

Perceptions of successful domestic and international research grant applications among experienced and novice researchers

Successful
research grant
among
researchers

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Abstract

Purpose – The main purpose of the study was to identify the key elements that characterize successful grant proposals and the relative importance of issues that constitute difficulties and concerns in preparing the proposals. The study aimed, in particular, to explore grantsmanship perceptions based on the experiences of researchers in Thailand who had, or had not yet, successfully been awarded domestic and/or international research funding.

Design/methodology/approach – Anonymous online questionnaires were distributed to researchers in biomedical and public health fields in Thai academic institutes. The online survey asked the anonymous participants to complete a questionnaire comprising both multiple-choice and open-ended questions.

Findings – About 19% of 300 respondents had received both domestic and international research grants, and 60% of domestic research grants. The top 5 issues in grant applications were: (1) choosing a topic that matched the grant opportunity, (2) feasibility of research design and methods, (3) suitable research design and methodology, (4) model and theoretical justification, and (5) ethical considerations. Significant differences in perceptions among researchers were found for the feasibility of research design and methods and proposing a reasonable and justifiable budget.

Originality/value – The information derived from this analysis reflected the perceptions of the researchers and may or may not correlate with those of grant agency reviewers. The results of this study may be insightful and instructive for other researchers and form the basis for training and mentoring researchers in informed and effective grantsmanship, particularly novice researchers with limited or no experience in grant proposal writing. This study particularly reflected grantsmanship perceptions among researchers in Thailand. It may also serve to exemplify lessons learned for researchers in other low-income and middle-income countries (LMIC) exposed to similar settings and situations applying for research grants.

Keywords Grantsmanship, Sponsored research grants, Training, Mentorship, Researcher perceptions

Paper type Research paper

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Introduction

Every researcher faces two key challenges: securing sponsored-research grants and publishing research papers. Most researchers experience difficulties in developing and applying for a sponsored research grant. They are required to develop high-quality grant proposals for funding in a highly competitive domestic and international environment. When the amount of funding available is limited or fixed, the relative performance of the applicant in presenting a convincing application often determines success. On the other hand, the primary expectation of investment in sponsored research is to produce knowledge that yields beneficial and applicable outcomes. Most grant agencies then use peer review to identify which proposals to fund, but there is mixed evidence of the effectiveness of peer review when making research funding decisions [1].

Literature suggests that a successfully funded proposal is based more on skill than luck [2]. Planning and preparing a successful grant proposal depends on a clear understanding of the review criteria that will be applied. The main purpose of the present study was to identify the key elements that characterize successful grant proposals and the relative importance of issues that constitute difficulties and concerns in preparing the proposals. The study aimed to explore grantsmanship perceptions based on the experiences of researchers in Thailand who had, or had not yet, successfully been awarded domestic and/or international research funding.

Methods

Target study participants

An online questionnaire was distributed to researchers, novices (those who had not yet received a grant), and experienced researchers (those who had received domestic and/or international research grants) between March and August 2017. Study participants were derived from different biomedical and public health fields, if they worked in the public and private sectors or in academic and research institutes across all regions of Thailand.

Data collection

An email containing a link to an online questionnaire was addressed to the heads of the research offices of 12 university hospitals, 116 nonuniversity hospitals and 53 research institutes. Recipients were asked to forward the link to researchers in their settings. In all, 2,787 emails were sent out, not only to heads of research offices but also alumni and researchers who had previously submitted proposals to and/or participated in workshops conducted by the Faculty of Tropical Medicine, Mahidol University, Thailand. The researchers receiving the link to the questionnaire were asked to complete the online form voluntarily, and the completed form was automatically submitted to a database.

The online survey asked the anonymous participants to complete a questionnaire comprising both multiple-choice and open-ended questions. The survey comprised two main parts: (1) the perceptions of the researchers regarding the critical issues in grant applications that required particular attention and would be emphasized by reviewers during proposal review, and (2) difficulties and/or concerns that researchers had experienced while preparing their proposals. The items in the questionnaire, which asked the researchers to rate the importance levels (using a Likert scale) of those issues, were developed from guidelines used by domestic and international funding agencies and literature reviews regarding grant applications.

