Developing an operational research model for strengthening policy and programs on prevention and control of hypertension in India

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ABSTRACT

Hypertension is one of the significant risk factors for many noncommunicable diseases (NCDs) including cardiovascular diseases (CVDs), diabetes, stroke and chronic artery diseases. Despite the dismal scenario of CVDs in India, there is paucity of research in the field, which hampers effective decision making. In cognizance of the crucial role played by operational research (OR) in NCD policy design and program implementation, the Resource Center of Cardiovascular Health issued an open call for a manuscript writing program on hypertension using secondary data of National Family Health Survey-4. After thorough screening of the concept proposals of the applicants, 30 researchers were selected. Each of the 30 selected researchers further formed team of 3–7 researchers per team, thus having almost 150 + researchers on the board. Besides receiving the short workshops for the finalization of research question and manuscript writing, each team of researchers was assigned an OR mentor for guidance, review and finalization of the manuscript. There were two levels of peer review for each manuscript. In this first-of-its-operative research (OR) model on hypertension, we built the capacity of young researchers from various medical and research institutes of country in OR related to hypertension in India. The models’ success is proved by its cost-effective approach and development of 30 high-quality research articles on hypertension. While we faced challenges in the process, several lessons were learned which will be instrumental in the future planning and implementation of such OR programs for other public health issues.

Keywords: Hypertension, NFHS, operational research model

Noncommunicable diseases (NCDs) kill 41 million people each year, equivalent to 71% of all deaths globally and 63% of all deaths in India.¹ Hypertension is one of the significant risk factors for many NCDs including cardiovascular diseases (CVDs), diabetes, stroke and chronic artery diseases.² It is directly responsible for 57% of all stroke deaths and 24% of all coronary heart disease deaths in India.³ UN Sustainable Development Goals highlight the importance of hypertension and kept a target of one-third reduction in NCDs by 2030.⁴ It is estimated that better hypertension control alone can prevent 0.5 million deaths by 2030.⁵

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Despite the dismal scenario of CVDs in India, there is paucity of research in the field, which hampers effective decision making. Of all published research on CVDs, only 6–8% were from developing countries as against the high burden of CVDs in these countries.[5] Only 23% of the 20 identified World Health Organization (WHO) priority research areas for prevention and control of NCDs belonged to low- and middle-income countries (LMICs).[6,7]

The 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.[7] Promoting research is one of the key objectives of the action plan. Through this objective, it was called upon to build the research capacity at national level, especially in LMICs to conduct good quality analytical and operational research (OR) for strengthening the implementation of NCD interventions/programs.[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 used by the global and national agencies to inform NCD-related policies and to identify and address issues in NCD program implementation.

Clarion call for OR in hypertension

In cognizance of the crucial role played by OR in NCD policy design and program implementation, the Resource Center of Cardiovascular Health (RCCVH) issued an open call for a manuscript writing program. RCCVH was established under the project entitled, “Strengthening hypertension services through capacity building, media and communication and stakeholder engagement in the state of Punjab” implemented by the Department of Community Medicine and School of Public Health, Postgraduate Institute of Medical Education and Research, Chandigarh (PGIMER). PGIMER is a premier institute of national importance established under the Act of Parliament, Government of India in 1967. The institute is mandated to provide high-quality patient care and postgraduate medical education to meet the country’s need for highly qualified medical teachers in all medical and surgical disciplines and undertake basic and advanced community-based research.

