

Column: Tips on Research and Publication

HOW TO CHOOSE A RESEARCH TOPIC?

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One of the most important aspects of planning research is choosing the research topic. Without a good research question, the outcome of any research is questionable and will not have any impact whatsoever. It is fairly common practice to hurriedly prepare a protocol and finish a study to meet the criteria for academic promotions. Similarly, to meet the grant application deadlines, not uncommonly, study ideas are generated within very brief periods. It often results in a poorly conceived research question. The time spent on choosing the research topic and generating appropriate questions will pay a rich dividend. An investment of time at this point in the research process offsets the potential time and resources wasted in pursuing an inappropriate question, or one that has been comprehensively addressed already.

Sources of research topics

There are many sources for research ideas. Clinical problems identified by astute clinicians could be the starting point of many

research topics. Most of the questions that arise from clinical problems will have immediate translational value. Some of the clinical questions come from observations that might have already been published as case reports or series. Ask your colleagues and seniors if they have come across any question that needs to be answered. Also, patients may provide with some concerns that can be translated into research questions.

Other sources may include critical appraisal of journal papers in the broad areas, that was published recently. Editorials in prominent journals often point out areas that need further research. Therefore, a literature search may identify areas where a further search is suggested. Sometimes, attending conferences and discussing with colleagues who have worked in the area may be helpful. Most of these studies that aim to refine the previous studies or extend them in some manner would be considered incremental research, and they constitute the bulk of studies conducted.

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Priorities of the society may be additional inputs for research, specifically when sponsors announce grants. Government or private bodies identify core areas that need research and offer funding opportunities. This can be easily found on the websites maintained by the respective ministries.

Sometimes, research questions arise from basic sciences, that may lead to translation of the findings for clinical use or extending it to the community. Such ideas arise in collaborative research when researchers from basic clinical sciences come together to formulate a research question. Most of this research could lead to novel solutions.

From a broad area to a narrow topic

Seasoned researchers will be working in a narrow area and would be aware of the gaps in the knowledge in that specific field. They will identify research questions that arise out of their prior research or the studies of other lead researchers working in that area. However, for a novice researcher, it may be difficult to identify the area in which one wants to do research. This is particularly a problem seen during the beginning of a research career.

In such situations, the first priority should be to identify one's own *research interest*. One can reflect which area one found interesting based on clinical encounters or while scanning through textbooks and journals. A broad area of interest can be chosen based on not only the individual interest but also the expertise of mentors, availability of resources, and population health needs. Some examples can be "schizophrenia," "anxiety disorder," "psychopathology," or "neuroimaging". Reviews in these broad areas (e.g., schizophrenia) would indicate what the active

areas of research in the field are. A simple PubMed search with keyword "schizophrenia" may indicate recently published literature in the field.

Conduct a literature survey

A thorough literature review is always required to identify what is already known in the field. When you search on a topic, you identify related research studies. These will help refine the research question further by defining the knowledge gap. Furthermore, an up to date review will help avoid unnecessary replication of the same studies, particularly when the answer to the question is already clear. It also helps to have a clear theoretical understanding of the topic or identify a conceptual framework that can be used to work on the topic. Look for systematic reviews or meta-analyses on the topics of interest, as they summarize a large number of studies. Most of these reviews identify potential areas for further research, as they identify the shortcomings in existing studies. If there are no systematic reviews available, you should conduct one in the research area so that the gap in knowledge becomes obvious.

Researchable question

Once a general area is identified, the next step is to generate a researchable question. The research question should lead to clinically useful information. Also, the question should lead to clear objectives of the study and testable hypotheses.

To ensure that a question is researchable, it has to be described in terms of exposures and outcomes in a specified population. Furthermore, one should clearly identify whether the focus is on diagnosis, prognosis, or intervention. These steps would lead to the

Table 1: Classes of research questions and the corresponding study designs

Research question	Study design
Incidence, prevalence	Cross-sectional survey, cohort study
Treatment efficacy	Clinical trial
Treatment harm	Clinical trial, cohort study, case control study
Screening	Clinical trial
Diagnostic accuracy	Clinical trial, cross sectional study
Prognosis	Clinical trial, cohort study
Aetiology	Cohort study, case control study

operationalization of the research question and the formulation of an answerable question.

