

Reports

An assessment of Bangabandhu Sheikh Mujib Medical University for improving the research capacity

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Background

Bangabandhu Sheikh Mujib Medical University (BSMMU) is a postgraduate medical university in Bangladesh, where health research is an institutional mission. To improve the institutional research culture that contributes to better research capabilities, an assessment of BSMMU's research output, challenges faced while conducting research, feasible actions to overcome them, and indicators for evaluating the research capacity were identified.

Methods

Published manuscripts from BSMMU for the year 2018, registered with PubMed and BanglaJOL, were reviewed to assess the status of research output. Key informant interviews and in-depth interviews were conducted with various members of the academic departments, central library, institutional review board and University journals, to identify research-related challenges, strategies to overcome, and indicators to evaluate the research capacity.

Results

In 2018, the total number of scientific articles published was 364, among which 68.4% of the articles were published in local journals and 31.6% in international journals. Journals published by the University lacked indexation into international medical databases and had no impact factor. The majority of the interviewees mentioned about the lack of dedicated time for research, prioritized research agendas and need for research-related trainings to improve research performance as challenges. Establishing policies for research support, development of University's research infrastructure and better mechanisms to disseminate research findings, were identified as key opportunities for improvement. For future evaluation of research capacity strengthening, individual levels indicators (publication outputs, research grants, awards, number of collaborations) were emphasized.

Conclusions

Preference for publishing in the local journals was observed rather than in international peer-reviewed journals. The key challenges for undertaking research included the absence of dedicated time and trainings for skill development. Publication outputs, research grants, awards, number of collaborations were identified as notable indicators for evaluating improvements in research capacity at an individual level. Establishing policies and guidelines for research support, along with the development of appropriate research infrastructure in the University, will enable it to guide national policies and programs.

Health research has been acknowledged to play a vital role in progress towards the Sustainable Development Goals.¹ It is known to guide health systems, develop new initiatives and generate evidence-based health policies.²

However, there remain gaps in the production of health research, particularly in many low and middle-income countries (LMICs). This can be overcome by developing robust research institutions with skilled researchers and by gener-

ating evidence to build their own health policies in order to achieve their health-related goals.³ This is an era of evidence-based medicine, which has been known to contribute significantly to the practice and advancement of medical science.⁴ Evidence suggests that patients who receive care in research-active hospitals have better health outcomes, as their problems are identified sooner, there is greater availability of more comprehensive treatment options and opportunities to be included in clinical trials.⁵ The Harris Interactive Survey, 2011, revealed that 75% of the public were eager to participate in clinical trials if the opportunity arose.⁶ Thus, generating research-oriented medical workforces is necessary.⁷

The development of the research capacity of an institute is primarily based on developing the individual research skills and boosting the research culture of institutions, which ultimately leads to an improvement in the research capacity and research excellence at the national level.⁸ Early introduction to scientific research and engagement in research work is known to enhance knowledge on research and develop practical skills. This is not only limited to protocol submission, manuscript writing skills, and methodological and data analysis skills,⁹ but also some soft skills like leadership and management skills. These enable the development for critical appraising, troubleshooting, idea generation, etc., among the researchers. As a result, it encourages involvement in research activities, generates scientific publications, and ultimately supports entry to varying research-focused careers.⁷ Equivalently, developing and promoting the research culture of health care institutions is imperative to encourage research and increase the research output. Research culture is reflected through the faculty member's beliefs and norms about research in the universities, which should provide a conducive research environment. But universities in developing countries have retained strong teaching functions and weak research functions,¹⁰ indicated by low research output.

Bangladesh has low visibility of its research outputs in the global research community,¹¹ and was ranked as the country with the least number of scientific publications among the Southeast Asian countries included in Scopus.¹² As a result, many quality published works have a limited readership in the country, and low citations from colleagues contribute to the poor visibility and low impact factors.¹³ Data from Web of Science and Scopus revealed that Bangladesh published most in the fields of Medicine, but a very limited number of health care institutes contribute to it.¹² This reflects the small number of health researchers in the country and decades of underinvestment in research institutions.¹⁴ Therefore, there is a critical need to develop research capacity in health care settings like medical universities and their hospitals, to inform service planning and decision-making in health services.