Online structured questionnaire

The basic components of a grant proposal included: problem statement, project objectives, aims and desired outcome(s), program methods and design, evaluation of outcome and

process, support and long-term project planning and proposal budget planning [3]. The criteria for reviewing and evaluating proposals are generally similar for domestic or international, government or private funding agencies [4].

The US National Institutes of Health (US-NIH) has updated the guidelines for grant applications over the years. In general, the research plan is composed of different sections, including specific aims, significance, innovation, approach, timeline and milestones, anticipated challenges and alternative approaches [5]. In reviewing the proposals submitted to US-NIH, the reviewer scores are based on five criteria: (1) significance: does the project address an important problem, and will it have an impact in the field? (2) investigator(s): are the investigators qualified and experienced to conduct this project, or do they possess complementary expertise appropriate for the project? (3) innovation: is the project concept novel and original? (4) approach: are the research plan, strategy and study design appropriate for the successful execution of the study, taking into consideration potential limitations and alternative strategies? and (5) environment: is the institution supportive, and are the resources adequate for the project? [2, 5, 6]. According to the United Kingdom Medical Research Council (UK-MRC), the key components of the assessment criteria used by grant agency panels are usually based on research quality (scientific rationale, novelty, importance, and timeliness of the research), research management, and people (suitability of the investigator group, including the track record(s) of the individuals in the study team), methodology (feasibility of experimental plans, statistics, methodology, and design) [7].

Based on the aforementioned issues, an online questionnaire was developed that asked study participants to rate the importance level (on a 1–5 Likert scale) of each issue related to proposal applications, which they perceived would be the main focus of reviewers assessing their proposals. In the second part of the survey, the researchers were asked to rate the level (on a 1–3 Likert scale) of difficulty or concern experienced when preparing a grant proposal. Prior to the final version of the questionnaire, there were three steps in the development process:

Step 1. Identifying basic components and issues related to a research grant application and researchers' concerns: The content of the questionnaire was derived from a review of various international and local guidelines and calls for proposals of funding agencies/organizations, as well as from discussions in scientific journals, as previously mentioned.

Step 2. Determining the validity of the questionnaire items: The questionnaire was subjected to face validity by three faculty members of the Faculty of Tropical Medicine who reviewed a draft questionnaire. The reviewers had extensive experience with submitting and receiving both local and international grants. They also received input and suggestions from their peers.

Step 3. Trial version of the online questionnaire: The questionnaire was trialed on 10 researchers who attended a workshop held by the Faculty of Tropical Medicine. The main purpose was to ensure the feasibility and comprehensibility of the questionnaire; thus, no formal pilot study of the questionnaire was conducted. As there were no critical comments or concerns about answering the questionnaire, it was considered acceptable, and a link to the final version was emailed to the targeted study participants.

Thus, one limitation of this questionnaire development may be that it was derived from a comprehensive literature review and the opinions of three reviewers. The questionnaire content attempted mainly to capture the self-reported experiences, perceptions, and opinions of the study participants regarding their research-grant applications. There were no formal calculations for internal consistency reliability and construct validity of measurement.

Data analysis

Researchers generally read and tried to follow the instructions and requirements of the funding agencies to prepare and submit their research proposals so that ratings were expected to skew towards a high level of importance. In order to assess the subliminal thoughts of the study participants, the study used Likert-scale ratings collapsed into two categories, the highest score vs. other scores of importance. The Likert-scale importance ratings for each item were analyzed, and the percentages of experienced and novice researchers assigning the highest values were calculated. Comparisons of rating levels between the three groups of researchers (i.e. experienced, receiving domestic and international grants; experienced receiving domestic grants only; and novice), were evaluated using chi-square tests, with a *p*-value of < 0.05 considered statistically significant.

