significance level for the analysis, as well as the program utilized, should be included. To minimize any complaints concerning post-hoc research in non-predefined subgroups, any planned subgroup analyses should be stated in this paragraph. It should be noted that planned subgroup studies have an impact on sample size calculation, and the use of multiple analyses may necessitate Bonferroni's correction to guarantee that the alpha risk is not overstated. These factors, which were previously worked out during the project's development, must be detailed in the statistical analysis section.

This portion should be easy for you if you are well-versed in methodology and statistics. If you are less comfortable with statistics, your research almost certainly had methodological support from a skilled methodologist and/or statistician, therefore you may ask their contribution for this section of the manuscript to assure correctness and comprehensiveness.

Table 3 provides a proposed list of elements to discuss in the methods section for retrospective and prospective research.

In terms of tense, the procedures should mostly be expressed in the past (imperfect) tense, i.e. we performed, we recorded, we measured, we tested... To explain events that occurred

prior to your study, use the past perfect tense, such as "after thrombolysis failed, we commenced...".

3.3. The results section

The goal of the findings section is to describe what you saw without any remark or debate. It is no longer required to discuss the methods; this has already been done in the methods section; instead, simply provide the results. If the reader reads the techniques section carefully, they will recall what methods were employed. It is also unnecessary to comment or interpret, thus comments like "surprise..." or "interestingly..." are often considered inappropriate in the results section. You must provide a result for each method described in the methods section, and it is best practice to give the outcomes in the same order as the methods to make the article easier to follow and read. Subtitles (again, the same ones used in the techniques section) can also help to divide down the results into easy-to-follow chunks.

Table 3: Suggested list of items to be included in the methods section for retrospective and prospective studies.

Retrospective study	Prospective study
Subjects Inclusion and non-inclusion criteria Ethical considerations (ethics committee approval, name of committee, _date and file number, informed consent) Primary endpoint Secondary endpoints Statistical analysis	
Data recorded	Study registration, if randomized
Source(s) of study data	Sample size calculation
Subgroups (if any)	Randomization procedure
Number of subjects/samples	Interventions

A typical results paragraph should begin by recalling the sort of analysis (e.g., "QCA analysis revealed that..."), then discuss the results observed, referring to relevant tables or figures (e.g., "the number of lesions was considerably larger in group A compared to group B"). In terms of techniques, the results should be stated in the past (imperfect) tense: "serum creatinine was linked with glomerular filtration rate," for example.

When drafting the results section, many researchers struggle with whether to describe the results in the text or use a table or graphic. While there are no hard and fast rules, in general, outcomes that can be simply explained in one or two lines should be written in the text. Tables should be used when describing the same variables for two or more groups, such as baseline characteristics, outcomes, and treatments. Tables often contain the most essential results and, on their own, should be adequate to provide the reader with a clear understanding of your findings. Figures are useful when the source data is either too complex for presentation or is difficult to interpret. Relationships and trends can be shown graphically in figures. Depending on the target

journal, there may be a restriction to the overall number of illustrations (figures and tables) that you are allowed, so ask for guidance before inserting too many. Take care not to include too many illustrations, as this may cause them to lose interest, and, above all, do not repeat facts in the text that occurs in a table or figure.

3.4. The discussion sections

This is where you interpret and explain the relevance of your findings, as well as how they fit into the larger picture of what has previously been seen and published on the same issue. The discussion should begin with a quick overview of your study's principal findings, preferably using the same language as the primary objective (in the introduction) and primary endpoint (in the methods). This is followed by an interpretation of your findings. When interpreting, be careful not to just repeat the results or, on the other hand, to over-interpret. After all, this is a scientific article, not a prose fiction. As an example, If you mention in your results that "20 out of 25 patients developed cerebral bleeding after administration of drug X," it is not accurate to state in the discussion that "80 percent of patients who take drug X have intracranial hemorrhage." This is a slight change in interpretation that contradicts the original facts. It would be more accurate, for example, to say, "our findings imply that medicine X may have severe detrimental consequences."

Putting your findings in the context of previous studies is a crucial element of the conversation. How do your findings compare to other studies in the literature? Do you have any plausible explanations if your findings differ? What are the conceivable differences in situations, populations, or techniques that could explain why you saw what you saw? Any discoveries that are particularly surprising or interesting should be examined, and potential explanations should be proposed. Can you extrapolate your findings to other contexts or populations, and if not, why not? If numerous analyses or interventions were carried out, you should go beyond focusing on individual outcomes to explain the overall importance of the results when all tests or analyses are taken into account.

In order to compare your findings to those of other writers, you will naturally wish to describe what they have reported in similar settings. Remember that when critiquing the work of others, it is important to be polite. Instead of pointing out flaws in other people's work, rephrase it to highlight the strengths of your own - the meaning will be clear without you having to directly criticize your peers' publications. For example, rather than claiming that "Smith's study was underpowered," it is preferable to use a softer tone and a more cautious approach, such as "Smith's study may have been underpowered," or even better, "Our study had adequate statistical power to detect." In the context of a direct comparison, this implies to the reader that Smith's study may not have had enough power. When paraphrasing for readers whose first language is not English, take care not to affect the emphasis of the statement. The order in which the results or aspects of debate are stated may gently shift the emphasis away from what the other author intended. Again, rigorous re-reading by co-authors and senior mentors, as well as members of your publications department (if you have one), will aid in avoiding these mistakes.

