Introduction

Noncommunicable diseases (NCDs) are estimated to be the major cause of death globally contributing 68% of total deaths, i.e., 38 million out of 56 million deaths in 2012. Of the deaths due to NCDs, nearly 82% of the deaths are due to cardiovascular diseases (CVDs), cancer, chronic respiratory diseases, and diabetes mellitus which share common four NCD risk factors, namely, tobacco use, harmful use of alcohol, inadequate physical activity, and unhealthy diet. Of the 38 million deaths, 16 million (40%) are premature, i.e., before the age of 70 years. The low- and middle-income countries (LMICs) bear the brunt with three-quarters of all NCDs and 82% of premature deaths due to NCDs. The unfinished infectious disease agenda in these countries has ill-prepared the health systems to fight this new epidemic.\textsuperscript{[1]}

Against this background, the World Health Organization (WHO) developed the Global Action Plan for the Prevention and Control of NCDs 2008–2013 and 2013–2020 which laid down a blueprint for action at a national level. Promoting research is one of the key objectives of the action plan. Through this objective, it was called upon operational research for strengthening noncommunicable disease prevention and control program.
to build the capacity at national level, especially in LMICs to conduct good quality analytical and operational research (OR) in order to strengthen the implementation of NCD interventions/program.\cite{2,3} Following this, a prioritized research agenda has been developed to assess and understand the impact of interventions, strategies, policies, and plans on prevention and control of NCDs.

Operational research has improved the coverage and effectiveness of interventions for infectious diseases such as tuberculosis (TB), HIV/AIDS, and malaria and strengthened the health systems to address these diseases over a period of time by identifying the gaps and mitigating them.\cite{4,5} Zachariah et al. provide multiple examples of how OR has improved medical care and practice, been used to assess the feasibility of interventions, and to advocate policy change. The lessons learned from OR in infectious diseases could be applied to improve the effectiveness and implementation of NCD interventions/programs.\cite{6}

This review article is based on one of the scientific sessions “Operational research for strengthening NCD prevention and control program” of the preconference workshop in the “21st Joint Annual Meeting of North Zone-Indian Association of Preventive and Social Medicine and Indian Public Health Association” of the World NCD Congress 2017 conducted in November 2017 at Chandigarh, India.

Why Operational Research Is Needed to Address the Growing Noncommunicable Disease Epidemic?

The quantum of research from developing countries is generally low and it is true for NCDs also. Of all published research on CVDs, only 6%–8% were from developing countries as against the high burden of CVDs in these countries.\cite{7} Of the 20 identified WHO NCD priority research areas for prevention and control of NCDs, only 23% came from LMICs.\cite{7,8} Research is essential to assess gaps in implementation and improve the effectiveness of available NCD interventions through a continuous process of improvement in quality and/or coverage. OR has been identified by the global and national agencies to identify and address the issues related to NCD intervention/program implementation.

What is Operational Research?

Zachariah et al. defined OR as “search for new knowledge on interventions, strategies or tools that can enhance the quality or coverage of health systems and service.” According to the Global Fund, it is defined as “any research producing practically usable knowledge (such as evidence, findings, information) which can improve programme implementation (e.g., effectiveness, efficiency, quality, access, scale-up, and sustainability) regardless of the type of research (design, methodology, approach).”\cite{5,6,9} Translation of research findings to impact policy and/or practice is the main goal of conducting OR.

OR includes all types of study designs except the basic science research and randomized controlled trials where efficacy is the outcome of the study.\cite{6} The principles of OR could be harnessed to assess the acceptability, appropriateness, effectiveness, cost-effectiveness, coverage, sustainability, timeliness, and equitable distribution of the NCD interventions or strategies.

Prerequisites to Conduct Operational Research

Setting the priority research agenda is one of the key steps. The WHO has drawn up a NCD research agenda to guide the countries. As resources for health are limited, particularly in LMICs, the research agenda will provide guidance to countries in understanding and identify the key public health research needs related to NCDs. One of the objectives of the agenda is to support LMICs in building capacity for epidemiological and health systems research, including the analytical and OR required for program implementation and evaluation in the area of NCDs. Through nine voluntary global targets under the global action plan, the priority NCD risk factors and diseases have been clearly identified.\cite{9} Country-specific adaptation of the priority research agendas and targets is needed. For example, Southeast Asia region included an additional voluntary target in their action plan as the tenth voluntary target, i.e., reduction of indoor air pollution through reducing household solid fuel use.\cite{10}