Ethics approval

This study was approved by the Ethics Committee of the Faculty of Tropical Medicine, Mahidol University, Thailand. The study participants were informed about the study purpose and answered the questionnaire anonymously; they were at liberty to skip any item(s) they did not want to answer.

Availability of data and material

All data were for the purpose of this analysis. Comments or notifications could be accessed only by authorized personnel at the Faculty of Tropical Medicine, Mahidol University, Thailand.

Results

Characteristics of the survey respondents

During the 6 months of the online survey, of the 2,787 emails distributed, 300 (10.8%) responses were received. Approximately 19% had received both domestic and international research grants, and 60% had received domestic research grants. About 22% were novices who had not yet successfully obtained a research grant (Table 1). Based on the complete data, 249 respondents were identified as researchers who had been working for between 1–42 years (Mean = 13.0, SD = 9.8 years).

Most important issues for proposal review, as perceived by the researchers

As shown in Figure 1, the most highly rated issue was choosing a topic that matched the grant opportunity (78%). About 65–67% of researchers rated study design and methodology

Characteristics of the respondents	<i>N</i>	%
<i>Experiences in receiving grants (N = 300)</i>		
Novice	65	21.7
Domestic grant recipient	179	59.6
International and domestic grant recipient	56	18.7
<i>Years being a researcher (n = 249)</i>		
1–5	63	25.3
6–10	71	28.5
11–20	58	23.3
21–30	37	14.9
>30	20	8.0

Table 1. Characteristics of the online survey respondents

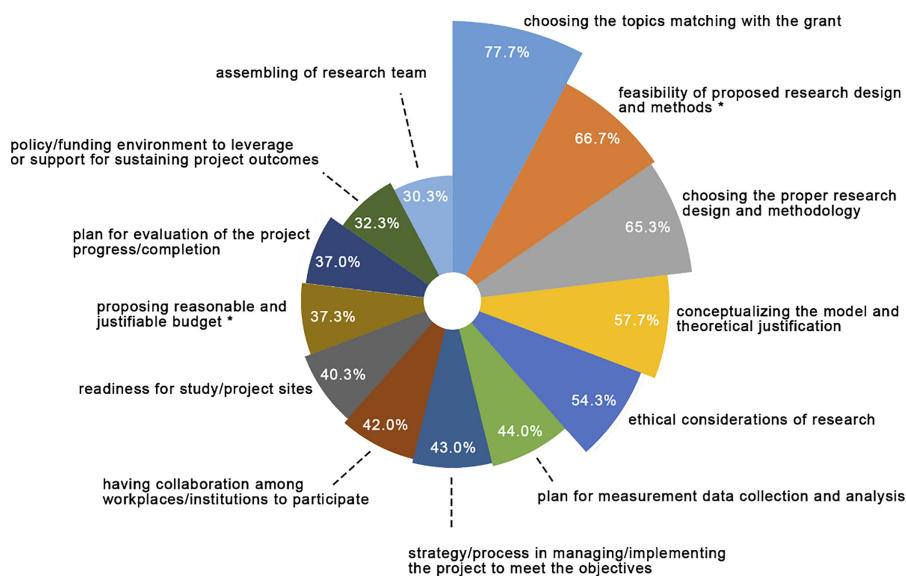


Figure 1.
The most important
issues in grant
applications

(choice and feasibility of proposed research design and methodology) as the most important issues. Conceptualizing the model/theoretical justification for the study was rated as the most important issue by 58%. Ethical considerations of the research were rated highly among 54%.

When comparing the ratings of the most important issues among researchers with different experiences of receiving grants, only two issues were found to be statistically significantly different (Table 2), including the “feasibility of proposed research design and methods” and “proposing reasonable and justifiable budget.” Regarding the feasibility of the proposed research design and methodology, the ratings were 79% among researchers who were recipients of both domestic and international grants, 61% among those who received only domestic grants, and 71% among novices who had not yet had successful grant applications. Comparing the proportions of ratings among the three groups, only those who were recipients of both domestic and international grants (79%) were statistically significantly different from those who received only domestic grants (61%). Proposing a reasonable and justifiable budget was rated as the most important issue by 51% of novices, compared with 35% of researchers who had domestic grants and 29% of researchers who had both domestic and international grants.

