

Research Article

Secret to Success in Medical Research: A Concise Directive

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A B S T R A C T

Starting from philosophy to medicine - research is the fundament to their growth and enrichment. Over the years varied disciplines have not only contributed to the development of research as a speciality but also to the jargons that surround it. This article focuses on finetuning medical research under ten sections/ commandments and the way to achieve core competency using accepted abbreviations and acronyms applicable trans domain so that it becomes users friendly. They are the SMARTER guideline, FINER criteria and PICOTS format along with variants.

Keywords: Medical Research, Ten Commandments, SMART/SMARTER Guideline, FINER Criteria and PICOTS and its Variants

Introduction

Seeking truth by rational, and methodical consideration started with the development of Philosophy during 1250-1300 AD.^{1,2} Since then 'research philosophy' has become a permanent mundane in almost all sphere of studies be it economics and market research, sociology, psychology or medicine to name a few. What research philosophy means is the process of collection, analysis and use of data about an observable fact.^{3,4} Here the researcher is engaged in handling primary or secondary data to derive an answer to the research question which generates new evidence or knowledge.⁵ Hence it is the core component of the methodology section of any research.

Despite its great significance as the sole tool for evidence generation, research, in general, is comprehended as

draconian. This has created aversion towards the subject and has fewer buyers. This article is structured to eliminate this bias and make research users friendly.

Research in Medicine

Research is an integral part of development in medical sciences. It enmeshes diverge fields that can contribute to the development of tools that benefits human health and wellbeing's by inventing a new medicine, surgical procedure, diagnostic and imaging technique, nutritional or lifestyle intervention - the list is as lengthy as the complexity that determines health.⁶ So, terms like health research, physician-scientists, clinical research, epidemiological research, translational research etc. are in circulation and many times creates confusion in the mind of many medical professionals. Their zeal to contribute to the betterment

of their fraternity gets dampened.⁷⁻⁹

The way Ahead

If the jargon surrounding research in medicine can be eased then more and more health professionals will get involved and contribute their bits to bring a mega change to the field of medicine. This can happen if a simple and soothing framework is introduced for better comprehension and easy administration/ implementation.

There are definite simple guidelines that can assist a naïve, struggling or even established researcher in a rational and easy to implement fashion. When adhered to, this will fascinate and bring in more professionals into the ambit of researching commune and encourage them to take up a subject of their interest and come out with valid outputs thereby enhancing evidence synthesis.

At the start, the researcher must conceptualize the research purpose. To do this he must have an issue or topic in mind, then he should find a relevant population on which the issue or idea can be studied upon and to chose a technically sound methodology that will yield a valid result. When illustrated this 'Research Trilogy' will look like as illustrated in figure 1.

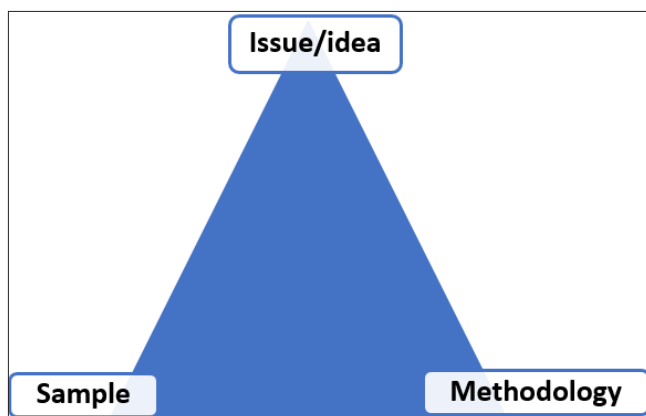


Figure 1. Research Trilogy

For successful implementation of the above trilogy, we have well-established guidelines; which are:

- The ten commandments for successful research
- SMART/ SMARTER guideline for perfect goal setting, defining a research question and generating hypothesis
- FINER criteria to develop quality Aim and objectives
- PICOTS outline and its variants to develop a sound methodology

The Ten Commandments for Research

These are a list of must-do things for succeeding in any research activities. This emphasizes on a research guideline consisting of; 1. Designing an apt title addressing key words; 2. Drafting an informative and attention-seeking abstract; 3. Stating the researched problem statement or research question; 4. Developing aim and objectives

to find an answer to the stated problem; 5. Highlighting the significance of the research in bridging the knowledge gap and influencing the audience; 6. Designing a suitable and replicable Methodology; 7. Analysing and interpreting data in expected line; 8. Time-bound project outlines; 9. Discussing and disseminating the impact of the work done 10. Enlisting the supportive sources in bibliography.¹⁰

To achieve this a researcher can seek support through established abbreviations and acronyms that can make life simple and interesting. The first one of the lots is SMART/ SMARTER criteria or guideline.