Class of the research question

The question will be one from the following types: a) incidence and prevalence, b) treatment effect or harm, c) screening, d) diagnostic accuracy, e) prognosis, or f) aetiology. The study design that will be required will depend on the category to which the research question falls (Table 1). For example, let us consider depressive disorder:

‘how common is clinical depression in the community?’ (incidence or prevalence); ‘what causes depression: genetic or environmental factors?’ (aetiology); ‘what will happen to those diagnosed with clinical depression?’ (prognosis); ‘possible benefits of antidepressant treatment’ (efficacy); ‘potential adverse effects of antidepressants’ (harm); ‘whether a diagnostic test is useful for depression?’ (diagnostic accuracy); and ‘whether the outcome will be different if screened early?’ (screening).

PICO elements

While framing researchable questions, it is important to define the Patients, Interventions/Exposure, Controls, and Outcomes (PICO/PECO) elements. These PICO elements are an essential characteristic of answerable questions. Firstly, the study question should define the *patient* characteristics to be studied, with clearly defined eligibility criteria for the disease or condition. These criteria should specify the problem in the population, medical or psychiatric comorbid conditions to include, and which conditions not to include. This should also mention the setting, such as community, outpatients, or inpatients. Secondly, the type of *intervention* or *exposure* should be clearly defined. It should not be in vague terms but should be exact. It should include details such as the dose of the medication, timing, frequency, duration and route, etc. For exposures in the context of observational studies, it should include the timing and duration of exposure. Thirdly, the *comparison* group is defined accurately. A poorly selected comparison group will not allow appropriate conclusions to be made. For clinical trials, what is placebo or sham

treatment, or standard treatment or no treatment, should be clearly defined. The control group in observational studies may be from the hospital. It is better if they are from the same neighbourhood as the patients. Finally, the *outcome* of interest is included. It is important to understand whether the outcome is important and to whom it is important. Is it important to the patient, the doctor, or other stakeholders? Also, when should the outcome be studied? The PICO question format is, “in (X population), what is the effect of (X intervention) on (X outcome), compared with (X comparison intervention)?” Some use PICOTS to describe all the components, with ‘*time*’ and ‘*setting*’ elements in addition to the traditional PICO elements. Timing refers to the duration of follow up, and setting refers to community vs hospital, inpatients vs outpatients, primary care vs speciality services, etc.

FINER criteria for a good research question

FINER stands for feasible, interesting, novel, ethical, and relevant. It is a framework to identify good research questions. Examining each question under this framework allows one to evaluate their scientific merit.

Feasibility: The research question is evaluated in terms of time required, scope, and available funds, resources, and expertise. Can the research question be answered in a reasonable time frame in the proposed place of work? Are infrastructure and human resources available for this research? Is an appropriate pool of subjects available? The financial aspect should also be taken into consideration as it can affect the research. This includes hidden costs, which may not always be obvious. Is funding available? Is the expertise to carry out the research available? The availability of mentor

or guidance may be relevant in some context, especially if the researcher is not familiar with the techniques involved in a particular research. A feasibility or pilot study may sometimes be required to understand the nuances clearly.

Interesting: The researcher should have a genuine interest in the topic so that the study is carried out successfully. Also, in collaborative efforts, the research question should interest all the researchers. The question you can ask is whether this research would be personally and professionally rewarding.

Novel: The research question should lead to studies that result in new findings. Replicating an important study could also be taken up, as getting the same findings in different samples improves the generalizability. However, it is important to critically appraise previous studies and improve upon their methodology if limitations have been identified. This may also include the examination of confounders or some other predictor or outcome variables that have not been examined before. Sometimes, identifying clear gaps in the literature results in new questions to be framed.

Ethical: All research should meet the ethical guidelines of the Indian Council of Medical Research. The Institutional Ethics Committee has to approve the research proposal prior to the conduct of research. (If one is not available, then you can approach an Independent Ethics Committee) The risk-benefit ratio for the participants of the study is examined by the Review Board, especially when humans or animal research is involved.

Relevant: This is one of the most important aspects of choosing the research question. All questions should pass the “so what” test, i.e.,

the outcome of the research should ultimately provide useful information that somehow contributes to improvement in the health of the population.

Conclusions

To summarize, everyday clinical questions are an important source of research questions. The areas identified by Government or funding agencies are top priorities and would lead to important questions. A systematic review of completed studies in the field allows one to identify the gap. A skeptical attitude towards the widely held beliefs may sometimes result in new ideas that can be taken up as research questions. The research question should be answerable and should have all the PICO

elements. Also, the question should generate some interest in the researcher. Most important, the question should not have been answered before!

Suggested reading

1. Cummings SR, Browner WS, Hulley SB. Conceiving the research question. In: Hulley SB, et al. (eds). *Designing Clinical Research*. 4th ed. Philadelphia: Lippincott Williams & Wilkins, 2013, pp 14-22.
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