What are your study's novel findings? Highlighting how your findings provide fresh evidence or make a new addition to the state of knowledge will validate the significance of your research and its added worth to the literature, as opposed to being "just another paper" on a

"worn-out" issue. In this sense, you can debate whether your article was successful in filling the "gap in knowledge" that you mentioned in the opening.

Do not be afraid to publish an article that has bad results. A well-conducted study that does not provide positive results is always a useful contribution to the present body of data, and you may explain the implications appropriately. For example, it may serve to enhance knowledge in the field by calling into question commonly held beliefs, questioning prior findings, or supporting a tiny body of contradictory data that was previously regarded purely "anecdotal." As long as your study was properly organized and carried out, there is no reason to suppose that your findings are invalid, even if they are unfavorable.

In practice, you might highlight how your findings are expected to affect practice or the state of knowledge. Will your findings, for example, affect public opinion one way or the other? You should also mention any prospective future study directions, particularly any new hypotheses that may have been created by observations on your secondary objectives. Finally, a brief paragraph describing the study's strengths and weaknesses is beneficial. Enumerating your limitations, in particular, provides significant advantages. First, it shows the reviewers that you are aware of your own inadequacies, and second, it allows you to defend yourself on these points and explain why the alleged limitation may not be so terrible after all.

3.5. The abstract

The abstract is a brief description of the article divided into sections (usually background, methods, results, conclusion). It is used for reference purposes in online bibliographic databases (such as PubMed), and hence should create a standalone unit that is understandable as a standalone text without referring to the entire text. It is also the first thing potential reviewer sees when they are invited to review your manuscript for publication in a journal. As a result, it is critical that the abstract be brief yet comprehensive and appealing in order to give the potential reader a taste of the primary content and pique their interest in reading the whole work. It is the most important marketing tool for your company; thus, it is worth dedicating some time and attention to its creation.

There are a few key aspects to mind when preparing the abstract, but space is limited, so keep it brief. Table 4 summarizes the important points for the abstract. If you spent enough time and thought into preparing your project and producing the finished piece, preparing the abstract should not take long. There will almost certainly be a sentence or two in the introduction that may be reused in the abstract (possibly with minor reduction). Similarly, the findings will be mostly copied and pasted from the article's results section. The conclusion might be written as the key take-home message from your work. Indeed, the most difficult element of the abstract is typically shortening it enough to fit under the word restriction of your desired journal.

3.6. The title

Last but not least, consider the title of your piece. The title should include keywords that reflect the primary points of your content. It should also pique the potential reader's curiosity and compel them to read the rest of your work. Remember that persons searching for papers on a specific topic will most likely use PubMed/Medline or other online archives, thus your title should include the main terms and keywords so that it can be easily discovered using PubMed. If your title is poorly written, your work will be difficult to identify and will never appear in other people's search results, which means your paper will never be cited by others because they did not locate it or read it. Once your title has been recognized and listed among dozens, if not hundreds, of other papers on the same topic, it should differentiate itself from other articles by describing how your piece contributes to the literature or fills a knowledge gap.

Table 4 Main points to keep in mind when writing the abstract.

Item	Notes
Background	A brief reminder of the context, and a brief statement of the main objective. Should be short and to the point. Two to three sentences are generally sufficient Identify the gap in knowledge that you hope to fill
Methods	The main methods should be outlined: The main inclusion criteria to define the population Define the study groups, if any Describe (very briefly) the main interventions or treatments State the primary endpoint You will not have room to explain all the methods in great detail, so stick to the overall defining criteria (e.g. adult patients [> 18 years] with septic shock, defined as persistent hypotension despite adequate vascular filling)
Results	List the main results, with means, odds ratios, p-values, etc for each group. List the result of the primary endpoint first, followed by secondary outcomes Ensure that you have given a result for every method you mentioned in the methods section There should be enough detail to back up your conclusion
Conclusion	A one-line conclusion summarizing your main finding is sufficient, with perhaps a short sentence with the implications for future research, if you have enough space The conclusion should be directly related to the main objective and endpoint
References	There should be no references in an abstract

Discussion	There should be no discussion, or no judgmental statements in the abstract (i.e. remarks such as “Surprisingly, we observed. . .”)
Figures	There should be no figures, tables or other illustrations in an abstract

This may seem like a huge order for a simple title, but it's not as difficult as it appears. Table 5 provides some guidelines for creating a title. For ideas and examples of what defines an effective title, look at the titles of papers in highly regarded medical journals (both general medicine publications and the most highly cited specialized journals in your field). Keep in mind that the length of your title may be limited (in terms of words or characters) by your target journal. Again, keeping it brief is more difficult than coming up with a 4-line title.

Table 5 The main elements to be included in a successful title.