Difficulties and concerns experienced while preparing grant proposals

Figure 2 presents the ratings of the highest level of difficulties or concerns while preparing grant proposals. The top four issues rated by >30% of researchers as most important were the availability of facilities (e.g. laboratory, support staff, technicians, libraries) among the entire research team (38%), time available/allocated by the principal investigator (PI) and researchers (38%), the complexity of the application forms/procedures (36%) and timing of grant supports (32%). Concerns raised by about one-fourth of the researchers as most important were the size of the grant/funding provision (29%), decision timeframes for grant applications (28%), submission process services/support for submission at the primary workplace and/or collaborating team (25%) and financial support from the primary

Table 2.
Importance of issues in grant applications, as perceived by grant applicants

Important issues to be considered in grant applications	Novices N = 65		Domestic grant recipients N = 179		International and domestic recipients N = 56		All N = 300	
	n	%	n	%	n	%	n	%
Choosing a topic to match the grant	53	81.5	132	73.7	48	85.7	233	77.7
Feasibility of proposed research design and methods*	46	70.8	109	60.9	44	78.6	200	66.7
Choosing the right research design and methodology	43	66.2	114	63.7	39	69.6	196	65.3
Conceptualizing the model and theoretical justification	36	55.4	105	58.7	32	57.1	173	57.7
Ethical considerations of research	36	55.4	101	56.4	26	46.4	163	54.3
Plan for measurement, data collection and analysis	32	49.2	81	45.3	19	33.9	132	44.0
Strategy/process in managing/implementing the project to meet the objectives	30	46.2	82	45.8	17	30.4	129	43.0
Having collaboration among workplaces/institutions to participate	26	40.0	75	41.9	25	44.6	126	42.0
Readiness of study/project sites	27	41.5	73	40.8	21	37.5	121	40.3
Proposing reasonable and justifiable budget*	33	50.8	63	35.2	16	28.6	112	37.3
Plan for evaluation of the project progress/completion	31	47.7	65	36.3	15	26.8	111	37.0
Policy/funding environment to leverage or support for sustaining project outcomes	25	38.5	60	33.5	12	21.4	97	32.3
Assembling the research team	15	23.1	57	31.8	19	33.9	91	30.3