Methods

Data source

National Family Health Survey-Round 4 (NFHS-4) data was used which was procured from the Demographic and Health Survey (DHS) Program with appropriate permissions to use the same for secondary analysis. NFHS-4 data is a large-scale countrywide data on key demographic and health indicators, which provide reliable information from representative samples of households throughout India. It uses multistage sampling using a standard questionnaire throughout the country to generate estimates representative at level of districts, even allowing for urban–rural segregation.[9] The objective of prioritizing secondary data in OR lies in the fact that it is often perceived to avoid biased to primary data, less expensive and time consuming and often can be used to triangulate primary data.[10]

Selection of the participants

The ‘Open Call for Writing Manuscripts’ was published on the official websites of RCCVH and PGIMER, Chandigarh [Figure 1]. We disseminated it widely through social media handles of RCCVH (Twitter, Facebook and Instagram) inviting applications from like-minded researchers working on hypertension across country. The applicants contested via a google form along with the submission of the brief concept proposals. More than 100 researchers with a commendable curriculum vitae and affiliation to premier institutes of India applied. We screened the applications on specific parameters such as the prior research of the applicant, both general and specifically on cardiovascular health and NCDs including those using secondary data. We also obtained exemption from ethical review by the Institute Ethics Committee, PGIMER, Chandigarh to use the secondary data (IEC No. PGI/IEC/2021/001139 dated 3.8.21).

Formation of research teams and organization of sensitization workshops

After thorough screening of the concept proposals of the applicants, 30 researchers were selected. Each of the 30 selected researchers further formed team of three to seven researchers per team, thus having almost 150 + researchers on the board. After the selection of mentors and mentees, a 3-h online workshop was conducted for the team of selected researchers to finalize the research question. Also, we organized a 1-day workshop on ‘How to write manuscripts’ to sensitize the researchers to the principal elements of a scientific manuscript with special focus on secondary data analysis. We also explained the process of curating a manuscript for its publication in a peer reviewed journal.

Conduction of peer review

There were two levels of peer review for each paper. Manuscripts were written in a time-bound manner and submitted to mentors for their review (section wise). After review from the mentors, the manuscripts were revised by the respective OR mentees/teams, which followed an iterative process. It was followed by another process of peer review including plagiarism check, in which the experts from PGIMER reviewed the manuscripts.

Contacting journals for the special e-issue

Even amidst the COVID-19 restrictions, the entire process of selecting the participants and formation of research teams went uninterruptedly. Due to the availability of virtual platform and its seamless reach, we could connect with the participants easily. Advocacy calls and e-meetings were held with the chief editors of various peer-reviewed journals to publish a special issue on hypertension. Our proposal was accepted by one of the leading Public Health Journal.
Diagrammatic representation of the whole process of ‘manuscript writing program’ is represented in Figure 2.

**Results**

A total of 30 research teams (150+ researchers) were selected. Figure 3 depicts the geographic distribution of the 30 selected teams who represented 15 states/Union Territories of India, namely, states of Uttar Pradesh, Punjab, Tamil Nadu, Jammu and Kashmir, Odisha, Karnataka, Haryana, Himachal Pradesh, Maharashtra, Andhra Pradesh, West Bengal, Uttarakhand, New Delhi, Puducherry and Chandigarh. Most (>60%) of these states are high burden states in terms of NCDs and also lack research evidence on hypertension and other risk factors of NCDs. Table 1 depicts the demographic and professional characteristics of the researchers. Out of the total, 53% were females, with majority of them (97%) being postgraduates and academicians (67%). The manuscripts covered five core themes: hypertension and risk factors; prevalence, burden and determinants; hypertension and risk factors among specific groups; tobacco use and hypertension, and others. A total of 24 subthemes emerged out of them, which are detailed in...
Box 1. Out of 30, teams of 15 researchers agreed to publish their manuscript in the special issue, while other manuscripts are in various stages of publishing in different international and national peer-review journals. The details of the articles are given in Annexure 1.