Among the many health care institutions in Bangladesh, Bangabandhu Sheikh Mujib Medical University (BSMMU) is a postgraduate medical university that provides specialized patient care by being active in training, education and research. The health professionals of this institute constitute a crucial talent that needs to be continually supported for

undertaking research for their prosperity in the research arena. In light of this reality, there is a need to improve the University's research capacity and develop a strong research orientation among health professionals. Hence, an initiative was taken by the Department of Public Health and Informatics (DPHI), BSMMU, in collaboration with the World Health Organization (WHO) – Bangladesh office, to evaluate the situation of the research conducted by the University. This will be corroborated by identifying the potential barriers for undertaking research, strategies to overcome them and decide indicators for systematically tracking the trends and progress of research in the future. This study will be a first of its kind done in any health care institution of Bangladesh with the hope of shaping research culture among the health service providers of this country.

METHODS

An assessment was conducted to appraise the University's research output, address the gaps and challenges for conducting research, identifying feasible actions for improvement, and determination of indicators for future evaluation of the University's research capacity. Data collection was performed from August to October 2019, by reviewing the scientific publications done from BSMMU for the duration of January to December 2018, and interviews with various staff members of the University.

ASSESSMENT OF THE SCIENTIFIC PUBLICATIONS FROM BSMMU

A review of the scientific publications from the academic departments to assess the research output from the University was conducted. We utilized PubMed¹⁵ and Bangladesh Online Journals (BanglaJOL)¹⁶ databases to select the articles. All the articles published from January 01 to December 31, 2018, were included in this analysis. The particular keywords used for searching articles were "Bangabandhu Sheikh Mujib Medical University" or "BSMMU", and any article having an author affiliated with BSMMU was taken into account. The screening language was limited to English. The data were compiled onto Microsoft Office Excel-2010 spreadsheets and analyzed. Descriptive analyses were performed on the publications data to generate frequencies and percentages.

INTERVIEWS TO IDENTIFY CHALLENGES, FEASIBLE ACTIONS TO OVERCOME THEM AND INDICATORS FOR EVALUATION OF RESEARCH CAPACITY STRENGTHENING

To accomplish a comprehensive assessment of the University's research support systems to provide academic, administrative and financial services for research activities, the list of research management and support systems (RMSS) components generated by Wallis et al., 2017,¹⁴ was utilized. The primary data collection tool developed was a guideline of semi-structured questions for interviews with members of different faculties of the University. Ten in-depth interviews with professors and associate professors who were vested in research, and two key-informant inter-

views with an assistant librarian and a member of the institutional review board, were done to identify the challenges for undertaking research, possible strategies to overcome the afore-mentioned challenges in research support systems, and determination of indicators for future evaluation of the research capacity of the University. The authors themselves conducted the interviews for this study, as they had past experience in conducting in-depth interviews. They were able to develop rapport and trust with the participants very easily, as they were medical doctors themselves. Every interview was audio-recorded with the consent of the participant, along with notes taken by the research assistant. After every interview, extensive discussions with the authors and research assistants were held to compare notes and discuss findings and meanings where necessary to minimize any possibilities for misinterpretation of the participant narratives. All the interviews conducted were translated into English for analysis by the authors themselves. Data were analyzed manually by applying the thematic framework analysis method. To ensure the reliability of data interpretations, the final categories and their contents were conferred among all the authors.

ETHICS CONSIDERATIONS

This study was considered to be an assessment of an institution aimed to improve and strengthen its research capacity. Therefore, formal ethical approval was not sought. However, verbal consent was taken from every study participant after explaining the objectives of the study, and provided them with an opportunity to withdraw their participation without any consequences.

RESULTS

RESEARCH PUBLICATIONS

A review of the publications revealed a total of 364 articles of which, 115 (31.6%) were found in PubMed and 249 (68.4%) in BanglaJOL, for the year 2018. Among those in PubMed, majority (69.8%) were original research articles followed by 16.2% case reports, 10.0% review papers, 4.0% others (two systematic reviews and one letter to the editors, and comment each). A large portion (32.7%) of the articles were published in Mymensingh Medical Journal, which is indexed and included in Index Medicus and MEDLINE.¹⁷ A total of 36 departments from the University contributed to the articles in PubMed. As shown in [Figure 1](#), majority (19) of the articles were published from the department of Psychiatry, among which 14 of the articles were published in the Asian Journal of Psychiatry (not shown in the figure). The second highest number of articles (8) was published from the departments of Rheumatology and Internal Medicine, which was followed by Endocrinology (7), and 6 articles each from the departments of Hepatology, Public Health & Informatics, and Obstetrics & Gynaecology.

