Evolution of Non-communicable Disease Programs in Kerala: Lessons Learnt and the Way Forward

Jeena Ramesh1,2 and Rakhal Gaitonde2

Abstract
Addressing the double burden of disease in a country like India is a massive challenge, especially when the system is tuned to do monitoring and surveillance of mainly communicable diseases. Achieving the sustainable development goal target 3.4 to bring down the premature mortality from non-communicable diseases (NCDs) to one-third will need to consider the requirement of robust indicators at the national level to keep track of the prevalence of NCD and its risk factors among its population. The state of Kerala in contrast has a strong primary health care system that it can build on to address the rising NCD burden.

Keywords
Non-communicable diseases, Kerala, sustainable development goals, AARDRAM mission

Introduction

70% of the world’s deaths were because of non-communicable diseases (NCD), of which 83% are contributed by low and middle-income countries (LMIC).1 The change in global rankings of various NCDs from 1990 to 2019 using the Institute for Health Metrics and Evaluation (IHME) data showed the shift from communicable diseases to NCDs, suggesting an epidemiological transition.2 The study conducted by Sarma et al, in 2019, saw the prevalence of raised blood pressure in Kerala to be 34.6% in men and 27.9% in women. Similarly, from the same study, it was found that one in every 5 men had a raised fasting blood glucose and two in every five adults had either raised blood pressure or a raised fasting glucose, the worrisome fact being that only 12.3% and 15.3% of the hypertensives and diabetics, respectively, are under control.3

Changes in the World Scenario

The world scenario brought forward by the World Health Organization (WHO) saw major studies that came to the forefront such as the Framingham Heart study and the North Karelia Project. Although it all started with 12 major diseases (cardiovascular diseases, diabetes mellitus, chronic obstructive pulmonary diseases, cancers, rheumatic disease, congenital abnormality, renal disease, occupational health disease, mental health, and malnutrition) that initially came under the banner of being chronic considering the time frame for disease development, the concept of “shared risk factors” formed the basis for narrowing down the number of diseases in the NCD list from 12 to 4. Hence, by the early 21st century, the world witnessed the crystallizing of the 4 × 4 framework that focused on 4 major NCDs (cardiovascular diseases, diabetes mellitus, chronic obstructive pulmonary diseases, and cancers) which had 4 shared risk factors (physical inactivity, unhealthy diet, smoking, and excessive use of alcohol) and the 3-4-50 model (3 risk factors leading to 4 conditions that contribute to 50% of the premature deaths), leaving behind key causes of NCDs affecting the LMIC such as diabetes, air pollution, and mental illness.2

India

India contributes to more than two-thirds of total deaths because of NCDs in the South East Asian Regions (SEAR).4 National health programs were started in India as early as 1975 and 1976 for cancer and blindness. Despite this, as per available documented evidence, inadequate investments in health during the 11th five-year plan and the mere mention of an increase in mortality because of lifestyle diseases in the

---

1 Department of Community Medicine, Government Medical College, Kollam, Kerala, India
2 Achutha Menon Centre for Health Science Studies, Sree Chitra Tirunal Institute of Medical Science Technology, Thiruvananthapuram, Kerala, India

Corresponding author:
Jeena Ramesh, Department of Community Medicine, Government Medical College, Kollam, Kerala 691574, India.
E-mail: drjeena3987@gmail.com
national health policy of 2002 were the only meagre sparks that could be cited.\(^5\) It was in 2008 that a pilot study conducted in 100 districts in India formed the basis of the National Program for control of Cancer, Diabetes, Coronary Heart Disease and Stroke (NPCDCS) which was implemented through the basic public health infrastructure with major impetus on NCD clinics at district and tertiary care centers and having a major focus on screening. This was followed by India becoming the first country to adopt the WHO’s global monitoring framework that focused on the national systems response to various risk factors leading to morbidity and premature deaths.\(^6\) 2018 saw the inception of the India Hypertension Control Initiative (IHCI), which shifted the focus from being solely concentrating on screening to the achievement of control of NCDs.\(^7\)

