PQR cascade: A system proposed for research prioritization in applied sciences

The main goal of applied research in sciences such as health and social welfare is to find evidence-based solutions for problems and effective ways to meet the needs of society; a principle reflected in the country's development plans. The first step towards accurate and purposeful research is to determine research priorities.[1] Prioritizing research and integrating priority setting into research policies are essential for research macro-planning. Yet, a reasonable foundation for prioritization requires trustworthy information and an analytical vision, along with sound reasoning and judgment. Research prioritization is a key process in research management that guarantees the allocation of essentially limited resources and addresses domains conferring the greatest benefits to society.[2,3] Moreover, due to the limited financial resources and the importance of efficient research management, human and financial capacities should be allocated to more prevailing problems that cause more serious harm to the society. According to the literature, less than 10% of the global research fund is dedicated to health problems that cause 90% of the total burden of diseases.[4] In other words, research subjects are mostly determined by researchers' personal motivation and the interests of the private sector sponsors.

There is no consensus on how to prioritize research; yet, most prioritization methods refer to a range of activities that include identifying, ranking, and reaching a consensus on research domains or questions that are important to stakeholders.[5] Research prioritization can be defined as selecting the best set of research activities and programs to facilitate the most effective use of available resources to conduct research. Although numerous technical guidelines are available for research prioritization, a major concern of policymakers is that they are difficult to understand and most of them are not really practical. The existing research prioritization guidelines such as Essential National Health Research (ENHR) and Child Health and Nutrition Research Initiative (CHNRI) are generally designed based on the opinion of experts; therefore, they do not appear to well determine priorities based on the community needs and mainly cover researchers' topics of interest. As such, a new method is required to exploit the strengths of the available methods and meet the real societal needs and problems.

Considering the management problems and the limitation of research resources to deal with health problems in developing countries, the present method helps to allocate limited resources in an effective way and reduce the burden of these countries' problems by emphasizing and identifying problems as priority. To overcome this issue, we used a hybrid approach consisting of previous prioritization strategies, a review of the literature, assessing the societal problems and needs, and seeking the opinions of healthcare stakeholders including providers, policymakers, and researchers. The outcome was a method we named as PQR model: P stands for Problem; Q for Question; and R for Research [Figure 1]. Based on the results presented

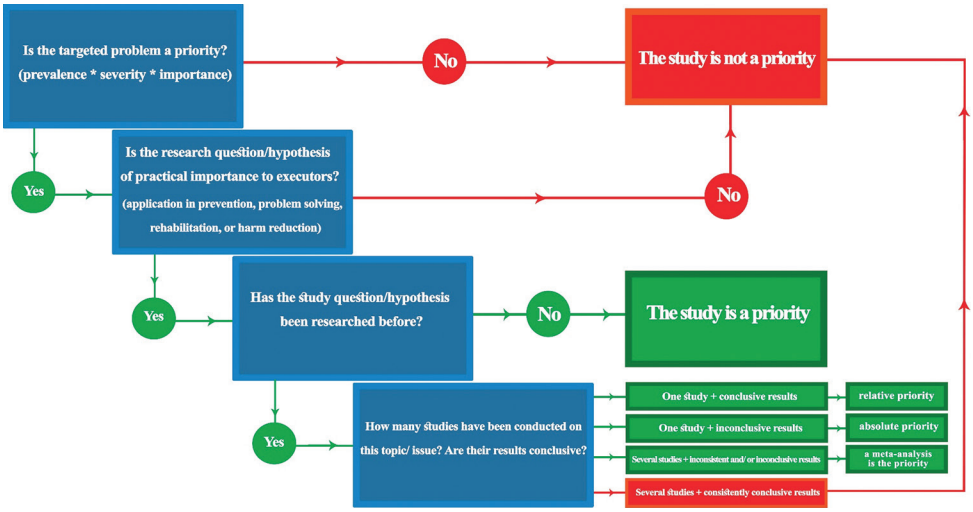

Figure 1: The research prioritization system: PQR model

in the model, research institutions must initially follow these three steps to formulate their research priorities; and then, they should determine the priority of the received proposals by following the same steps. Only after these steps are completed, the proposals can be submitted. Review for the methodology, budget, scheduling, ethics, and other considerations is expected to happen after priority is confirmed.

Step 1: Prioritizing the health problems/social problems. In the first step, only those studies can be supported by an institute that focuses on problems that are at high priority based on three criteria of prevalence or any other index of magnitude, severity of its harms, complications, and consequences on people, and importance; i.e., how much sensitive it is for people because of their culture and social norms. To this end, the institute needs to consider expert opinions, which can be achieved using methods such as Delphi or nominal group.

Step 2: Prioritizing research questions. Different issues may be considered when it comes to the health and/or social problem whose priority has been determined. Here, the research question refers to a question with an unknown answer or a hypothesis not been tested yet. For example, how many women with substance use disorder are there in the province who need a women-only treatment center (a research question) or is there any association between living in a slum and conducting crime or delinquency (a research hypothesis)? In this step, we ask executives and stakeholders about the questions and/or hypotheses they have in dealing with the problem that they didn't find their answers in previous researches. In other words, we ask government officials and non-governmental or private activists who work on prevention, problem-solving, rehabilitation, and harm reduction what kind of evidence they find lacking when they refer to the evidence obtained in previous studies when they try to design their interventions. Finding this evidence is the priority.

Step 3: Reviewing the previous research. Rarely can we find a question/hypothesis in the literature that has not been researched yet. In such a case, that question/hypothesis is naturally a priority. Usually, however, there are studies that should be reviewed to determine the priority of the next studies according to their number and results:

a. If only one study has been conducted on a question/hypothesis with conclusive results, research on that question/hypothesis has relative priority.
b. If only one study has been conducted on a question/hypothesis without conclusive results, research on that question/hypothesis is an absolute priority.
J. If more than one study has been conducted on that question/hypothesis and the results of those studies are totally consistent and unilateral, those results should be considered conclusive; therefore, research on the said question/hypothesis is no longer a priority.
d. If more than one study has been conducted on that question/hypothesis but the results of those studies are not consistent, it is proper to conduct a meta-analysis on those studies and determine the future direction of research on the said question/hypothesis based on the results of the meta-analysis.

In conclusion:

Absolute priority is assigned to a study that:
(a) targets a prioritized social/health problem;
(b) addresses a prioritized question/hypothesis to solve; and
(c) there has been no research on it so far, or only one study has been conducted with inconclusive results.

Relative priority is assigned to a study that:
(a) targets a prioritized social/health problem and
(b) deals with a question/hypothesis about that problem that has only been investigated once, albeit with conclusive results.

In the case of a high-priority problem, if there is prior research with inconsistent results about the subject, a meta-analysis should be on the agenda as the priority.

The research is not a priority when:
(a) it targets a non-priority problem;
(b) addresses a non-priority question/hypothesis about a priority problem; or
(c) addresses a question/hypothesis that has already been answered.

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Conflicts of interest

There are no conflicts of interest.

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