For the articles found in BanglaJOL (249), 67.7% were original research articles, 23.6% case reports, 5.6% review papers and 2.1% editorials. The preferred journal for publication was the Bangabandhu Sheikh Mujib Medical Univer-

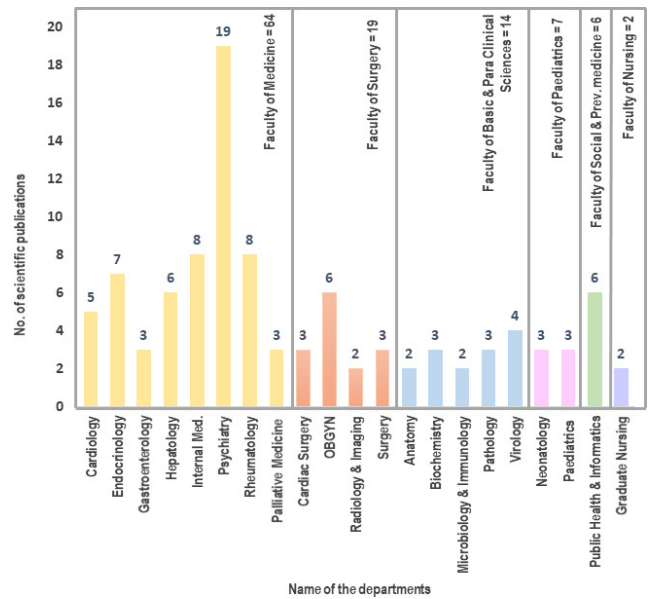


Figure 1. Number of scientific publications listed in PubMed by the departments of BSMMU in 2018

Note: Departments with publications <1 are not included in the graph

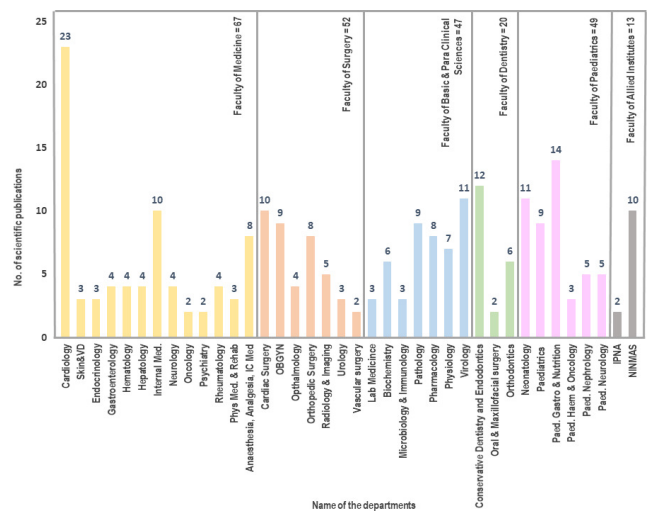


Figure 2. Number of scientific publications listed in BanglaJOL by the departments of BSMMU in 2018

Note: Departments with publications <1 are not included in the graph

sity Journal (25.8%) and University Heart Journal (11.7%), both being published by BSMMU. As illustrated in [Figure 2](#), the highest number of articles published was from the department of Cardiology, which contributed to 23 articles and Cardiac Surgery contributed to 10. The department of Paediatric Gastroenterology & Nutrition had the second highest number of publications (14) and the departments of Conservative Dentistry and Endodontics ranked third (12).

The research productivity of the faculty members was expressed in [Table 1](#), where the publication output per faculty member for the year 2018 was calculated. Based on the publication rate, the top performing faculty was the Faculty of Preventive and Social Medicine (1.167). When all the faculties and their employees were combined, the publication/

Table 1. Publication per faculty member in 2018

Faculty	No. of departments	No. of faculty members	No. of publications	Publication/faculty member
Preventive and Social Medicine	1	6	7	1.167
Basics and Para-clinical Sciences	8	54	61	1.130
Pediatrics	8	58	57	0.983
Medicine	16	152	131	0.862
Dentistry	5	29	21	0.724
Surgery	17	179	71	0.397
Nursing	1	12	2	0.167
Total (by Faculty)	56	490	350	0.714
Allied Institute	3	30	14	0.467
Total (All)	59	520	364	0.700

faculty member rate was 0.714, which further decreased to 0.70 when the allied institutes were added to the faculties.