**Initiatives from the State of Kerala**

Kerala’s health indicators were always an envious achievement for many, which was a reflection of the importance given to health from the time of the Maharajas who ruled the state. The first documented evidence of an increasing trend in NCDs came from the National Sample Survey Office (NSSO) surveys of 1973 to 1974 which revealed that the state had a high percentage of morbidity among various Indian states. This finding was further reinforced by the work by Panicker and C. R. Soman in 1984 showing low mortality and high morbidity.\(^8\) This was evident from Sample Registration Bulletin 1979 in which, at a time when the national average for Crude Death Rate was 12.8, Kerala reported a low Crude Death Rate of 6.8, with an enviable low infant mortality rate of 47 as against India’s national average of 130. Although malnutrition and infections among children still prevailed, what was well evident was that both diseases of affluence and diseases of poverty were seen in the state of Kerala as early as the early 1980s. One of the landmark studies that could be accounted for is the *Kerala’s health paradox* by Dr K. P. Aravindan and Kunjikannan.\(^9\) In 1987, heart attack was found to be the major cause of death available from hospital statistics, but by 1996 cerebral thrombosis became the leading cause of death showing that the state had already entered the third stage of epidemiological transition within a decade. The fact that the proportion of deaths because of diseases of the circulatory system was building up in Kerala was also evident in the study conducted by Rajan et al, in 1993.\(^10\)

Despite having recognized the upsurge of NCDs in Kerala, it was after 3 decades, in 2005, with the launch of the National Rural Health Mission (NRHM), that Kerala showed a formal intervention to tackle the slow epidemic of NCDs that was encroaching. But unpublished information from Kerala health services shows that even in the early part of the decade, before the launch of NRHM, the rising trend in NCDs was felt by many local self-governments, despite there being no documented evidence of the same. This prompted funding to Primary Health Centers (PHC) for tackling NCDs at the grassroot level.

Kerala had adopted decentralization on August 17, 1996, under the banner of Peoples Plan Campaign consequent to the enactment of the Kerala Panchayati Raj Act 1994 and Kerala Municipality act 1994. This gave power to the local bodies such as panchayats to act as per the community needs assessment at the grass root level. The need is presumed to have arisen in the local *Gramasabhas* which oversee the development of locally relevant programs to be implemented.

Another documented movement taken toward tackling the issue of NCD was seen with an innovative intervention named “Pariraksha,” which was started in Malappuram district wherein they built the NCD program on the existing palliative care (Malappuram initiative in palliative care) platform.\(^11\) This was because of the initiative of the then district collector who was keen on NCD control.

**Program Modifications in Kerala**

The launch of the NPCDCS in 2010 at the national level aimed at strengthening the community health centers (CHC), district hospitals, and tertiary care centers. But in Kerala, the state plan fund was utilized to strengthen primary care by focusing on the PHCs and sub-centers. Along with this, the central fund was used to scale up the CHCs (mainly 5 districts), and by 2016, funds were redistributed to cover 14 districts and subdistricts. These changes in the system probably reflected the impact of decentralization and the demand for curative care at the panchayat level. However, these innovations are yet to translate into community-level effectiveness which could be one of the reasons the state is finding it a challenge to control NCDs. One of the main issues noted was the lack of a uniform system of monitoring and surveillance which should have been inbuilt at the inception of the program itself.

The launch of the IHCI in 2017 saw a shift of focus from screening to control of NCD. IHCI was meant to complement NPCDCS. It is a multipartner initiative that includes the Government of India, Union Ministry of Health and Family Welfare, Indian Council of Medical Research, State governments, and the WHO India. Initially initiated in 5 states (Punjab, Maharashtra, Madhya Pradesh, and Telangana), it was launched in the state of Kerala in 2018 in 4 districts (Thiruvananthapuram, Thrissur, Kannur, and Wayanad).\(^3\) In 2019, this was scaled up to cover a total of 9 districts. There are currently 4 cardiovascular health officers and senior treatment supervisors who supervise the achievements of the program at the district level.

The program is being monitored on a quarterly and yearly basis across districts. Issues regarding drug supply and
physicians not able to follow protocol-based treatments are the challenges that the system has had to encounter. 

Kerala saw the rise of the state initiative “AARDRAM mission” in 2018 which, along with taking steps to make primary health care facilities more patient friendly (phased upgrading of selected PHCs to family health centers [FHCs]), also had a component that addressed NCDs.12 The mid-level service providers, a new cadre of health care workers recruited under NRHM for facilitating the objectives of AARDRAM mission, are a potential group that can be involved in IHCI monitoring at the health center level.

