A synopsis of how to undertake research

N Kairinos
Department of Plastic and Reconstructive Surgery, University of Stellenbosch, South Africa
Corresponding author, email: kairinos@sun.ac.za

Undertaking research and getting it published can be a daunting task for those who have little experience in doing so. This article provides basic guidelines to assist novice researchers in succeeding with their research.

Keywords: research, study

 Wound Healing Southern Africa 2022;15(1):5-7

Introduction

It is said that once you have published your first article and the bug has bitten, you will have an urge to keep publishing. Sadly, most health professionals never get to do research or publish at all because of many factors, including lack of confidence in their academic abilities, absence of supervision, poor command of the English language, etc.

This article aims to provide some basic guidelines and tips on conducting research.

Types of research

As this article is a synopsis and not a comprehensive guide to research, the different types of research studies will not be discussed in detail. The reader must be aware that research studies can take many forms, e.g. retrospective or prospective studies, randomised control trials, interventional or non-interventional studies, quality improvement interventions, etc. Case studies and case series are at the lower end of significance when considering the importance/impact of research but are still an important part of our literature, particularly if unusual cases are reported. This is often of greater importance in some fields, such as wound care, and can be useful for other practitioners who encounter similar clinical problems. This synopsis, however, will focus mainly on how to undertake original research.

Undertaking research

Find a research question

Most novice researchers will benefit from a supervisor's assistance, preferably someone with experience or a research degree. However, the most important tip on doing any research is to ensure that you are interested in the research that you are doing. Research can be very tedious, but if you are interested in what you are researching, it can become enjoyable and rewarding to undertake studies. Many research projects have never been completed because of a lack of enthusiasm of the researcher. This is often seen when a researcher is given a project by a supervisor who is interested in determining the answer to a particular question, but the researcher is not.

The best is to discover a question **you** want to have answered because finding the answer to that through your research will keep you interested throughout and ensure that you see your project through to fruition.

Most novice researchers find it challenging to find a topic to research. The easiest way is to think critically about everyday things you do in your work and ask the question, "why" regularly. Why do certain things happen the way they do? If you don't know the answer to "why", you may have a potential research project. But first, you must check that the answer isn't already known.

Literature search

For this reason, most research projects need to start with a literature search to see what has been done already with regard to your question. If your question has never been raised or answered by other researchers, then you are lucky in that your research will be novel. Research which has never been done before always carries more value. It is also more exciting for the researcher, knowing that whatever your findings, they will be a first. This type of novel research is usually required for PhD theses.

However, even if somebody has already done a study, which answers your question or one that is similar, this doesn't preclude you from doing a study on this too. Whilst it may not be novel research, it is still valuable as it contributes to either supporting the existing research or possibly challenging the findings of other researchers. Remember, not everything that is published is necessarily correct or true, particularly if the research methods that the other researchers used were flawed. Therefore, more research on the same topic is always valuable, particularly if using a different methodology than prior studies. Although you might be attempting to answer the same question that other researchers have already answered, the fact that you are using different methodology makes your research novel.

Undertaking a literature search is also useful because it gives you information on what methods have been tried already, potential flaws in those methods and generally provides more insight into the topic you are researching.

Most would undertake a literature search using existing publication search engines, such as PubMed, MEDLINE, Google Scholar, etc. Although you will be able to read the abstracts of most articles, many of these will not be "open access" articles, and therefore, you will not be able to read the full article unless you subscribe to that journal. However, if you are affiliated with a teaching institution or know somebody who is, you can access the full article via the academic libraries. They can help you get the full article online and are usually very useful in assisting with this.

Ensure that you keep all relevant articles, as you are likely to want to quote them when you publish your study. Ideally, you must keep a database of all the articles you have read in your literature search on an electronic referencing platform, such as Endnote, RefWorks, Mendeley, etc. These applications will keep all your articles in a database and allow for the automatic creation of references when you write the article. The latter is particularly useful when sentences or paragraphs are moved or re-written, which could change the reference order. These applications change the reference order for you automatically.

Aim

The aim of the study gives the reader an idea of the purpose of the study. It also focuses the researcher on what they are trying to achieve or discover. For example, you could want to determine whether "dressing A" is more absorbent than "dressing B".

Method

The next step is to determine how you will be able to answer the question you posed in your aim. You need to consider what method/s could be used to arrive at the answer and whether you plan to test your method in vivo (on a patient/animal) or in vitro (in a laboratory/inanimate objects). It is always a good idea to use the latter route because it is easier, safer and less onerous in terms of getting ethics approval for your study (although both would require ethics approval from your university if you were to publish in a reputable journal). Continuing with the example mentioned above, you may decide to do a simple test and pour water onto the dressing using a measuring device or syringe until it is maximally saturated (no longer absorbing water) and measure how much water each dressing managed to absorb. This would be considered an in vitro study.