Pointer	Example
Cite the main factors studied	State the name of the drug or intervention
Cite the population/clinical context studied	In acute myocardial infarction/intermediate-risk pulmonary embolism/early phase septic shock
Cite the design	Randomized, double-blind, controlled trial/registry/cohort study/case-control study
Cite the main finding	Increases/reduces/prevents. . .
Put the most important aspect first	If the focus is on the intervention, because this is what distinguishes your article from others, then start the title with the intervention name
Avoid imprecise formulations that serve no specific purpose	Avoid terms such as “a report of. . .” or “the effects of. . .”. If there are effects, state what they are!
Use international common denominations for drug names	Clopidogrel, ticagrelor, prasugrel. . . Commercial names should be avoided. They indicate propriety (of the pharmaceutical company), and may be construed as indirect preference for a particular company. Also, they are not always the same across different countries
Subtitles should be used sparingly	Reserve subtitles for names of study groups. Specific recommendations may apply, depending on your target journal

3.7. References

The reference section outlines all of the sources you used to develop your hypothesis and conduct your study. It is your ethical and professional responsibility to thoroughly document your work and provide complete transparency in identifying your sources. It is also necessary to cite the sources on which your hypotheses are founded in order to demonstrate that they are sound. The references back up your work and position it in the context of other studies on the same topic, while also directing readers who want to do more research on the subject.

Many novice researchers struggle to determine whether it is necessary to cite a source. Essentially, any thought or information that comes from a source other than oneself must be substantiated with a reference. However, universal truths or facts that are commonly accepted do not need to be cited (for example, cardiovascular disease is highly prevalent or cancer is a leading cause of death). However, ideas, or more specifically phrases or names coined by others, must be cited (e.g. patients with the "McConnell Sign" — the study by McConnell describing the sign should be credited here). Alternatively, patients were categorized using the BARC criteria (the work that describes the BARC criteria should be acknowledged here).

Title citing Drug/Intervention, Context, Design & Main Finding: <i>Use subtitles sparingly for study group names</i>	
Abstract: Comprehensible by itself. Introduction, methods, results, conclusion.	
Introduction	Explain the current level of knowledge, citing sources. Determine the knowledge gap that you want to fill with your research. Outline your goals (primary and secondary).
Methods	Describe in detail what you did and how you did it. Specify the criteria for selecting the study population. Describe every test, intervention, analysis, and technique.... Endpoints of specificity (primary and secondary). It is necessary to discuss ethical considerations. Statistical approaches will be discussed in a separate paragraph
Results	Describe the study's findings. Commentary and interpretation should be avoided. Give a result for each procedure described in the preceding section. Make use of appropriate illustrations (Tables and Figures).
Discussion	Begin with a summary of your major discovery. Compare your findings to those of other studies in the literature. Explain the relevance of the findings and how they contribute to the overall state of knowledge or enhance knowledge. Outline your strengths and weaknesses
References	List any sources that you used to create your work. Check the accuracy of all references, even if they have been copied from other works.

Figure 1: Shows a summary of the essential principles for what should be included in each section of a scientific paper.

Aside from specific studies that give their name to a sign or classification system, as in the instances above, you should prioritize articles published in English-language, peer-reviewed journals when citing references. Citing passages from published books is also permissible, but you must be very particular and provide the exact names and titles of the chapter in question, together with the page numbers, as well as the names of the book's authors and/or editors, as well as the publication data

Personal conversations and unpublished material, as well as Internet sites, should be avoided wherever possible. If you have numerous possible references, you may want to select the most current one or one published in the most dependable and reputable source journal. Try to prioritize original research pieces over reviews. If you want to reference an idea from a study where the authors already cite another source for the same idea, go back to the original piece and double-check the accuracy of what you're quoting, then cite the original authors rather than the intermediate publication. It is your obligation to ensure the accuracy of every reference you cite, and it is your job to offer enough detail so that a possible reader may locate that paper. You should double-check the accuracy of every reference, including those taken from other published publications. It is not the responsibility of your chosen target journal to format or validate your references.

In terms of formatting, the style in which the references should be presented will differ depending on the publication to which you intend to submit your work. You must follow the journal's author instructions on this subject or risk having your manuscript rejected if you do not. The introduction of bibliographic management software, of which there are many different kinds and types, both free and commercial, has made the process of gathering, saving, and formatting references much easier (fee paying). Use it if you have such software at your disposal. When writing your study procedure and article introduction, make a note of important references as you go by noting down the word or idea you want to remember, along with the exact reference details. You may believe you would recall where you saw such and such a finding, but after reading dozens of papers, your memory may begin to falter, and you may waste substantial time reading through everything again to find one reference.

4. Conclusion

Overall, while writing an article from start may appear to be a daunting endeavor for many young researchers, the process may be greatly aided by strong research project preparation and a methodical approach to writing, which follows these easy rules for each component (see summary in Fig. 1). It is worthwhile to put in the time and effort to properly prepare your essay because getting it published is a satisfying reward. After all, sharing your knowledge for the benefit of others, adding to the body of evidence on a certain topic, and capitalizing on your research with print publications are all components that will help to your career's success. So, take out your pen and begin writing: that is what your efforts deserve!

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