

Chapter-11

How to Develop a Research Proposal for Extramural Funding

Anwar Ali Siddiqui

It is imperative that developing countries must build their own research base, mainly for the better understanding of the health needs and developing solutions and strategies for the ailments and conditions considered unique to the region. While past few decades have witnessed exponential growth in the number of scientific articles, yet investigator initiated research projects are relatively few. It is hard to disagree from the notion that health personnel working in their field of specialization within their own region are more realistically placed to make a decision regarding the severity and identification of a health problem of the areas they are living in.¹ Likewise when it comes to finding appropriate diagnostic, preventive or treatment measures, the local experts having familiarity with the social, cultural environment would be at a distinct advantage.² When certain disasters struck either in the form of natural calamity like earthquake or flood or eruption of an epidemic, again local researchers due to their better understanding of the environment, culture and population make up are always in a better position to look for solution.

Cost effective accessible health care deem necessary, that can only originate through investigation and decisions based on evidence. Searching for solution to health issues requires research and meaningful results can only be generated from reasonably large size projects. Proposals to study such situations and to seek solutions would require resources, mainly finances

and logistic support. A quick search of scientific literature on a topic of your interest would yield scores of quality research papers, which present work produced by researchers who had been recipient of research grant money awarded by the well, known and well recognized national and international organisations.

This chapter is written with the aim to provide basic knowledge on the development of research proposal intended to seek intra mural and extramural funding. Securing grant fund is a competitive process where an applicant submits his/ her proposal either in response to an RFA (Request For Applications) or an investigator initiated proposal which is generally submitted to funding agencies interested in improving the status of life in general. An essential characteristic of a researcher is to be a good observer, who can identify a problem and look for solution. It may sound so simple, but in reality from identification of a problem, conceiving the idea and finally the development of a research proposal would involve several phases, and each one of these would require rigorous thought process and hard work, until the final stage of submission of the proposal to the funding agency.

Conceptualization and molding the idea:

Some very bright ideas emerge due to constraints, as a result of which, out of the box solutions are sought. This gives birth to novelty, innovation and invention.³ Researchers conceptualize and give shape to the idea so that it can be tested and proven. These are early stages in the development of a research proposal. If you have an idea say it loudly and document, it in intelligible form using a forum so that you can have a claim over it. Evaluate your idea on the basis of its necessity and importance to the society, accessibility to background information, feasibility, and availability of resources. Remember a good proposal emerges from a well-conceived idea that others might wish and repent how and why they missed!

Pre-Writing Phase:

Identify area of interest, funding agencies, their priority area, substantive and administrative requirements. Notedown

due dates and submission requirements (e.g., whether a letter of intent is required before submission of the full proposal). Develop preliminary statement of potential research question, topic, and approach. Identify availability of relevant facilities, equipment, accessibility to patient data and other resources that will be required to carry out project work. Extensive literature search must be conducted very early in the thinking process.⁴ In fact one should develop a habit of mastering the use of software including EndNote, and create libraries of topic of interest, which must be regularly updated.

Identify a Sponsor:

Depending on the type of research area, one can develop a proposal in response to an RFA or for a granting agency obligated with a mission to support hardcore science. Clinical trial proposals can be developed on the invitation of the pharmaceutical industry interested in supporting intervention studies. Carefully read the eligibility criteria of the sponsor and pre and post research terms and conditions. Length of your proposal will depend on the RFA, as many extramural funding agencies first just ask for a concept note, short proposal or a letter of intent on a theme or programme, which they intend to support. Such short concept notes do not require detailed narrative, methodology or budgetary details as their primary aim is to judge the capacity and capability of the investigator to deliver according to their agenda.

Thoroughly search for research funding sources and identify those who have been funding research areas like yours and those that best match your interests. When you find funding sources that support individuals similar to your interest, then you can begin preparing the proposal according to the prescribed format of the funder. Before you start writing a proposal, first carefully read the guidelines and eligibility criteria provided on the website or given in the contents of the announcement for that particular RFA.

Next also read your own institutional policies on applying and handling of extramural grants. This is important as most sponsors

only (*I think this is always the case; so can be emphasized*) accept applications endorsed by the highest authority of the host institution. Remember, individual may be the principal investigator (PI), but grant is awarded to the institution and not to an individual.

Proposal Design:

Design of a proposal holds the scientific validity of the proposed research. A bad and inappropriately selected design could destroy the entire value and scientific appeal of an important research question. Such a proposal would not produce the correct answer to a good research question. Selection of an appropriate design is a complex issue, which requires expertise, as it acts like a road map in setting up the direction of a study and making the desired objectives achievable. Due to space restriction it would not be possible to include detailed description of each study design in this chapter. However, for the sake of understanding a brief mention of each design is provided. Beginners are advised to consult or even collaborate with experts who can guide in the selection of right strategy for research. Selection of the most appropriate study design is underpinned by the study objectives and research question. Depending on the nature of the problem under study, one can select from the qualitative or the quantitative approach. These are the two major designs applied in health research.