Note(s): * $p < 0.05$

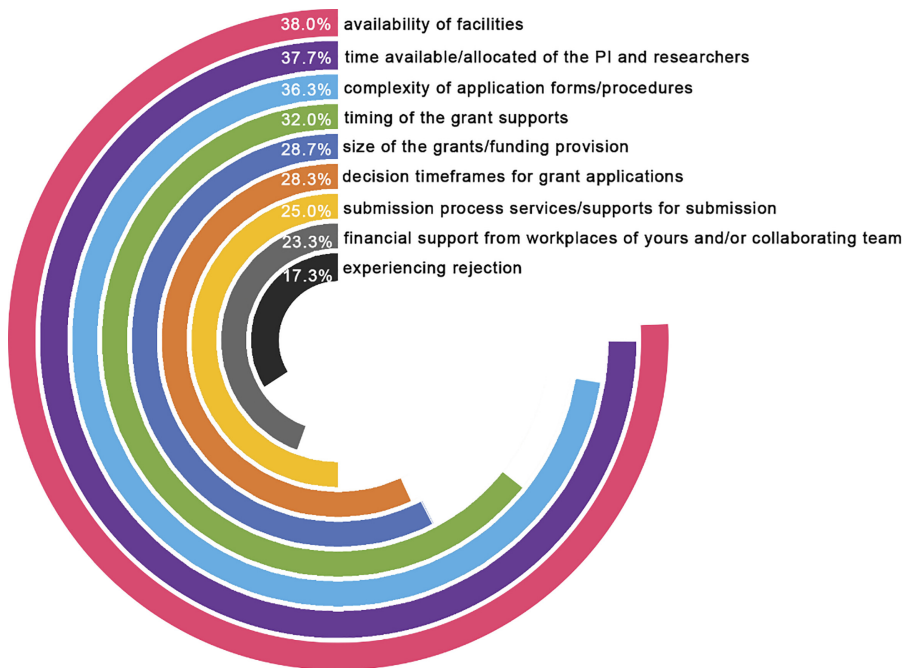


Figure 2.
Difficulties and
concerns experienced
while preparing a
proposal

workplace and/or collaborating team (23%). Overall, about 17% had had proposals rejected. When comparing the concerns of researchers who were classified by their experience as grant recipients, the ratings varied but were not statistically different among the three groups of researchers (Table 3).

Of 300 respondents, 82 shared their experiences of grant submission in the open-ended questions (Table 4). The top five issues were similar to some issues listed in the multiple-choice items, including identifying the significance of topics corresponding to national policy/strategy and community concerns, grant agency focus on researcher experience, expertise, and track record, the constitution and composition of the research team, time constraints in preparing the proposal (due to high routine workload) and grant requirements and budget justification.

Discussion

This study investigated the perceptions and concerns among researchers in different biomedical and public health fields with different experiences of receiving grants. The perceptions may or may not concur with the process and criteria employed by grant application reviewers to make their decisions; however, the issues and concerns rated as most important by the researchers in this study mostly accorded with the issues and criteria explicated by grant agencies in the literature.

The top three issues, according to the researchers' perceptions of successful grant applications, were reflected by their ratings for the conceptualization and methodological approaches of the proposal; choosing a topic to match the grant, feasibility of the proposed research design and methods, and choosing the right research design and methodology. Novices and experienced researchers generally had similar perceptions and rated most

Table 3.
Issues faced by
researchers when
preparing grant
proposals

	Novices N = 65		Domestic grant recipients N = 179		International and domestic recipients N = 56		All N = 300	
	n	%	n	%	n	%	n	%
Difficulties and concerns in preparation of a grant proposal								
Availability of facilities (e.g. laboratory, support staff, technicians, libraries) among all research team	26	40.0	65	36.3	23	41.1	114	38.0
Time available/allocated of the PI and researchers	27	41.5	71	39.7	14	25.0	113	37.7
Complexity of application forms/procedures	25	38.5	62	34.6	22	39.3	109	36.3
Timing of the grant supports	22	33.8	57	31.8	17	30.4	96	32.0
Size of the grants/funding provision	22	33.8	50	27.9	14	25.0	86	28.7
Decision timeframes for grant applications	15	23.1	51	28.5	18	32.1	85	28.3
Submission process services/supports for submission at the workplaces of yours and/or collaborating team	22	33.8	42	23.5	11	19.6	75	25.0
Financial support from workplaces of yours and/or collaborating team	17	26.2	38	21.2	15	26.8	70	23.3
Experiencing rejection	14	21.5	31	17.3	7	12.5	52	17.3

Issues and experiences from grant submissions	Freq (N = 82)	Successful research grant among researchers
Identifying the significance of topics corresponding to national policy/strategy and community concerns	22	535
Grant agency focus on experience, expertise, and track record of researchers	20	
Constitution and composition of the research team	18	
Time constraints to prepare proposal (due to high routine workload)	17	
Grant requirements and budget justification	16	
Research environment, availability of equipment, and institutional support	13	
Having a mentor for drafting the proposal	12	
Number of grants available vs. number of applicants	8	
Having connections with grant agencies (grant project officers) to clarify scope and approaches	5	
Experience of reviewer bias	4	
Limited calls for research in specific areas (i.e. traditional medicine or basic science studies)	3	
Lack of scientific writing skills	3	
Lack of preliminary study information	3	
Feasibility of the study (objectives, study endpoints, eligible subjects)	3	
Innovation and creativity of the study	3	
Having a conflict of interest	2	
Procedures and steps in proposal application	2	
Boosting motivation to do research	2	
Problems with ethical issues of the study	3	