**Discussion**

OR has gained importance in the last decade and has been recognized as a critical factor to help in the development

| Characteristics                  | Number (n=30) | Percentage (%) |
|-----------------------------------|--------------|----------------|
| Gender                            |              |                |
| Male                              | 14           | 47             |
| Female                            | 16           | 53             |
| Qualification                     |              |                |
| Postgraduate                      | 29           | 97             |
| Graduate                          | 1            | 3              |
| Profession                        |              |                |
| Academician/Researcher/Public Health Professional | 26 | 77 |
| Implementers/Program Managers     | 4            | 13             |

**Figure 2:** Diagrammatic representation of the process of manuscript writing program

**Figure 3:** Geographical distribution of research teams in manuscript writing program
Lessons learnt and future plan

This program has few challenges during its implementation. While the meetings and workshops were planned and implemented as scheduled, we were not able to achieve all of the desired outputs. Few participants could not have a draft manuscript within the stipulated timelines. Nonresponse from the mentors and participants regarding the status of the manuscripts was another challenge. In few cases, it became necessary to repeatedly contact the team members of the selected researcher. Other challenges included participants’ lack of capacity in handling data and conducting data analysis, lower mentee–mentor ratio and lack of ample time for paper writing.

We learnt few lessons from the current manuscript writing program, which should be addressed while guiding such programs or initiatives in the future. The time duration between selection, training and initiation of writing manuscript should be minimal. Mentors should be enrolled during the planning phase itself to reduce this delay. This could be considered as a precourse ‘e-mentoring’ phase. The problem of time shortage for finalizing the research question and writing results and discussion section of manuscript can be addressed by framing a clear-cut research question during the e-mentoring stage (before the actual program), with clear-cut dependent and independent variables, which can be easily extracted from the available data set. This would allow the participants to come prepared, after having discussed with their mentors, with one or two clear research question(s). Though the program provided data analytical support to participants for tackling issue pertaining to inadequate data analytical skills of participants, we felt that a detailed data analysis training was necessary for them during the e-mentoring stage only. The mentor–mentee ratio should be increased to 1:1 or 1:2, which shall take away the pressure on both the mentors and the researchers. OR is not on the priority list for many program implementers and academicians due to these competing priorities, which reduce the time available for them to invest in OR and manuscript writing. Thus, there should be funding commitment from the program implementers (in line with funds available under National TB elimination Program) and various funding organizations to support such cost-effective OR programs focusing on burden of NCDs, along with commitment from mentors (faculty) from different medical and research institutions. We intend to follow-up in terms of long-term outcomes such as change in policy and practice as a result of the manuscript writing program. The National Programme for Control of Cancer, Diabetes, Cardiovascular Diseases and Stroke, India, should take a lead in providing technical and financial support to such manuscript writing programs on hypertension and CVDs and also encourage young researchers from medical colleges along with state program managers in developing and addressing relevant policy-focused research questions.

Conclusion

In this first-of-its-kind OR model on hypertension, we built the capacity of young researchers from various medical and
research institutes of country in OR related to hypertension in India. The models’ success is proved by its cost-effective approach and development of 30 high-quality research articles on hypertension. While we faced few challenges during the process, several lessons were learned which will be instrumental in the future planning and implementation of such OR programs for other public health issues.

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Conflicts of interest
There are no conflicts of interest.