SMART Guideline for Goal Setting

It is the most commonly used and easy to comprehend guideline for identifying the problem, setting goal and designing aim and objectives for its execution. This immensely helps one to formulate a clear, concise and logical structure or framework for the research work one intent to carry out.¹¹

The credit for designing the SMART model goes to George Doran, Arthur Miller and James Cunningham who published this concept in a management journal in 1981.¹² Over the years this acronym has infiltrated into virtually all sphere of life and established itself as the gold standard in goal setting.¹³

The SMART/SMARTER acronym stands for S - Specific, M - Measurable, A - Attainable or Achievable, R - realistic or relevant, and T - Timely or Timebound. Designing your research goals and objective in accord with this guideline can give clarity to your work and boosts one's confidence. SMART goal setting can be SMARTER by incorporating two more components to it that deals with E - Evaluation and R - Review. As we all know, goal setting can be a daunting task and to accomplish this there is always a place for self-reflection that identifies areas for future growth or change.¹⁴⁻¹⁶ A closer look at this acronym scaffolds that the objective of our work should not only be Specific, but also simple, sensible and significant. The goal set with these ingredients is bound to succeed. We too should have a tool to measure the ingredients (variables) we want to explore to substantiate our set goal thereby lending it meaning and thus motivating those involved in the job. The team should be in a position to attain or achieve the desired results that is been agreed upon at the time of goal setting. Nothing is more satisfying than achieving any target within a suitable predetermined time. Thus, attaching the time component to any research activities further keeps the focus on the target and makes it time-based, time-limited, time and cost limited, timely, and time-sensitive.

Any research especially in the field of medicine and health is a complex undertaking asking for extra caution. Under interim evaluation at multiple checkpoints, one identifies

areas needing a relook and finding a timely solution to it, and by regular review, one makes readjustments so that the achievable is ensured within the set time and those responsible rewarded or make a revisit when things are not falling in line.^{17,18}

The specificity of research is enhanced when we stick to the five 'W' questioning. They are 'what' - one desires to achieve, 'why' - is the goal so important, 'who' - will be involved in the process, 'where' - the action/research will take place and 'which' - resources will be needed for conduction and completion of the job.¹⁹

Making the objectives measurable helps the researcher to track progress and augments team spirit. Predefining the measurable parameters in terms of how much, how many and how long will be a good armour.

Relevancy of the work undertaken is established when one elicits a 'yes' answer to questions like; Is the study worthwhile? Is the timing, right? Will the result apply to the current context? Are we the right persons to do this?²⁰

FINER criteria for developing a 'Research Question' (RQ): Once the big picture is conceptualized and the goal is firmly on saddle then it becomes vital to design a competent research question that can give further direction. A well-drafted RQ sets the tone for subsequent research activities; like adopting a sound and well-matched methodology and supplementing method.

Designing the RQ in accord to the FINER criteria has immense benefits. It takes care of the disreputable areas and guides the researcher in developing or designing a potent weapon (researching tool) with a high strike rate. The acronym is explained as follows. F- Feasible, I- Interesting, N- Novelty, E-Ethical and R-Relevant.

Thus, a sound RQ that can establish or guide the future researching activities have to be feasible, interesting, novel, ethical and relevant.

The main motive behind developing feasible research questions is to ensure that all those relevant preconditions are explored and answers sought to enable successful completion of the research project. So, it becomes mandatory that feasible research questions must answer the following important queries though not exactly exclusive. Is the RQ contextual for existing and upcoming clinical or empirical circumstances? Is it feasible to have an adequate number of subjects of interest for a statistically valid sample? Do we have technical expertise that is affordable in terms of material(equipment), time and money? Is the question manageable in terms of its scope in achieving set objectives like detectable effect size of clinical relevance? Is it feasible to conduct an analysable and guiding pilot investigation?

Besides being feasible the RQ should also address the 'I' component that stands for interest. The researching topic must be of interest to the investigators (intrinsic interest) and the population (extrinsic interest) alike. Such circumstances can create a 'win-win situation'. So, the focus must be on developing an RQ that kindle one's passion and is of scientific relevance. Thus, we have a set of questions though not entirely exclusive, that a researcher must ask himself or herself for adding weightage to RQ. They are as follows. Will the study be personally, professionally, economically and socially rewarding with a strong interdisciplinary interest(preferred)?

The next one in line is 'N' which stands for novelty. The topic one chooses to work upon is required to have some amount of novelty or newness. To fulfil the criteria of novelty one should point out an existence in the gap in knowledge and how it can be bridged, or need of innovative and new technologies for clinical and health-related problem solving by producing convincing/clinging evidence which can serve the needs of patients in particular and the population in general. At the same time drafting a novel, RQ essentially does not prevent one from replicating a successful research work conducted elsewhere that carries significant local relevance.