Table 4. Issues and experiences from the submission of grant proposals (open-ended questions)

important almost all issues that would result in a successful application, apart from the feasibility of the proposed research and the justification for the proposed budget. Interestingly, novices and awardees of both domestic and international grants placed more importance on the feasibility of the proposed design and methods than those who received only domestic grants. This observation may be related to the types of calls for proposals by grant agencies. Most international grant agencies, having larger and more plentiful awards, tend to issue broader calls for research topics/ideas, while domestic calls for proposals may be more specific. Regarding the proposal of a reasonable and justifiable budget, it was clear that novices with less experience rated this issue as a most important issue when compared with experienced award recipients of domestic and/or international grants.

Most researchers rated as most important the choice of a topic that matched the grant opportunity. In the open-ended questions, where researchers shared their experiences of grant submission, the importance of this issue was also confirmed. It was suggested in the literature that, before writing a grant application, researchers should: (1) identify the problem/ goal area for which funds will be sought, (2) develop relationships and communicate with funders, (3) search thoroughly for relevant grant opportunities, and (4) determine whether the proposed project is a good fit with the sponsor and the sponsor's key objectives [8]. In submitting a grant proposal, researchers undergo intense scrutiny, requiring them to show that their ideas are compatible not only with research colleagues in the field but also with relevant industries and policymakers [9]. Many grant agencies have regular announcements, Requests For Proposals (RFPs), and Funding Opportunity Announcements (FOAs). The top-most reason for success is that the application has a good fit with the RFP/FOA schema [4, 10]. The UK-MRC requires that the proposals submitted, either by RFP or not, should present the pathways to impact, detailing the activities that will promote potential economic and societal benefits from the study outcomes [11]. Reviewers of grant applications will always look for good science and science that will have an impact [12]. Similarly, the Wellcome Trust requires researchers to present their research vision by communicating how the project will result in significant

advances in the proposed field; and reviewers will be looking for transformative or innovative research [13].

About 58% of researchers rated conceptualizing the model and theoretical justification as most important. In the early phase of a research grant proposal, researchers should define the problem clearly, formulate falsifiable hypotheses, include preliminary data, and establish clear objectives before planning the research methods/methodology [14]. A grant proposal that presented inadequately specific aims failed to attract the positive attention of reviewers [15].

Securing funding is important for enabling researchers to conduct their studies, but the budget justification must be sound and reasonable. Requesting an appropriate amount of funding is also important. In preparing the budget, it is suggested that novice researchers should review the application budgets of colleagues and mentors [16]. Novice grant writers should get help with budget preparation, together with other grant application activities, such as legal, contractual, intellectual property, biosafety and ethics [2].

About 54% of researchers rated ethical considerations as the most important, and a few experienced researchers reported ethical problems with grant reviewers in previous applications. Ethical and/or research governance issues are requisite parts of proposal packages [5, 7].

Grant seeking is a methodical process involving input from stakeholders at various levels of the organization [17]. About 42% of researchers rated collaboration among workplaces/institutions as most important. About 38% had concerns regarding the availability of facilities (e.g. laboratory, support staff, libraries) among all research teams, while 23% had concerns about financial support of their own and/or collaborating team's workplace.

In their responses to the open-ended questions, many researchers remarked that grant agencies tended to focus on researchers' experience, expertise and track record. An analysis of research funding for European universities showed that researchers with the most external funding tended to be those with the most patents and collaboration with industry and were likely outstanding communicators [9]. Another study of factors associated with successful grant proposals indicated that past researcher productivity (track record) positively affected funding level, but that effective networking and collaboration were more important [18]. Besides the background of the PIs or coinvestigator(s), grant applications are usually required to provide details of research staff. It was suggested by experts that successful grant applicants will begin with "people"; that means assembling the research team, followed by innovative and impactful ideas [19]. It is also important to have a clear engagement process with the research team and other stakeholders [20].