CHALLENGES AND OPPORTUNITIES IDENTIFIED FOR RESEARCH CAPACITY STRENGTHENING

Respondents sharing their views revealed multiple challenges and constructive ways for strengthening the research support systems of the University. The results are categorized according to the relevant list of items generated by the research management support system described elsewhere.¹⁴ The findings from the interviews are enumerated in [Table 2](#).

INDICATORS FOR FUTURE EVALUATION OF RESEARCH STATUS

For the future assessment of improvement in the research capacity of the University, the most common indicators mentioned by the interviewees are presented in [Table 3](#). The indicators are categorized according to the level at which they are targeted: individual, institutional and societal.¹⁸

DISCUSSION

This study demonstrated a concise process for the assessment of the research activities conducted from BSMMU, the identification of potential gaps and feasible strategies to improve the University's research capacity and indicators for the future evaluation of University's research capacity. The year 2018 was considered for the evaluation. The study revealed a diverse assortment of health research done in the University, of which 68.4% published manuscripts were found in local journals. The top local journals preferred for publication were Mymensingh Medical Journal, BSMMU Journal, and University Heart Journal, the latter two being published by BSMMU. Some possible reasons for choosing local journals for publications might be because, it is a low-barrier way to publication, easy formatting style for man-

uscript preparation, short duration from submission to acceptance which expedites promotion in academia, and the effort to fulfil the criteria for the journal's indexation into international databases. A wide variability of the publication rates among the faculties was observed ranging from 1.167 to 0.167. The average publication rate of the faculty members of BSMMU was 0.70, which was comparatively low to other medical institutes, such as, the average publication rate of the American University of Beirut faculty members was 1.24,¹⁹ and in the University of Nebraska College of Medicine it was 1.95.²⁰ Such low publication rates can be possibly be attributed to heavy clinical workload, lack of protected time for research, the size of faculty, absence of mentors, etc. According to a report by Scientific Bangladesh, BSMMU was not a leading contributor of health research from Bangladesh in the Scopus database.²¹ This observation is supportive to our findings, where the total number of scientific publications from BSMMU was small in number and majority of them were in the local journals. Publishing in local journals is favorable in many cases, since it encourages the researchers to address agendas pertaining to their country, whereas publication in international journals steer researchers away from local agendas toward topics of international concern.²²

The study was able to identify multiple challenges for conducting research in the University. Among them, the most commonly mentioned was the burden of excessive clinical and academic workload, which left minimal time allotted for research. This lack of protected time for research, along with the deficiency of institutionalized training programs for the skill development of health care professionals, created apprehension towards research. Adding to this apprehensiveness, is the inadequate infrastructure of the University and lack of support services creating an unfavorable environment for research. Hence, among many faculties, research has become an individual activity conducted within the margins of their departments, rather than utilizing institutional processes.²³ The challenges found in the current study resonates with the institutes based in LMICs, where they mentioned; heavy teaching loads, weak organi-

Table 2. Consolidated identified gaps in research management and support systems and suggested actions from the interviews, by RMSS components