Asking an ethical research question is paramount and has been emphasized since ancient time. The important elements once must keep in mind while constructing an ethically valid RQ are; How to recruit, consent and ensure the safety of the participants? Will there be an incentive (direct or indirect) for them? How to ensure the confidentiality of participants data/ information and who will be entitled to access them? On presentday these have become a mandatory requirement for seeking permission from Institutional Review Board or Ethical Committee and Centralized Reviewing/ Ethical Committees which are established to safeguard the dignity, rights and welfare of human participants recruited into a study.^{21,22}

The last element under FINER criteria deals with R, that stands for relevance. The RQ must be relevant to the field of clinical practice or human health by bringing quality changes in treatment or investigation protocols which shall improve treatment outcomes. The research and its outcome shall also ensure financial benefits to all stake holders.²³

PICOTS Outline and 'its Variants' to Develop the Methodology

After taking care of the goals, the research question designed to address it via the aim and objectives it is time to look at the methodology and different methods that can help the researcher to reach to a logical conclusion. The PICOTS and its different variants are a popular suggested guide in these regards. The acronym stands for; P- Population/

patient/clinical problem, I- Intervention/indicator, C- Comparison/control, O-Outcome, T-Time/type of question, and S-Sample. A closer look at them is needed to have a clear understanding.

The population to be studied must be clearly defined for sociodemographic variables like; age, gender, ethnicity, socioeconomic status, and have an explicit inclusion and exclusion criteria considering their prognostic, and clinical characteristics. This is required to make the research findings internally and externally valid.

The Intervention in classic circumstances refers to testing a new drug, investigation, procedure, diet etc as is done in Randomized Control Trials (RCTs) or a variable of interest like exposure to a disease, risk factor, prognostic factor etc as noted in observational studies. So, in observational research the I of intervention becomes E for Exposure and PICOTS takes the form its first variant as PECOTS.

Comparison or control represents the placebo or standard treatment, investigation or procedures (surgical/ investigative) against which the novel concept is tested as the case in RCTs or observing the 'usual business' in observational studies where events like no disease, absence or presence of risk/ prognostic factor are compared with those who develop or have developed them during or at time of observation.

The methodology section should also focus on measuring the outcome of interest; be it the success of a treatment regimen, risk of disease occurrence, the diagnostic accuracy of investigations, the occurrence of morbidity or complication etc. The researcher should also explore the availability and affordability components attached to it.

The proverbial quote 'All good things must come to an end' holds good in medical research too. How dear the topic maybe but one has to finish the work in a timebound fashion. Keeping in mind the fast-changing scenario of scientific world, timely completion, compilation and publication are vital in the field of scientific study. So one has to make macro and micro plans to meet the set targets/ objective like time taken for completion of the investigation, achieving an outcome, observing the population for the occurrence of event etc. T also stands for types of study design one deploys like RCT, Cohort, case-control, Cross-sectional, correlational, comparative, Case Series, case study etc. when the RQ focuses on a 'first-time' concept with no or least literature support, then one restores to qualitative/ explorative design whereas if it intends to tests a hypothesis previously developed one will Require a quantitative/ Correlational/ Intervention (RCT) design. On some occasions, there may be a need to combine both of them under the ambit of 'mixed-method' research. Here while testing a hypothesis one may come

across or foresee the emergence of some new finding that requires exploratory techniques. The PICOT variant for qualitative research adopts PICo acronym where 'P' stands for population/ patients/participants, 'I' represents Interest (a phenomenon, event, activity, experience) area and 'Co' points to Context or environment. Thus, the researcher has to choose which design would best answer his RQ24-26. In figure 2, a comprehensive flow chart that comes handy while deciding on a research design is provided for the benefit of the reader.

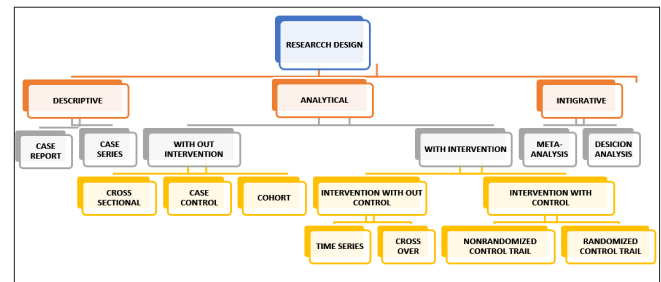


Figure 2. Flow diagram showing different research designs

Conflicts of Interest: None

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