

Conducting publishable research under conditions of severely limited resources

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ABSTRACT

Doing research when resources are severely limited will always be challenging. But by sharing resources, collaborating internationally as well as locally, developing sustainable research lines and optimizing study concept and design, researchers can significantly increase their research output and enhance its quality.

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The intense competition for research and publication puts researchers working with limited resources at a serious disadvantage. Moreover, the efficiency with which the available resources are utilized depends on the availability of skills, expertise, and the efficiency of the administrative and financial procedures. When resources are very limited, some researchers might resort to publishing their research in any journal that accepts it, especially if the academic promotion requirements are lax. Taking Libya as an example, the percentage of PubMed-indexed papers published in journals without an impact factor was 41% during 1988–2007 [1] and 43.8% during 2003–2013 [2]. The former study also estimated an average annual publication rate of 1 PubMed-indexed paper per 143 academic staff members [1], and it seems logical to assume that most of the research was published in journals that were not indexed in PubMed. Notably, both of these studies cover a period of time when the country's economic resources were plentiful. This editorial discusses some ways for researchers faced by a severe limitation of resources, for whatever reason, to increase the quantity and quality of their publications.

The robustness of research depends foremost on the quality of the study question and the appropriateness of the study design. Sometimes, researchers complete studies but then find it difficult or impossible to publish them in good journals due to faults in the study question or study design. In some instances, the outcome could or would have been different if minor but important aspects of the study had been modified, such as incorporation of a novelty aspect, inclusion or better selection of a control group, or modification of the sampling or recruitment procedure.

The quality of research can also be enhanced by increasing the efficiency of resource utilization. Four

important approaches are pooling of resources, collaboration, optimization of conception and design, and development of strategic research plans. First, resources can be pooled physically, for examples labs within a college or in core facilities, or functionally by developing a liberal access policy for the use of research facilities within an institution. Second, local collaboration is important, but collaboration with overseas researchers has the added value of accessing overseas research facilities and possibly higher levels of expertise. Developing nations suffer from brain drain, and researchers can exploit this loss by establishing collaborations with their previous colleagues who had chosen not to return. Third, conception of research topics can be optimized by focusing on novel study questions that are of interest to at least the relevant regional readership of journals. Fourth, it is important to develop strategic plans of a few years and to follow them rather than periodically hunting for a topic. This can be achieved after dedicated study of the literature to understand the scope and landscape of the area of interest, to identify sustainable research topics that require little or no resources, and to understand the gaps in knowledge therein. The following types of research require little or no financial or laboratory resources, and they are widely prevalent, but they are discussed here in the light of seeking to perform more robust research while avoiding pitfalls.

First, survey-based questionnaires are among the easiest tools for many types of research. Surveys are better designed or used to test a hypothesis or to lay the ground for a planned study. Many validated questionnaires and scales are used to assess various health-related issues. They range from diagnostic

and therapeutic questionnaires to assessment of the quality of life of specific patient groups. They can be used to study the efficacy or safety of treatments or to understand risk factors and associations, as well as in community-based prevalence studies. However, examining a well-established relationship between certain variables in a country in which it has not been tested is not in itself novel unless there is convincing evidence that the situation might be different. Moreover, hopping from one topic to another does not promote research and publication because the researchers do not follow-up on their results and hence do not deepen and widen their knowledge of the topic. Gaining greater experience in a topic or line of research grants researchers a greater ability to conceive new studies in that domain.

Another area of research related to validated questionnaires is their translation and cultural adaptation. In Arab countries, many but not all translations have been to classical Arabic because it is the same in all Arab countries. However, a poor level of education is an impediment to understanding and responding correctly to such questionnaires. Comparatively evaluating classical and colloquial translations within the same society is one useful avenue of research that seems to have received inadequate attention.

Second, cohort studies are powerful research designs, but they are very difficult or nearly impossible to conduct in settings where patients frequently switch between hospitals and clinics or the patient records are not efficiently organized. Hence, case series almost become the default, but if the aim is essentially to collect and statistically analyze data without justified novelty or a well-founded hypothesis, they might not grab the attention of a journal editor. Case series can be used to answer novel and significant study questions, such as the hypothesis-driven retrospective case series study 'to evaluate the feasibility of adding temozolomide to pazopanib in advanced sarcoma patients following single-agent pazopanib failure' [3].

Third, systematic reviews with meta-analyses have long been placed at the top of the evidence pyramid in evidence-based medicine, though a new model has been proposed in which they are represented by a lens through which studies are evaluated [4]. Systematic reviews sometimes stand alone, but they are frequently combined with meta-analysis. However, systematic reviews require

expertise not only in the topic being reviewed, but also in critically selecting studies for inclusion, and meta-analysis requires statistical expertise. Where local expertise is not available, it can be recruited by collaboration with researchers abroad by e-mail. This would also ameliorate any difficulties in obtaining the full text of the papers. For detailed discussions of how to conduct a systematic review and meta-analysis, the reader is referred to two recent articles [5,6].

Fourth, clinical research can be integrated with clinical care: the patients, physicians and laboratories are all available, eliminating or greatly reducing the need for expenditure. While they could be attractive in limited resources settings, this approach is better avoided if there is no guarantee of vigorous ethical review and monitoring of the study because there is a risk that the objectives of the study receive priority over patient welfare [7].

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