Qualitative research is mostly used in the exploratory situations where open ended questions in the form of group discussions are used. A small number of participants is selected to explore various aspects impacting on the health and well being of not only patients but on health care workers. For instance it can be used to assess the level of stress among health care providers that are playing important role in patient care as well as to assess perception and tolerance of pain and some biosocial practices impacting the health status of individuals.⁵ Qualitative design can be a method of choice when straight descriptions of phenomena are desired. In many situations

qualitative study serve the purpose of generating supportive data that helps in building a strong rationale for the large scale quantitative study.

Quantitative study designs offer assorted options for investigating a health problem affecting a population or identifying the areas that need attention to improve the living conditions of individuals. For instance one could opt for a cohort study design, where group of study participants or animals are observed over a given period or a cross sectional type based on single occasion observation. A case control type of study would require matching sets of study participants selected based on intended observations, while in interventional type of studies, clinical trials or animal based experimental studies are required.⁶ Mixed methods approach (a combination of qualitative and quantitative methods in the same project) is also increasingly becoming common in health sciences where dimensions of discovery vs verification is aimed in the same project.⁷

Essential Elements of a Proposal

Prepare a Work Plan:

Include a work plan in your research proposal. Your work plan or timeline should explain when you will accomplish each task (as described in your methods) and how long each will take. It should be in a table format, with a list of tasks in the left side column (perhaps grouped by the objective they support), and a list of months across the top. Your timeline is an estimate about future activities

Study Protocol:

Most research proposals share the same general structure which sits on its protocol with a written plan of the study. Study protocol must be clearly written and demarcated in sections by appropriate headings. A clear and precisely written protocol can effectively convince the reader about the capabilities of the principal investigator.

A well-designed protocol would have all essential elements including research question, hypothesis, objectives and well written narrative or introduction that will make the proposal stand out in a competition where other similar applications are assessed for funding. Other equally important sections are material and methods, budget, plan of work and list of references cited in the text. Most organisations and sponsors provide guidelines along with specific sets of forms that are designed to make sure that all necessary information about you and your institution are listed and the essential elements of the research proposal are explicitly provided.⁸

Narrative:

Collection of authentic information and, and the extensive literature review should enable you to focus, and provide conceptual clarity to write in a transparent language. An essential feature of your narrative on this proposed research would be to relate this to the past and identify gaps and shortcomings to justify your proposal. This is important because most new ideas are not completely new, but emanate from the flaws and gaps in the past research. After presenting a convincing argument, you can describe how your research can fill the gaps in knowledge and bring in improvements or resolve the hitherto unresolved issues. This section puts the project into context by providing essential information in the form of evidence about the specific issue and showing how the proposed project builds on previous work, and identifies gaps in previous knowledge.

After providing evidence, significance of your proposed work need to be highlighted to justify the case for the project, at the same time maintaining the focus on the proposed specific aims and emphasizing the need for the proposed study.

As a writer you must help the would be reviewer of your grant application to understand the issue you are drawing attention by making its significance crystal clear, avoiding jargon and topic-specific abbreviations or terminology, and not expecting reviewers to search references. Here you need to be

like a lawyer pleading your case, the difference is that your arguments must not conceal the truth and reality at any cost. The proposal should be completely self-contained.

Research Question, Hypothesis and Objectives:

A research question is a reflection of an inquisitive mind, which observes issues and problems with close interest to resolve it. Offering any possible calculated guess made to resolve this specific issue is like putting forward a hypothesis, which needs to be tested. For example if the questions is asked, why are we witnessing emergence of dengue virus in recent years?, what is the most likely reason of its spread in big cities, and how can the local population be protected? If the reported literature does not offer a satisfactory answer, then one can think of possible answers, by making calculated guess, which would be the hypothesis and will require intensive testing to validate. It can be deduced from the above statement that you seek answer to a research question and you test a hypothesis to verify the answer of your question in yes or no. This means that question and hypothesis are closely linked, but cannot be considered as one entity. Thus a hypothesis is a statement or explanation that is suggested by knowledge or observation, but has not, yet, been proved or disproved. A good research question should with stand the test on what? why? and How? It is aimed so that getting the answer should contribute to the existing knowledge and help in solving the problem identified in the form of a research question. A hypothesis based research carries more value as oppose to non hypothesis based like simple surveys which may serve as reliable resources for information.⁸

Research objectives determine the direction of the study so that desired outcome can be obtained. Experts have defined certain rules for writing objectives which are that; an objective must start with an action verb and written in clear language logically defining the activities to be undertaken during the life time of the proposed project. Objectives should aim to measure the outcomes. While writing objectives, one need to

understand the difference between goals and objectives as goals are long terms and may not be achievable at the end of the projects, while objectives are expected to be achieved upon the conclusion of the project. Going back to the above example of dengue, the goal of the research would be to eradicate the endemic of dengue, which would require huge resources and time, but one can have relatively small scale project having an objective to identify the possible solution to curtail its spread in the city.

