Chapter-12

Research Grants & Funding Sources

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Introduction

Research is an integral part of academic institutions. Researchers conceive novel ideas which then transform into new knowledge. This paves way to development of new drugs, equipment and other technologies.[1] Converting ideas into reality requires experimentation. For this uphill task, resources are needed. In order to tap available resources from funding agencies, a good research proposal is mandatory. However everyone is not a born writer, especially in Pakistani context, where research culture is yet to develop. In clinical sciences emphasis is more on provision of services for the patient population which is the main reason for not finding enough time for research related activities. Medical Institutions and universities do not have a decent research departments. Thus faculty members and residents find it extremely difficult to write a research grant proposal. It is important to understand that grant money brings prestige to an individual and his institution. This is considered as a credit for an academician. Thus on one hand individual / institutions get resources for testing hypothesis and on the other hand rating / standing of an institution also improves. With grant money capacity building of research department is also enhanced. It is therefore important to have a broad based knowledge of grant writing. This chapter provides basics of writing an impressive research proposal so as to facilitate naives, who are intending to undertake such an endeavor, in developing skills.

Essential Steps in Grant Writing

a) Problem Statement: Research is a systematic process. It begins with identification of a problem which researcher wishes to address. It can be basic research where intention is to increase the knowledge or applied research intended to develop new chemical compounds etc. Problem must be of significant interest so as to attract funding agencies.[2]

Statement of problem can be written in three steps. It should start as to what is an ideal situation. It is followed by what currently exists that needs to be improved. The last component points out how researcher plans to address this situation so as to achieve desired outcomes. The issue in context must be described in sufficient detail so that readers are able to get clear message as to how useful this research would be. This section must not be long. About 500 to 750 words suffice. Providing evidence based references in this section adds to strength of this section.

b) Literature Search: It is important that a thorough search must have been contemplated by the researcher related to problem of statement. If same problem has been addressed and solutions are available, then it would be inappropriate to waste time and resources on re-inventing the wheel. Researchers must be able to access all the published literature on the subject. The full length articles, for which subscription is required, are often ignored by the researchers. These may contain sufficient information in relation to subject of research. It would be helpful for the authors to find Cochrane Reviews on the subject. Systematic literature review and meta analysis on the subject can help in finding out previous work done on the issue.

c) Developing Research Question: Based upon problem identified formulate a clear research question for which answer can be sought. This is the fundamental part of the proposal. It must be measureable, feasible and ethical as well. This helps in identifying study design to answer the question raised and how the results will be analyzed.

d) Hypothesis Generation: Hypothesis is described as an educated guess. It is a statement as to what will happen in course of experiments. It should be clear and described in simple words. It is based upon the variables that researchers want to analyze. Hypothesis should be testable.

e) Selection of Study Design: This is dictated by research question. A randomized controlled trial is considered as high level evidence. Only through this study design one can confidently deduce that an intervention done as an experiment, resulted in an outcome. With observational study designs one can find associations between exposure and outcome. Cohort studies in this context are extremely useful. It is not possible to always conduct a randomized controlled trial in some specialties.[3] Thus scientifically conducted observational studies can answer important question, based upon nature of the problem.

f) Sample Size Calculation: It is extremely important to determine minimum sample size for conducting a research so as to obtain meaningful results through statistical analysis. An epidemiologist may help in calculating sample size through various formulas available free of cost on internet. As a broad based concept it can be understood in simple words by stating that it is not possible to induct the whole population in context to answer a research question. It is therefore important to find a representative "sample" of the population that may be inducted into the study and results obtained can then be generalized to same population from which sample was drawn.[4] This is an essential step often not taken into consideration.

g) Analysis of Results: Statistical test that will be applied on variables of the data collected is another mandatory requirement. Statistician should be consulted before researcher plans to collect data. Validity of statistical analysis depends upon sample size.

h) Study Location / Collaborators/ Environment: Mention study site/s where research will be conducted. In case it is

multicenter collaboration then permission must be sought from other institutions. The name of all the collaborators must be written in main document. The availability of equipment, laboratory, human resource etc must be mentioned.

i) Ethical Considerations: All research proposals must be approved by institutional review boards and ethics review committees. Human subject research can expose study population to undue harm. Ethics review committees are there to prevent such happenings. These are not to be considered as hurdles but a facilitator. Informed consent forms must be developed on standard guidelines and be available for review with the main document. Researchers must declare if they have any conflict of interest. Any association or payment received for conducting research from other sources must be declared upfront.

j) Dissemination of Results: A paragraph as to how the results will be disseminated is important. A funding agency will be interested in knowing which data base might accept such a research. It will also justify additional expenses asked for publication and presentation of results in international conferences and other meetings. Funding agencies also get credit when disclosure is made as to who provided funds for the research.

k) Financial Needs (Budget): Cost calculation of research project is important consideration. Researcher must rationalize the amount mentioned against each head. Funding agencies meticulously scrutinize this part of the proposal. It is important for the researcher that their institutions should have a basic infrastructure for conducting research. This includes logistics and human resource.

l) Timeline: Researchers should provide an outline as to project schedule. A Gantt chart illustrates nicely the timeline which is easily understandable and gives better conception of the implementation strategies.