References
1. Dahal S, Sah RB, Niraula SR, Karkee R, Chakravartty A. Prevalence and determinants of non-communicable disease risk factors among adult population of Kathmandu. PLoS One 2021;16:e0257037.
2. Fuchs FD, Whelton PK. High blood pressure and cardiovascular disease. Hypertension 2020;75:285-92.
3. Gupta R. Trends in hypertension epidemiology in India. J Hum Hypertens 2004;18:73-8.
4. Gupta R, Xavier D. Hypertension: The most important non-communicable disease risk factor in India. Indian Heart J 2018;70:565-72.
5. Gupta R, Xavier D. Hypertension: The most important non-communicable disease risk factor in India. Indian Heart J 2018;70:565-72.
6. Prabhakaran P, Ajay VS, Prabhakaran D, Gottumukkala AK, Shrihari JS, Snehi U, et al. Global cardiovascular disease research survey. J Am Coll Cardiol 2007;50:2322-8.
7. Allen L. Noncommunicable disease research. Int J Noncommun Dis 2016;1:131.
8. World Health Organization. 2008-2013 Action Plan for the Global Strategy for the Prevention and Control of Noncommunicable Diseases. Geneva: World Health Organization; 2008. p. 42. Available from: http://www.who.int/nmh/Actionplan‑PC‑NCD‑2008.pdf. [Last accessed on 2018 Apr 10].
9. World Health Organization. Global Action Plan for the Prevention and Control of Noncommunicable Diseases 2013-2020. Geneva: World Health Organization; 2013. p. 55. Available from: http://www.who.int/about/licensing/copyright_form/en/index.html. [Last accessed on 2018 Jan 02].
10. International Institute for Population Sciences. National Family Health Survey, India. Available from: http://rchiips.org/nfhs/nfhs4.shtml.
11. Roth A, Gray J, Shockley J, Weng HH (Robin). The Use of Secondary Source Data for Measuring Performance in Operations Management Research. Available from: SSRN: https://ssrn.com/abstract=2271202 or http://dx.doi.org/10.2139/ssrn.2271202. [Last accessed on 2015 Jan 05].
12. Zachariah R, Harries AD, Ishikawa N, Rieder HL, Bissell K, Laserson K, et al. Operational research in low-income countries: What, why, and how? Lancet Infect Dis 2009;9:711-7.
## Annexure 1: List of manuscripts developed during manuscript writing program under RCCVH in PGIMER