Material and Methods:

In this section all activities starting from enrolling the participants, taking consent (in case of adult participants) collection of data and samples and procedures you plan to record any physiological observations if required. List all activities with all possible detail. Indicate the methodological steps you will take to answer every question or to test every hypothesis mentioned in your proposal.

Data Collection and Data Analysis:

Outline the general plan for collecting the data. This may include questionnaire administration procedures, interviews and observation procedures. Specify the procedures you will use like descriptive analysis, Analysis of Variance (ANOVA), multiple regression. Indicate briefly any analytic tools you will have available and expect to use (e.g., Ethnograph, NUDIST, AQUAD, or SPSS,. In the end it must mention how the results will be evaluated and the progress of the project will be monitored.

References:

Follow Vancouver or APA guidelines regarding use of references in text and in the reference list , which should Include only references cited in the text.

Budget:

A project budget is more than just a statement of proposed expenditures; it is an alternate way of expressing your project. In fact the budget is numerical explanation of your project as it

lists all the activities you intend to undertake during the course of the proposed plan. It needs to be as creditable as the narrative. Most funding agencies provide specific forms and expect strict adherence to their specific guidelines. While preparing the budget, keep in mind all objectives and activities mentioned in the material and methods section. Be careful not to leave out any items, from printing of a questionnaire or buying an equipment to salaries of research staff. Seek help from your institutions finance and budget department who can guide you about all the institutional requirements and policies of handling the money matters. Grants are awarded by the funding agencies to those who can demonstrate through proposals their ability to complete the projects satisfactorily within the available resources.

Ethical Clearance:

All research proposals whether interventional or observational, require prior approval of the Institutional Ethics Review Committee (ERC) or Institutional Review Board (IRB). No agency or host institution allows a research project to proceed without this approval. Make sure that you submit your proposal to the respective ERC well ahead of the funder's submission deadline.

REFERENCES

1. Srinivasa S., S.J., Developing countries and innovation: Searching for a new analytical approach *Technology in Society*. 2008;30(2):129-140.
2. Harris E, Building scientific capacity in developing countries. *EMBO Reports*, 2004;5(1):7-11.
3. Amy P. Wong, a.M.G., a Sergey S. Shevkoplyasa and George M. Whitesides, Egg beater as centrifuge: isolating human blood plasma from whole blood in resource-poor settings. *lab on a chip*, 2008(12).
4. Gitlin L. N., A.L.K., *Successful Grant Writing:Strategies for Health and Human Service Professionals*. 4 ed. 2014, New York: Springer Publishing company. 353.

5. Broom A ., W.W., A Qualitative Study of Meedical Oncologists Experiences of their Workforce and Sustainabilities. PLoS ONE 2016. 11(11:e0166302).
6. Hulley S.B., N., T.B., and Cummings, S.R., Getting Started: The anatomy and Physiology of Clinical Research, in Designing clinical research: An epidemiological approach., S.B. Hulley, Cummings, T.B., Browner, W.S., Cummings, S.R., Hulley, D.G., & Hearst, N., Editor. 2013, Lippincott, Williams, & Wilkins.: Philadelphia. p. 2-10.
7. Foss C, E.B., The value of combining qualitative and quantitative approaches in nursing research by means of method triangulation. J Adv Nurs., 2002. 40(2): p. 242-248.
8. Cummings S.R., G.D.g., and Hulley S.B., Writing a Proposal for Funding Research . in Designing clinical research: An epidemiological approach., S.B. Hulley, Cummings, T.B., Browner, W.S., Cummings, S.R., Hulley, D.G., & Hearst, N. , Editor. 2013, Lippincott, Williams, & Wilkins.: Philadelphia. p. 277-291.

-
1. Prof. Anwar Ali Siddiqui, BSc (Hons.), MSc, MPhil, PhD.
Dept. of Biological & BioMedical Sciences,
Aga Khan University,
Karachi - 74800, Pakistan.
Email: anwaralisiddiqui@gmail.com