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Presenting budget in a research grant application

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An innovative research idea does not mean a successful grant application.^{1,2} Convincing details about the feasibility and the team are important grant winning combinations in a competitive grant review.³ Once reviewers have understood the research project, they turn their attention to the proposed budget.¹ A well-justified budget plan aligned with the research needs, feasibility, team, and institutional infrastructure is the tipping point in favour of an application.⁴ What reviewers are looking for is to be convinced that their approval is giving the best bang for the buck.^{1,3-5} The aim of this short communication is to provide new investigators the essentials of presenting the budget in a research grant application with a fictive example.

Planning for the Budget

Budget preparation starts with the conception of research question that include study population, measurements, and timeframe for the study. Research question/objectives drive sample size (study participants, SP) required to achieve the objectives. Thus, sample size estimation is an essential starting for budget preparation followed by laying out study operations and time required to recruit the given number of participants. Most of the time there is maximum allowable budget and you have to play with your sample size and measurement procedures to bring your budget within limits. Selection of measurement procedure for outcomes is an important part of study and budgeting. Many times more objective (sensitive and specific) procedures are expensive or invasive. So you have to play a trade-off between measurement procedure quality and cost of procedure/laboratory test e.g., self-reported clinical diagnosis of using influenza like illness is very cheap but not very specific while Polymerase Chain Reaction (or PCR) testing is very specific but is expensive.

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What Constitutes a Study Budget

Research grant applications forms vary among funding agencies yet their budget sections are quite similar. Taking the examples of research programmes of the three major public sector health research funding agencies in Pakistan,⁶⁻⁸ namely, Pakistan Medical Research Council, Pakistan Science Foundation and the Higher Education Commission, it is evident that the budget sections in their application forms are almost always divided in following five subsections: 1) Personnel, 2) materials, 3) travel expenses, 4) equipment, and 5) indirect costs (Table-1). A brief description of the mentioned subsections is provided below.

Personnel

A research project always needs personnel to achieve proposed aims.² For example, for a research project as part of training programme such as residency, often hospital interns and residents self-constitute the human resource to accomplish their research goals.^{2,3} For larger and long term projects, dedicated personnel consisting of research managers, coordinator, associates and/or assistants are needed depending upon the research scope and methods.² Their salaries and allowances are budgeted in this subsection.⁴ Sometimes a provision exists in this subsection to budget salary support for investigators, trainees or other staff employed by the institution where the proposed research is expected to be completed.^{2,4} Usually, a column is provided to mention the time spent on the proposed research project for each of the investigator or trainee so the support is proportional to their time investments in the project.⁶ Number of personnel and percent effort or days on project comes from the sample size and time required to complete data collection from study participants (SP).

Materials

This is a broad category. It may include expendables, services, and all other expenses directly related to research processes.^{4,6,8} Expendables are necessary physical objects consumed in the research process e.g. laboratory tests, electrodes, printed questionnaires etc.^{5,6} Services include technical support required for research processes but personnel performing these are not part of the research team as such e.g. translation of questionnaires, laboratory services, informatics support,

Table-1: Comparison of budget descriptions required by funding agencies sponsoring health research in Pakistan.

	Pakistan Medical Research Council	Pakistan Science Foundation	Higher Education Commission
A) Overall characteristics			
1) Name of program	Routine Research Grant	Research Project PSF-1	National Research Program for Universities
2) Number of years shown in budget section	Three	Three	Three
3) Budget summary	Yes	Yes	No*
4) Budget justification	Yes	Yes	Yes
5) Currency	PKR	PKR	PKR
7) Maximum budget	200 000 PKR	Not mentioned	Start at 10M PKR†
B) Budget subsections			
1) Personnel	Yes - separate	Yes - combined	Yes - separate
2) Materials	Yes - separate	Yes - combined	Yes - separate
3) Travel	Yes - separate	Yes - combined	Yes - separate
4) Equipment	Yes -separate	Yes -combined	Yes -separate
5) Indirect costs	Yes - separate	Yes - combined	Yes - separate

*Only one section at introduction inquires about the total study budget. †It increases with respect to potential impact factor of a project. M: Million. PKR: Pakistani Rupees.

printing services etc.⁵ Other expenses could be the participant compensations as well as arrangement of food or medical cover for the SP.^{2,4}

Travelling

Two major types of travelling are involved in health research. The first one is related to research process itself, e.g. for field work or providing transport to SP.^{2,4,7} Secondly, research dissemination requires travelling which is an important priority for all funding agencies.^{5,6} Therefore, expenses to present intermediate or final research findings at different forums or conferences are budgeted in this subsection. It may be possible that both of these costs are defined separately as "local travel" and "travel related to dissemination" in which case they need to be mentioned in the manner as prescribed in the grant application forms.