A few experienced researchers felt it valuable to establish and maintain connections with grant project officers who can help clarify the scope, objectives, and approaches of the RFP/FOA and potentially provide support within their agency. Most grant opportunities list key contact persons, such as program officers, who are usually experts in the application process, knowledgeable about the type of project and may possess specific knowledge of the scientific area [5, 21]. Grant officers are generally looking for work that might lead to further studies, or how a study might be utilized for a further benefit, not necessarily for immediate application [22]. Early contact with the assigned project officer should help increase the chances of success [5, 21].

Many researchers had concerns about the submission process. It may seem less important than the science, but it is crucial to submit a complete application on time and include all of the required nonscientific sections, i.e. supporting documentation (e.g. biosketches, letters of support, facilities and resources, equipment, ethics/human and animal use requirements, etc.) [6]. As suggested in the literature, grant applicants require administrative support before, during, and after the application and during the subsequent project. The research-administration team can provide effective communication and linkages between researchers

and grant agencies and facilitate/mediate political and administrative issues within the institution [9].

Many researchers in this study reported their concerns about grant submission were partly due to their experience of rejection (22% for novices, 17% for domestic grant recipients, and 13% for domestic and international grant recipients). It is important to recognize that most proposals did not get funded on the researcher's first submission [12]. However, an unfunded study is not necessarily poor science. The characteristics of poor impact proposals, as summarized in the literature, were a lack of specificity on deliverables, lack of consideration of broader beneficiaries and stakeholders, and proposal too narrowly focused, or too much focus on track record rather than what will be done [10]. It is essential that researchers read the invaluable reviewer comments thoroughly; these comments inform the next proposal for submission or serve as the basis for submission to a different sponsor [15]. Grantees of successful proposals should also read the reviews carefully, as helpful comments and issues may be raised that will improve the quality and conduct of the project.

Limitations of the study

The results of this study were based on an online survey. The return rate was about 10%, which was very low. The emails were sent to almost all academic and research institutes in Thailand, and all those connected with research activities and the Faculty of Tropical Medicine, Mahidol University. This approach to data collection has both advantages and disadvantages. The results of this study were based on an online data-collection survey, which could reach many people and groups; however, one potential drawback was that respondents were restricted to those with Internet access. The target groups in the present study were researchers in scientific fields who generally used the Internet as part of their normal work. The sampling bias, being an anonymous survey, may be problematic, as very limited information about the characteristics of the respondents was collected. The present study also employed a "snowball" technique in questionnaire distribution, which may result in the representation of some groups over others, resulting in systemic selection bias. Therefore, caution should be exercised in generalizing the study findings to estimate population parameters.

Conclusion

The top five issues perceived as most important by researchers submitting grant applications were: (1) choosing a topic that matched the grant opportunity, (2) the feasibility of the proposed research design and methods, (3) choosing the appropriate research design and methodology, (4) conceptualizing the model and theoretical justification, and (5) ethical considerations of the research. The top five issues perceived as the highest level difficulties in preparing and applying for a grant were: (1) availability of facilities among all research team(s), (2) time available/allocated by the PI and researchers, (3) complexity of application forms/procedures, (4) timing of the grant supports, and (5) size of the grants/funding provision.

The results of this study could be used in the development of a training plan on grantsmanship for researchers seeking funding from local and international agencies, particularly for novice researchers without or with limited experience in grant-proposal writing, to increase the chance of securing grants that would make a significant scientific impact and progress their research career paths. This study particularly reflected grantsmanship perceptions among researchers in Thailand but may also serve to exemplify lessons learned for researchers in other low-income and middle-income countries (LMIC) exposed to similar settings and situations applying for research grants.

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