Gaps	Suggested actions
Research strategies and policies	
<ul style="list-style-type: none"> No research policy or strategy available for the institute Absence of plans for prioritizing research topics in each department Unclear guidelines for research protocol reviews and none available for the various members of IRB, detailing their roles and responsibilities Lack of authorship guidelines promoted by the University 	<ul style="list-style-type: none"> Develop an attainable research policy or strategy that can be utilized by departments and act as a guidance for the management of research. University needs to plan for and prioritize the health needs of the population of the country, where research for a specified period on a particular topic will generate evidence from our country's perspective. Establish regulations and policies for ethical reviews of research proposals, along with guidelines for the IRB members for maintaining professional standards of conduct and prevent infringement of those. Departments need a meticulous authorship guideline to support the contributing authors, and to avoid authorship malpractice.
Institutional support services and infrastructure	
<ul style="list-style-type: none"> Lack of research support offices and/or inadequate coordination among departments for collaborative research Insufficient development of research infrastructure within the University to support research Inadequate inclusion of research related activities in the post graduate curriculum Inefficient tracking and cataloging of research proposals with corrections and amendments 	<ul style="list-style-type: none"> Proactive engagement between the research members from various departments needs to be encouraged. Collaborate with other contract research organizations to overcome the lack of in-house research facilities. Urgent upgradation and integration of information and communication technology (ICT) facilities for storing and monitoring patient's history, diagnostic report, and track the current health condition, which can be used for research. Establish dedicated research laboratory facilities with international accreditation. Develop clear processes and diminished costing for researchers wishing to access lab facilities. Consider the development of a biobank for the storage of patient's blood, serum, tissues, etc. for future research. Improved access to health science journals in the library by increasing subscriptions of Elsevier and Springer journals, easy login to HINARI database from any device logged into BSMMU's intranet and appropriate listing of all scientific and academic outputs from all departments of BSMMU. Revision and emphasis of research-based courses in the postgraduate curriculum. Early planning for thesis's proposal development and writing to reduce hassles and delays related to submission. Include publication of original thesis findings in University's journals/ international peer-reviewed journals as a part of the curriculum. Dedicated day for poster presentation of all the resident student's thesis ensuing their defense examinations. Establishment of electronic management system for cataloguing all the proposals with their review decisions and corrections. Development of a checklist to be attached with every proposal undergoing review process listing the changes/ corrections made with written notifications on decisions regarding approval/ disapproval of proposal.
Human resource management for research	
<ul style="list-style-type: none"> Academic and administrative workloads overburdening the researchers Lack of appreciation for the researchers in the University Very few doctoral students in the University No formal postdoctoral career posts for researchers and non-existent career paths for research staff 	<ul style="list-style-type: none"> Dedicated time slots for research related activities assigned by the University's authority. Motivate researchers by enticing them with yearly recognition or awards, waivers for publication into high-impact journals, budgetary allotment for travel and stay for original paper/ abstract/ poster presentation. Formal doctoral and post-doctoral programs need to be established to develop skilled researchers in health care. Formalize career tracks for research staff.
Human resource development for research	
<ul style="list-style-type: none"> Deficiency in continued professional development of resident students/ researchers/library staff/IRB staff 	<ul style="list-style-type: none"> Early introduction into research skills training for resident students. Training needs assessment for all research staff will enable in developing tailored training programs.

Gaps	Suggested actions
	<ul style="list-style-type: none"> • Establish institutional programs, for technical improvement of resident students which mainly include statistical knowledge and use of statistical software, research articles writing skills, etc. • For research staff more attention should be given for developing non-technical skills such as project management, leadership, supervision & monitoring, etc. • IRB committee members need both initial and continuing education and training in research ethics, methodology and governance. • Periodic trainings of the library staff to retain their knowledge of computer skills, literature search, database management, etc.
External promotion of research	
<ul style="list-style-type: none"> • Promotion of the research activities and successes are not publicized well enough 	<ul style="list-style-type: none"> • Regular emendation of the University's website to include all current research activities and publications. • Ensure easy accessibility to University's website along with proper functional hyperlinks.
National research engagement	
<ul style="list-style-type: none"> • Very few research outputs from the institution have the ability to influence national policies 	<ul style="list-style-type: none"> • University should publicize its research findings more on the national forums for its uptake into the national policies and programs. • Improvement into the researcher's capability to write medical jargon free press releases.

Table 3. Indicators for evaluation of improving research capacity

Level	Component	Evaluation indicators
Individual	• Publications	Publication output: publication quantity (number of articles), quality (journal impact factor), and impact (citations, webpage visits).
	• Recognition of research leadership	Awards received, invitations as speaker/plenary member
	• Career trajectory	Number of research projects engaged in, number of grants for new projects received, number of new collaborations.
Institutional	• Trainings	Trainings: numbers, participation rates
	• Establishing research environment	Availability of research related strategies and policies (e.g.: Finance, IRB, Human Resources) Improved ICT facilities in the University, dedicated research laboratories and their accreditation, developing a biobank, open access to Elsevier and Springer journals, indexation of University's journals in international medical indexes.
Societal	• Research impact and user engagement	Community impact of research and research influenced policies: number of dissemination/ workshops/ press releases/ policy briefs.