A general outline of a grant proposal submitted to a donor agency include some key elements which are given in Table-I.

Table-I: Key Elements of Grant Proposal Document.	
Executive summary	Abstract – New idea / Gaps in knowledge / How to fill in the gap in knowledge / what would be its impact?
Research Protocol	Methodology Research Question Hypothesis Sample size Inclusion / Exclusion criteria Statistical analysis
Ethical Considerations	IRB / ERC Approval
Budget Allocation	Provide details of expenditure
Timeline	Develop Gantt Chart

Identifying Appropriate Funding Agency

It is important for the researcher to surf internet for grant awarding bodies. Each agency has its own vision. They award grants to the projects that align with their objectives. It is important to visit their website as each donor agency has also developed their own guidelines. Read carefully the needed format and any specific documentations required. Various types of government and non-governmental bodies that provide grants are given below. In addition many universities, foundations, association etc offer grants and scholarships for research purposes.

a) In Pakistan: Higher Education Commission (HEC), Pakistan Health & Research Council (PHRC), Pakistan Science Foundation, Pakistan Academy of Sciences are few of the organizations that award grants for research under various categories. HEC also offers Start – up research grant for fresh PhD degree holders. HEC provides up to 20 million rupees grant to faculty members through National Research Program of few Universities. Various types of other grants are also available. Intended persons can visit their website (http://hec.gov.pk) for details. PHRC also provides research grant in priority areas including both communicable and non-communicable diseases. A grant up to 0.3 million is available for principal investigator.

b) International Donor Agencies Working in Pakistan: Many international donor agencies like USAID, in collaboration with government of Pakistan and provinces, award grants to researchers. World Health Organization through UNICEF and other divisions that have special mandate in select areas also provides funds in health sector.

c) Foreign Donors: There are many donor agencies that have special funds for developing countries especially in health and social sectors including education. This includes renowned Bill and Melinda Foundation. They are quite active in Pakistan in area of vaccines and infectious diseases.

d) Collaborative Research Funds: Many researchers in developed countries have ongoing projects and they seek collaborative partners in developing countries for facilitating ongoing research.

e) Pharmaceutical Industry: Pharmaceutical companies also provide funding for research. Conflict of interest in such situation should be considered. In Pakistan PharmEvo through Health Research Advisory Board (Health RAB), Getz, Hilton are few to mention here. These companies are usually involved in phase IV trials.

International Grants and Funding Opportunities

A list of donor agencies is given in Table-II, from where researchers can seek grants and funds.[5-7]

Table-II: Grant Awarding Agencies.

Research Councils UK
Commonwealth Funds
National Institute of Health (NIH)
Center for Disease Control (CDC)
Global Health Initiatives
Gates (Bill and Melinda) Foundation
The Global Fund
Pfizer
Wellcome Trust
International Development Research Centre (Canada)
The Fogarty International Center

Types of Grants

Various categories of grants are available from other countries. It is important to mention here that researcher can seek grant for further education, career development, and travel as well. International exposure helps in broadening thinking processes which helps in generating new ideas for research.

Important Considerations

a) Researchers' CV: In international arena number of agencies offer grants mostly though universities and government ministries to researchers. In this context researchers' own CV and association with an institution is important. Even in Pakistan, previous publications in impact factor journals and citation index of publications by researcher also counts. Researchers must mention other academic activities like being faculty member of prestigious universities, societies, associations, reviewer of medical journals, or member of editorial boards of journals etc.

It must be remembered that researcher works with a team. It is considered a strength if team includes persons with excellent academic background, who themselves have received research grants previously. Funding agencies are always critical in vetting the standing of research team. A good track record increases the chance of receiving grants.

It is advisable that researchers should keep their proposals ready or be able to complete them in short time as funding agencies announce availability of grants at random. They should keep a close eye on advertisement published in newspapers, medical journals and newsletters as well. Appropriate selection of available grant is important as some are time bound and funding may be limited.

b) Institution Standing: University / institution rating is important for funding agencies. Availability of logistics and trained human resource gets priority. Many universities invite researchers to become part of their team. Benefits are thus received by researcher as well as university when grant is approved.

Epilogue

Research in medical and related fields contributes to welfare of the people. This must be considered a social responsibility for improving health related parameters of our nation. Developing a positive attitude can go a long way to achieve the desire goals. Towards this end excellent grant writing skills will be the first step. Tapping of funding resources helps in executing research proposals.

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