| Title of the manuscript                                                                 | Institution                                                                 |
|---------------------------------------------------------------------------------------|------------------------------------------------------------------------------|
| Predictors of hypertension among current smokeless tobacco users of India; analysis of NFHS-4 | Rajarajeswari Medical College and Hospital, Bangalore, Karnataka              |
| Association of smoke and smokeless tobacco with hypertension in females — Evidence from National Family Health Survey-IV for an aspirational Indian state | Department of Community Medicine, Veer Surendra Sai Institute of Medical Sciences and Research, (VIIMSAR), Birla, Odhisa |
| Hypertension and its correlates among pregnant women consuming tobacco in India: Findings from the National Family Health Survey-4 | Maulana Azad Institute of Dental Sciences, New Delhi                         |
| What is the relationship of alcohol consumption with hypertension among the men and women in the Fourth National Family Health Survey/Demographic Health Survey 2015-2016: A secondary analysis | Maharani Laxmi Bai Medical College, Jhansi, Uttar Pradesh                     |
| Prevalence of hypertension and determinants of treatment-seeking behaviour among adolescents and young adults in India: An analysis of NFHS-4 | ESIC Medical College & PGIMSR, K.K. Nagar, Chennai                            |
| Gender specific factors associated with hypertension among women of child bearing age: findings from a nationwide survey in India | University College of Medical Sciences and GTB Hospital, Delhi               |
| Burden and determinants of uncontrolled hypertension among hypertensive individuals in India: A secondary analysis of National Family Health Survey 2015-2016 | ESIC Medical College & PGIMSR, K.K. Nagar, Chennai                            |
| Prevalence and determinants of hypertension among the tribal populations aged 15-49 years in India: Evidence from National Family Health Survey (NFHS-4), 2015-16 | Government Medical College, Baramulla, Jammu and Kashmir                      |
| Predictors of hypertension among pregnant and non-pregnant Indian women: Insights from National Family Health Survey-4 | Christian Medical College, Vellore, Tamil Nadu                                |
| Prevalence and risk factors of hypertension with thyroid dysfunction among Indian adults: Synthesis from National Family Health Survey (2015-16) | All India Institute of Medical Sciences, Kalyani, West Bengal                 |
| Hypertension in men – An emerging public health challenge for India: Evidence from National Family Health Survey-4 | Royal Tropical Institute (KIT), Amsterdam                                     |
| Predictors of hypertension among Indian women of reproductive age group: An analysis from NFHS 2015-16 Data | Akal University, Talwandi Sabo, Bathinda, Punjab                             |
| Equity in the burden and treatment seeking behaviour for hypertension among women in the reproductive age (15-45 years) group in India: Findings from a nationally representative survey | Indira Gandhi Medical College and Research Institute, Kathirkamam, Puducherry |
| Is rule of halves in hypertension valid uniformly across India? A cross sectional analysis of National Family Health Survey-4 data | Govt. Medical College, Haldwani, Uttarakhand                                 |
| Urban-rural disparities in blood pressure and lifestyle risk factors of Hypertension among Indian individuals. | Vardhman Mahavir Medical College & Safdarjung Hospital, New Delhi             |
| Association of Hypertensive Disorders of Pregnancy (HDP) and tobacco use among women of reproductive age group in India: A secondary data analysis from NFHS-4 | HRIDAY—Student Health Action Network, New Delhi                              |
| Diet and lifestyle risk factors associated with young hypertensives in India – Analysis of National Family Health Survey IV | King Edward Memorial (KEM) Hospital, Mumbai                                  |
| Prevalence and determinants of isolated systolic and isolated diastolic hypertension in India: Insights from the National Family Health Survey (NFHS)-4 | Janakpuri Superspeciality Hospital , New Delhi                                |
| Predictors of adherence to prescribed antihypertensive medications among hypertensive (15-49 years) in India: A secondary data analysis of National Family Health Survey 4 | ESIC Medical College and Hospital, Faridabad, Haryana                        |
| Hypertension as a silent epidemic among late adolescent girls, it's associated demographic factors, and pregnancy outcome: A report from National Family Health Survey (NFHS) IV Data | JSS Medical College, JSS Academy of Higher Education and Research, Mysuru, Karnataka |
| Establishing nomogram of blood pressure for late adolescents in India: Secondary analysis of NFHS-4 data | All India Institute of Medical Sciences, New Delhi                           |
| Assessment of cardiovascular risk using WHO-CVD risk prediction chart with respect to hypertension status among Indian population: A secondary analysis of National Family Health Survey (2015-16) | All India Institute of Medical Sciences, New Delhi                           |
| Hypertension and its association with body mass index among the Indian population. Findings from a nationwide survey (NFHS-4), 2015-16. | Dr Rajendra Prasad Govt. Medical College and Hospital, Kangra, Tanda Himachal Pradesh |
| Prevalence and determinants of hypertension and associated comorbidities in nonpregnant women of reproductive age group (15-49 years): Evidence from National Family Health Survey (NFHS-4), India | Adesh Medical College & Hospital, Shahabad (M), Kurukshetra, Haryana           |
| Tobacco use and uncontrolled hypertension among Indian men: Insights from the National Family Health Survey (NFHS-4), 2015-2016 | Dr Rajendra Prasad Govt. Medical College and Hospital, Kangra, Tanda Himachal Pradesh |
| Tobacco smoking and blood pressure: How are they related among the Indians? | King Edward Memorial (KEM) Hospital, Mumbai                                   |

Contd...
### Annexure 1: Contd...

| Title of the manuscript                                                                 | Institution                                                                 |
|----------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|
| Hypertension among women in reproductive age in India: Can we predict the risk?        | Andhra Medical College, Visakhapatnam, Andhra Pradesh                       |
| An analysis from National Family Health Survey (2015-16)                                 |                                                                             |
| Geo-spatial epidemiology of hypertension and its risk factors in India: Findings from   | United Nations Children's Fund (UNICEF), India                              |
| National Family Health Survey (2015-16)                                                 |                                                                             |
| Prevalence and associated factors for awareness of hypertension in India: Findings      | Indian Council of Medical Research, New Delhi                                |
| from National Survey-4                                                                  |                                                                             |
| Prevalence of cardiovascular disease in the hypertensive population of India.            | Postgraduate Institute of Medical Education and Research, Chandigarh         |