Equipment

Most funding agencies recognize that innovative research project require equipment including machines with the state of the art software that are budgeted in this subsection.^{6,8} Similarly, some grants allow to budget the construction or laboratory renovation expenses related to specific research projects which are included in this subsection.⁶

Indirect Costs

More often than not, a separate subsection is provided to include indirect costs, which are expenses that cannot be itemized and are shared resource and hence charged at fix percent. This cover office space, power, water, internet at office and printing, rentals or unbudgeted purchases etc.⁴ For instance, indirect institutional expenses, usually known as overheads,⁹ are included in this subsection.⁴

Budget Summary, Justification, and Research Plan

Most applications include a budget summary and a justification for different expenses as well as a year-wise research plan.^{6,7} The budget summary allows funding agency to screen the expenses according to major expenses categories (subsections)⁸ whereas the budget justification allows the review committee to judge whether proposed expenses are judicious based on their previous research experiences.⁵ Budget justification has to be concise and should concur with the proposed budget.² A year-wise research plan is a complimentary yet an important piece of information for funding agencies as most of them receive funds from government or other sources in an year-wise cycle (e.g. national budget).⁶ The plan helps these funding agencies to foresee transfer of funds to researcher or their institutions.⁵ This is also a built-in evaluation regarding the progress of the project as transfer of funds is often coupled with submission of progress reports of the projects.^{5,6,8}

Budget Restrictions and Cuts

Every grant application budget section comes with restrictions.^{3,5,9} The most notable is the total funding available per successful application. Often research methods are needed to be adapted to available funds. Furthermore, some institutions may restrict funding as per different categories. For instance, Pakistan Science Foundation restricts the amount to be paid to principal investigator at Pakistani Rupee (PKR) 50 000 per year.⁸ Similarly, some agencies specify that overhead expenses should not be over 10% of the proposed budget.⁶ Similarly, Pakistan Science Foundation and the Higher Education Commission allow a certain % or amount for independent auditing and accounting of project

expenses to maintain transparency.^{6,8} It is important to highlight here some restrictions may be imposed even if the grant application is approved. For instance, the federal Canadian health research agencies impose an 11-22% budget cut across the board for all applications after approval.¹⁰ Therefore, investigators have to be careful to read all instructions before applying and accepting research funding to have a clear plan for delivering the goods required at the end of the project.^{1,2}

Additional Funding Mechanisms

A successful grant application often attracts other financial support.^{1,2} For instance, investigators may be interested to add some additional diagnostic dimensions requiring financial support in an ongoing project.² If their objectives are in line with the mandate of the same or another funding agency, there are better chances of success for additional funding if project base funding is already established.³ Therefore, when signing contracts with the funding agencies, the investigators should take account whether they are allowed to obtain additional funding in case they wish to extend the scope of their research project in the near-future.⁶

Orientations of Funding Agencies

Research funding agencies have their own policies and mandates as well.^{1,3} Some agencies are more likely to fund proposals from basic sciences whereas others are interested in funding clinical research projects.^{7,8} Similarly, funding agencies can be interested in allocating necessary funds for research disseminations through conferences and meetings with the potential stakeholders or users to ensure uptake of research.⁶ Some agencies are interested in capacity building through engaging research trainees. When filing an application, it is important to align budgeting costs with these mandates (e.g. capacity building and dissemination) to make your application appealing to a particular funding agency.⁵

Illustrative Example

Let us demonstrate budgeting a study using an example from our previous "Learning Research" short communication.¹¹ Consider that investigators have chosen to compare the clinical effects of a new Drug "B" with the drug "A" in patients with disease "D". Supposing 60 SP with disease "D" are recruited in a randomized controlled study with two arms "A" and "B" (30 per arm).

Table-2: Proposed budget of a randomized controlled study to compare clinical effects of drug "B" (SP=30) with "A" (SP=30).