zational research systems, limited access to scientific information, slow internet connections and inadequate physical facilities including libraries and laboratories as the major disincentives.^{14,23} Along with the challenges, we also identified many options which can be addressed by BSMMU to improve the individual and organizational capacity for research. In order to strengthen research capacity at individual level, early induction of the clinicians into research, and continued tailored training programs are needed. The importance of fostering basic research skills (proposal writing, statistical analysis, article writing skills, etc.), along with soft skills (communication, leadership, research management, etc.) had been highlighted by many interviewees. Seamless integration of these trainings as a part of the post-graduate curriculum is also expected to ensure sustainable changes at the individual capacity, also recommended by Bateman et al.²⁴ Likewise, incentives like awards for research, grants with travel and training components, financial support for publication into high-impact

journals, formalized career tracks for research staff, are well recognized schemes to inspire the researchers. Such strategies to strengthen research skills have often been recommended in other studies.^{14,25,26} Some approaches for strengthening institutional capacity includes; establishing research support offices, developing inter-departmental collaborations, prioritizing research agendas, developing research management capacity, support from contract research organizations, and upgradation of the University's facilities (ICT and labs) to exclusively support research. To execute the afore mentioned issues, commitment from the management is vital to achieve changes in policies, rules and systems, which will support research. But focusing on strengthening research capacity at institutional level is a challenging task fraught with complexities, where it is not only about changing processes, but also about addressing power structures, politics, relationships and incentives.²⁵ Even though this study was able to identify challenges faced for conducting research at both individual and insti-

tutional level, it failed to bring forth the challenges faced at the national level, where initiatives to apprise and enhance the capacities of government bodies, academic institutions and private sectors for demanding and utilizing research needs to be boosted. This will not only lead to developing an enabling environment for research but also contribute to the social and economic development of the nation.

For tracking the progress of research in the University, multiple indicators were mentioned in this study, where much emphasis was given on publication outputs (especially in high impact journals), followed by the assessment of the researcher's leadership recognition and career trajectory. Publication outputs were acknowledged as the most commonly accepted measures of research capacity building and have been cited previously in many studies.^{24,26-28} But some have argued that using research publication in high impact journals as an indicator, is a tall order for faculties in institutes having low research skills, neither does it address issues to do with the usefulness of research, the impact of research activity on practice, or on measuring health improvement.²⁹ Very few of the interviewees mentioned about the importance of institutional indicators (e.g., availability of research related trainings, improvement in various aspects of research infrastructure, etc.) and societal indicators (e.g., assessing the community impact of research, development of research influenced policies, etc.). The limitations of individual indicators in presenting a holistic view of the improvement of research capacity, can be overcome by utilizing the institutional and societal indicators for assessing research infrastructure and impact.

Our current study methods can be utilized by other institution for evaluating and optimizing their research capacity, however some limitations need to be considered. The study was done to provide a broad overview of BSMMU's research status and capacity, which limited the capacity of the study to explore many components in depth. The study participants were purposively selected, who were invested in research and generally revealed similar problems. Also, conducting the study in only one University limited the generalizability of the results, which has been interpreted cautiously due to the lack of any standard comparison. Although the publications review from our end revealed many important observations, we were unable to perform some sophisticated analysis to address the publication capacity of the faculty members with regards to their rank, age, gender, etc. The review was also inadequate to reveal the international collaborations of the publications, as a major bulk of the articles in the local journals did not have all their authors' institutional affiliations listed. Lastly, more variables such as impact factors, citation index, conference presentations, research grants were not considered in this study due to the unreliability and incompleteness of the data received from various departments.

CONCLUSIONS

This study is a first of its kind, conducted in Bangladesh, where the assessment of the research outputs from an institution and approaches to build on its research capacity

was investigated. Although publications in international peer reviewed journals are visible, it is still under the dominance of local journals. The journals published from the University needs nourishment to achieve the standard of the international indexing authorities to attract more manuscripts from within and outside of the country. The key challenges identified for the health care professionals in the field of research included the absence for dedicated time to undertake research and the lack of research related skill developing trainings. The importance of embedding research culture among the health professionals, with establishing policies and guidelines for research support, along with the development of appropriate research infrastructure, will enable BSMMU to cater to the need for future generations to guide national policies and programs.

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AUTHORSHIP CONTRIBUTIONS

SER contributed in literature review, study design, data collection, analysis and interpretation, manuscript writing and revisions. MK contributed to study design, data analysis and interpretation, and manuscript revisions. FAK, KMTR, NM, NJ and FH contributed in literature review, data collection and analysis, and manuscript revisions. MMZ and SSI contributed to data interpretation and finalization of the manuscript. All authors have read and approved the final manuscript.

COMPETING INTERESTS

The authors completed the Unified Competing Interest form at www.icmje.org/disclosure-of-interest/ (available upon request from the corresponding author) and declare no conflicts of interest.

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