After research priority setting, finding a research question based on the understanding of the NCD program objectives and constraints to meet those objectives is the next crucial step in initiating an OR. The constraint should come from the program manager based on which the researcher should build the research question of direct program relevance.\cite{6,9}

Translation of Operational Research to Policy and Practice: Enabling Factors

The translation of research to policy and practice is an important process which is influenced by the direct
program relevance of the research question, involvement of program manager/policymakers in the research, use of routine data, building OR capacity of program managers, and effective dissemination of research results. Identification of appropriate audiences or stakeholders and effective delivery of research results through peer-reviewed publications, newsletter, or other modes of dissemination should be planned as part of the research. The research results should be presented in simple, nontechnical terms which can be easily understood and acted upon by the policymakers. Constant follow-up with the program manager/policymaker is needed until the policy and/or practice change is affected. Establishing partnership model and promoting the involvement of program managers from the conceptual stage till the completion of the study will lead to owning of the results of the OR by the key stakeholders, thereby improving the chances of policy uptake. The success and failure stories can be published and disseminated for the wider benefit of the population.\[6,9,11\]

Building a critical mass of researchers is important for continuous OR within the program setting.\[6,9,11\] This requires an OR capacity building model possibly along the lines of the WHO Structured Operational Research and Training Initiative (SORT IT). The SORT IT model has been pioneered by The International Union Against Tuberculosis and Lung Disease and The Medecins Sans Frontieres in different countries, especially the LMICs mostly in the field of infectious diseases such as TB, HIV/AIDS, and malaria.\[12\] In addition, integration of OR within the program and allocating resources for it as in the case of HIV/AIDS, TB, and malaria will further promote OR as a matter of routine. The lessons learned from OR on these infectious diseases could be tried in the field of NCDs. Similarly, the success stories of different countries or states on integrating OR into programs need to be replicated.\[4\]

Case studies on translation to policy/practice change
A multicentric, countrywide OR study was conducted in India with the active engagement of revised national TB control program and NCD program managers to assess the feasibility and develop operational guidelines for bidirectional screening of TB and diabetes mellitus. The study was initiated in October 2011 and was planned to be completed by April 2013. Based on the interim results of the study, a policy decision was taken at the national level for bidirectional screening of TB and diabetes in September 2012 before the completion of the study. Apart from the above-mentioned enabling factors, the authors of the study mentioned that inclusiveness of all relevant stakeholders, adherence to the timeline of the project by various stakeholders, and effective dissemination of interim analysis were the enabling factors for successful translation of the results into policy change.\[13\]

There are several other OR studies related to NCDs done in LMIC settings which have impacted change in program guidelines and/or practice. A study in Kibera, Kenya, demonstrated that chronic diseases can be successfully managed in a primary healthcare setting in informal settlements.\[14\] Another study in Kenya showed the potential role of medication adherence clubs in managing chronic diseases and ensuring adherence to treatment which is now part of their national NCD management guidelines.\[15\] Similarly, task shifting the management of NCDs from doctors to nurses has also been demonstrated successfully to effect a change in organizational practice.\[16\]

Role of Indian Council of Medical Research, India, in Promoting Operational Research
The Indian Council of Medical Research (ICMR) is the apex body in India for the formulation, coordination, and promotion of biomedical research and is one of the oldest medical research bodies in the world. One of the key pillars of the ICMR Strategic Plan and Agenda 2030 is strengthening program implementation through research, principally OR.\[17\] ICMR has been supporting OR through extramural research grants and capacity building programs. The ICMR is also supporting the establishment of Multi-Disciplinary Research Units in medical colleges, Model Rural Health Research Units in all states, and strengthening critical mass of human resource through fellowships for promoting health research with equal focus on OR.

Challenges
Ideally, program managers should be trained to conduct OR. However, lack of time and engagement in various processes of program implementation necessitates the need for collaboration of program managers with researchers from academic institutions. The main challenge is identifying the program relevant and priority research questions. Identification of research question should be done in consensus and based on the needs of the program. There is a huge research funding gap in building the capacity of human resource in OR, especially in LMICs which is also acknowledged as a major limitation.
Way Forward

Investment in NCD research and development, establishing a national and institutional research policy and plan to increase the national or institutional capacity in OR, is the need of the hour. Moving forward, uptake of research evidence for changing policy and/or practice is the ultimate goal of any OR.

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Conflicts of interest

There are no conflicts of interest.

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