You also need to consider possible confounding factors that could interfere with your results when doing the study. Continuing with the example above, one could wonder whether the fact that you are pouring water and not wound fluid (which may be more oily or proteinaceous in nature) on these dressings influences how they absorb water. If this were to be the case, your in vitro study is not indicative of how these dressings would perform on a patient and might change the results if they were compared in vivo.

So, you may then consider undertaking an in vivo experiment, so that you are dealing with real wound fluid. Then your methodology for measuring absorption might need to change. You could, for example, compare dressings by removing them when they are saturated and then use the weight of the dressings before application and after removal to determine how much fluid was absorbed and whether "dressing A" or "dressing B" absorbed the most fluid.

Other confounding variables could influence your absorption rates, thereby still not giving you an accurate comparison when comparing these dressings. Therefore, you should ideally think about anything that could be a confounder and then eliminate it as a variable that could influence your results by making the "variable" the same in both studies. For example, you may have planned to do the study across a few wound clinics using different measuring scales. The scales could be a confounding variable because each scale may be slightly different in its accuracy. Therefore, you could eliminate this as a variable by using the same scale throughout your study.

For the most accurate results, a good researcher would have thought of all the confounding variables and controlled for all of them, so that the only remaining variable that can influence your results is the dressing itself.

It is always a good idea to perform a pilot study with small numbers before you embark on your main study. This often highlights problems you were not anticipating and allows you to determine how many tests you would need to do to achieve statistically significant results. The greater the difference between the two objects you are comparing, the fewer tests you would need to do to achieve statistical significance. Your pilot study will give you an idea of how different the two compared objects are. You would usually give your results to a statistician to determine what statistical analysis would be best to compare the results. They would then inform you how many tests you need to do before you are likely to have statistically significant findings. This is referred to as the "power" of the study.

If you don't have enough experiments/patients and your study is "underpowered", then, although you may see a trend that "dressing A" absorbs more than "dressing B", your statistician may not be able to find that the results are "statistically significantly" different. If you had more patients in your study, all showing a similar trend, then your findings could become statistically significant. Showing statistically significant differences between two compared things makes your study findings more important. Having said that, your research can and should still be published despite not showing statistical significance. In fact, sometimes, it is important to demonstrate that there is no significant difference between two things. If, however, the statistician notices a trend toward a difference, but the study numbers are not large enough to achieve statistical significance (the study is underpowered), then this, too, should be mentioned when the work is published.

Ethics approval

You should ideally obtain ethics approval for a study, whether it is done in vivo or not and whether it is a retro- or prospective study. The primary role of the ethics board is to protect the subjects being studied (when in vivo research is undertaken). It also serves to protect the researcher, who may have embarked on a project that would have resulted in ethical or legal issues. But the role of obtaining ethics approval is not only to ensure that you are not harming anyone or anything but also to ensure that your study methodology is sound and that the results that you will obtain will be accurate and useful. If they see an obvious flaw in your methodology, they will alert you to this, which is useful before embarking on your research.

Most ethics boards are situated in an academic environment; therefore, it is helpful if you are affiliated with a university if you want to obtain

ethics approval. Having said that, although it adds more credibility to your study, not all journals require you to have obtained ethics approval for your study. Keep in mind that if doing a study on patients, you will also need to obtain informed consent from them or their parents in the case of children, and the ethics board would want to see your informed consent form when applying for ethics approval.

Results

You are now ready to undertake your study. Ensure that you plan how you will record your findings when you do your research. Most would record them on a spreadsheet, so that you can easily perform data mining, statistics, etc. Use the services of a statistician to analyse the results.

Try and make sense of what your findings demonstrate and be critical about your findings. You now have another chance to determine whether confounding variables that you did not think of before the study, may have influenced your results. If you become aware of one, and you have data on that variable, your statistician can analyse whether this variable could have influenced your findings.

Now is also a good time to determine your study's shortcomings and what you would improve on if you were to do the study again. Documenting this when you publish your study is important, as it demonstrates that you have insight and helps other researchers who may want to do similar work.

Once you have made sense of your findings, you are in a position to draw conclusions from your results and put all of this into writing (publishing your research). This, too, is a skill that you will need advice on if you have never published before. There will be a follow-up article to this one, which describes the basics of writing and successfully publishing a research article.

Conclusion

Research, if done correctly, can be extremely rewarding and becomes easier the more you do it. Many, unfortunately, don't have the supervision or prior experience to confidently embark on a research project. It is hoped that this opinion piece helps those that would like to try their hand at undertaking research.

ORCID

N Kairinos https://orcid.org/0000-0001-9944-2033