Challenges in NCD Control

The international developments in the NCD strategy witnessed narrowing of the original strategy, which is unquestionably relevant to LMIC settings. Kerala, as we see, had identified NCDs very early and had a number of load demand driven, pilot interventions to address the slow epidemic. The national program, the NPCDCS, though brought about to address NCDs at the national level, somehow did not fit well into the overall development at the state level. The difficulty in adhering to a protocol-based treatment at the health-provider level shows that the system is currently not geared to dealing with long-term illness which requires multiple visits and dose titrations. The need to integrate family-based chronic care models into such a system can then be used to bring about effective public health changes in the control of NCDs. This, along with a strong decentralized system under the umbrella of initiatives like AARDRAM Mission and IHCI can be the cornerstone for a more flexible and responsive system.

A uniform monitoring system and health information systems including E-health can strengthen the monitoring and evaluation of the program. All this will ultimately reflect on the health policy and research, where informed decisions based on program effectiveness can be made more accountable and transparent.

The Way Forward

All said and done, the Frieden’s health impact pyramid states that though policies focus on clinical interventions, counselling, and education, these are the interventions with the smallest impact; focusing on changing the context to make individuals’ default decisions healthy and improving the socioeconomic factors by addressing issues of poverty, education, housing, and equality have the largest impact on health.13 A robust primary care system is there in Kerala where trained staff are available at all levels, albeit inadequately. The FHCs and the implementation of IHCI in a majority of the districts is a beginning, where, if the monitoring and reporting systems are entrusted to the mid-level service providers at the FHCs, a step toward evaluating the effectiveness of these initiatives can be something that can be envisaged in the coming years.

Author Contribution

Conceptualization—Dr Jeena Ramesh, Dr Rakhal Gaitonde. Writing (original draft)—Dr Jeena Ramesh. Writing (review and editing)—Dr Jeena Ramesh, Dr Rakhal Gaitonde.

Declaration of Conflicting Interests

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The authors received no financial support for the research, authorship, and/or publication of this article.

ORCID iD

Jeena Ramesh https://orcid.org/0000-0003-1725-0869

References

1. Noncommunicable diseases. World Health Organization. https://www.who.int/news-room/fact-sheets/detail/noncommunicable-diseases (cited 2021, April 17).
2. Dandona L, Dandona R, Kumar GA, et al. Nations within a nation: variations in epidemiological transition across the states of India, 1990–2016 in the global burden of disease study. Lancet. 2017 December 2;390(10111):2437-2460.
3. Sarma PS, Sadanandan R, Thulasidharan JV, et al. Prevalence of risk factors of non communicable diseases in Kerala, India: results of a cross-sectional study. BMJ Open. 2019;9:e027880. doi:10.1136/Bmjopen-2018-027880.
4. Mohanty S, Venkatarao E, Yasobant S. Non-communicable disease care and physical activity promotion in India: analysis of recent policies, guidelines and workplans. Fam Med Community Health. 2020 April;8(2):e000206.
5. Non-communicable diseases. National Health Portal of India. https://www.nhp.gov.in/healthlyliving/ncd2019 (cited 2021, March 22).
6. NCD global monitoring framework. World Health Organization. https://www.who.int/teams/ncds/surveillance/monitoring-capacity/gmf (cited 2021, September 26).
7. Expanding IHCI for blood pressure control. Express Healthcare, 2019. https://www.expressexpresshealthcare.in/strategy/expanding-ihci-for-blood-pressure-control/413979/ (cited 2021, April 29).
8. Panikar PGK. Health status of Kerala: the paradox of economic backwardness and health development. Centre for Development Studies; 1984:159. https://catalog.hathitrust.org/Record/006257832
9. Kunhikannan, TP, Aravindan KP. 2000. Changes in the health status of Kerala, 1987–1997. Thiruvananthapuram: Kerala research programme on local development. Centre for Development Studies; 1984:159. https://catalog.hathitrust.org/Record/006257832
10. Rajan SI, James KS. Kerala’s health status: Some issues. Econ Pol Wkly. 1993;28(36):1889-1892.
11. Salahudheen OP. Palliative care: a malappuram epitome. Proc Indian Hist Congr. 2009;70:1220-1230.
12. Government of Kerala. Aardram: National Health Mission. https://arogyakeralam.gov.in/2020/04/01/aardram/ (cited 2021, September 27).
13. Frieden TR. A framework for public health action: the health impact pyramid. Am J Public Health. 2010 April;100(4):590-595.