	Number	%	Unit price (in PKR)	Total (in PKR)	Year 1, SP=30 (In PKR)	Year 2, SP=30 (In PKR)
1) Personal						
1a) Honoraria - PI	1	10%	2 000 000	200 000	100 000	100 000
1b) Honoraria - Co-PI	1	5%	2 000 000	100 000	50 000	50 000
1c) Research coordinator	1	100%	500 000	500 000	250 000	250 000
1d) Research assistant	1	100%	500 000	500 000	250 000	250 000
2) Materials						
Expendables						
2a) Drug "A" treatment*	30	-	30 000	900 000	450 000	450 000
2b) Drug "B" treatment*	30	-	30 000	900 000	450 000	450 000
2c) Urine test	120	-	100	12 000	6000	6000
2d) Blood test	120	-	100	12 000	6000	6000
Services						
2e) Health insurance	60	-	2 000	120 000	60000	60000
Other						
2f) Compensation to participants	60	-	1 000	60 000	30000	30000
3) Travel						
3a) Taxi for participants	120	-	200	24 000	12 000	12 000
3b) Conference presentation	2	-	20 000	40 000		40 000
4) Equipment						
4a) Laptop	1	-	50 000	50 000	50 000	
4b) Desktop	1	-	50 000	50 000	50 000	
4c) Blood pressure instruments	2	-	2 000	4 000	4 000	
5) Indirect costs						
5a) Overhead	-	10%	Add cells 1a to 4c	347 200	176 800	170 400
T) Total (1a to 5a)		-		3 819 200	1 994 800	1 874 400
O) Funded by other sources (2a+2b)*		-		1 800 000	900 000	900 000
A) Requested for funding (R=T-O)		-		2 019 200	1 044 800	974 400

*We assume that they are provided by pharmaceutical company. PKR: Pakistani Rupees. SP: Study participants.

Assuming that diseases "D" is a non-communicable chronic health problem and our study requires only two visits, a recruitment and a final visit separated by three months of treatment. SP are required to file in questionnaires, blood and urine examinations on both visits. Based on investigators' experiences, they assume that approximately 30 SP can be recruited per year so they propose a research plan for 2 years. A fictitious budget is presented in Table-2.

Budget Justification Related to Our Example

The proposed budget is divided in five subsections (please read this with Table-2). Personnel: The categories of this subsection "1a=PKR 200 000" and "1b=PKR 100 000" describe the proportion of time spent by investigators multiplied by their two-year salary, the duration of the proposed project. Their time represents project supervision, data analyses and report writing. Two dedicated research personnel i.e. a research coordinator (RC) and a research assistant (RA) are included in this research process, budgeted as "1c=PKR 500 000" and "1d=PKR 200 000". RC oversees recruitment, blinding, and other overall coordination whereas RA is involved in data collection and entry. No trainee stipend is budgeted in this study. Materials: Research processes require drug "A" and "B" treatment for three months budgeted as "2a=PKR 900 000" and "2b=PKR 900 000". Similarly, methods require blood and urine tests for 60 SP at recruitment and at final visit budgeted as "2c=PKR 12 000" and "2d=PKR 12 000". In order to avoid any ethical and legal consequences, health insurance is obtained for all 60 SP budgeted as "2e=PKR 120 000". The compensation for participation is budgeted as "2f=PKR 60 000". Travelling: SP are provided taxis to research institution at recruitment and final visits budgeted as "3a=PKR 24 000". Two conference presentations are planned as "3b=PKR 40 000" in year 2. Equipment: Necessary equipment required for the data entry (Laptop) and secure data (desktop) budgeted as "4a=PKR 50 000" and "4b=PKR 50 000". Blood pressure instrument is budgeted as "4c=PKR 2 000". All the equipment costs are budgeted in year 1. Indirect costs: Institutional overhead costs are budgeted as "5a=PKR 347 000" which are 10% of all budgeted expenses from "1a" to "4c". In RCT, usually drug treatments are provided from pharmaceutical companies. Therefore, treatment costs (O=PKR 1 800 000) were subtracted from total cost (T=PKR 3 819 200), resulting in budget requested (R) at slightly over 2 million PKR; PKR 1 044 800 in year 1 and PKR 974 400 in year 2.

Conclusion

Budget is an important part of any grant application.² Budget subsections are similarly structured in grant applications of different agencies.^{6,8} Careful attention is required to understand the allowed expenses, restrictions and conditions of expenses. Some institutions have dedicated research offices to review grant budgets and therefore investigators should seek help from these resources to increase clarity of their proposed budgets.⁶ In case these services are not accessible then it is recommended to verify with the managers and coordinators involved in research in order not to miss any important research needs.^{2,5} Lastly, please do not hesitate to contact funding agencies if you have queries regarding budget details.¹²

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