

# Biomedical research and publication: what the beginners need to know

Rahim MA

Research is a series of systematic works to find new knowledge and researchers are those who perform research. The Department of Education and Training of The Western Sydney University defines research as<sup>1</sup> “The creation of new knowledge and/or the use of existing knowledge in a new and creative way so as to generate new concepts, methodologies and understandings. This could include synthesis and analysis of previous research to the extent that it leads to new and creative outcomes”. As a beginner in medical profession, an academic research (thesis/dissertation) is often a prerequisite for partial fulfillment of a degree/certification. Research publications are required for promotion; research is needed to solve day to day clinical problems. Some people work as researcher. Physicians/senior faculties often work as guides/co-guides for academic research. Depending up on the duration of works in the career, researchers may be an early career researcher (first four years of career since PhD), advanced level researcher (more than 10 years and can lead a research project) and mid-level researcher (in between).<sup>2,3</sup>

A problem or a question is the key stimulator for a research. Question that a study or research project aims to answer is the research question.<sup>4</sup> What happens in academic research, recently published articles presented at journal clubs are often offered to a trainee physician to replicate in local setting. Often students are asked to bring few titles for discussion and subsequent selection. An identified problem is offered to solve in some cases.

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It is important to go through literature extensively to formulate a research question. A research question must have to be ethically acceptable, significant (new knowledge), clear and feasible to perform.<sup>5</sup> A senior fellow, guide, co-guide can help. Attending workshops is important for the beginners.

It is important to know the process of literature search. Selecting appropriate key words, how to combine them, how to filter the search items in terms of language (e.g. English), species (e.g. human), time frame, type of articles etc. are very important. Initially, it is required to go through the titles only, then through the abstracts and finally, through the full texts of selected 30, 40 or 50 most pertinent articles. A senior fellow, co-guide, guide and librarian can help in this regard. Not all full texts are freely available on-line, libraries can help in downloading and printing the articles with reasonable cost. Workshops can help in learning the process of literature search.

Finding research fund is an important obstacle in performing research. One should follow instruction of institutions/funders for preparation of research proposal. One may check previously accepted protocols for structure, as well. One may seek help from statistician for sample size estimation (according to study design), variables etc. Guide/co-guide and senior fellows may help in preparation of protocol for ethical approval and funds. Again, participating in workshops and finding mentors are very helpful. Bangladesh Medical Research Council (BMRC), Ministry of Science and Technology, Ministry of Health and Family Welfare, Bangladesh Society of Medicine (BSM), Ibrahim Medical College (IMC), Center for Disease Control (CDC), USA are examples of some of the potential funders.

Whenever a research protocol is accepted (after ethical review) and required funds are available, the data collection and other activities are started. Interim analysis is often done; progress reports are to be sent to the funders, if required. The progress is critically discussed among the research group members. The progress reports are often presented in seminars, which increases chances of receiving criticisms and networking. A researcher is needed to be open minded;<sup>6</sup> have to receive criticisms to improvise the final report. Statistician may help in analysis and interpretation of data. Participating in workshops early in the career gives confidence in statistical methods.

The final report should be presented among peers/in the department and whenever possible in conferences. Comments and criticisms should be addressed properly and incorporated. The final report needs to be submitted to college/university/sent to funders, as indicated. After completion of necessary procedures (including thesis defense), the research should be published in a good quality peer reviewed journal.

Before one starts to convert the thesis in to a draft manuscript, selection of suitable journals (may be 3, preferably peer-reviewed/indexed with top ranked indexing authorities) is important. Please follow instruction for authors, see similar articles in target journal (for style and format), cite from target journal (relevant ones only). Do not cut and paste and check for plagiarism. A common battery of works should be read – write – cite (from original document), keep 2 weeks under lock and key, then read as a fresh manuscript, give it to peers for comments (pre-submission peer review), then revise and submit.

After submission to a journal, one may face a rejection; if not, respond to reviewer's and editor's comments promptly. If you disagree to a comment or more – gently respond and give your arguments. After publication, increase visibility of your published paper through ResearchGate and Google Scholar. One may require to up-load the article in university repository. These increase chance of receiving post-publication peer review (criticism) and networking. Always be open, receive criticism positively to improve write-up and be perseverant.<sup>6</sup> Increase communication to perform larger research and multi-center studies.

Maintain ethics throughout including authorship. International Committee for Medical Journal Editors defined 4 criteria for authorship;<sup>7</sup> substantial contributions to the conception or design of the work; or the acquisition, analysis, or interpretation of data for the work; AND drafting the work or revising it critically for important intellectual content; AND final approval of the version to be published; AND agreement to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved. Contributors not fulfilling these criteria may be acknowledged.

As a beginner, one may start with a case report, then descriptive study, analytical ones followed by clinical trials and systematic review and meta-analysis. A clinician-researcher is a rare combination; good balance is needed, specially, for time management. Clinicians can identify the clinical needs. One published paper is an encouragement. A rich curriculum vitae is important for job, receiving research grant, fellowship etc. So, be passionate and perseverant. Develop a good observational capacity and have curiosity; read, read and read. Find mentors, participate in workshops, write protocols, find funds, develop networks, perform the research and publish. Ultimately be guide/mentor. Maintain research and publication ethics always.

## REFERENCES

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