



NEED FOR A MECHANISM FOR EARLY WARNING AND NUTRITION SURVEILLANCE IN INDIA: A REVIEW OF NUTRITION INFORMATION SOURCES

^{1, 2}Monica Sharma

¹Ph.D. Scholar

Centre of Social Medicine and Community Health, Jawaharlal Nehru University, New Delhi,
India

²Scientist-B(Non-Medical), Department of Epidemiology, ICMR-National Institute of Cholera and Enteric Diseases, Kolkata,
India

Abstract: Given the continued prevalence of malnutrition in India, especially the rise in the number of districts with increasing prevalence of wasting (weight-for-height), an indicator of acute malnutrition, measures focusing on action against malnutrition needs prioritized attention. Nutrition monitoring and surveillance information for action against malnutrition is one important link between the community and the administration responsible for timely action. Using open access research articles and reports available online, this review presents an analysis of the gaps in the nutrition information system in India. The paper argues for potential imaginations of community-based and community level mechanisms for early detection of acute food shortage and nutrition surveillance considering the time lag in reporting findings of large-scale sample surveys, lack of feedback to the communities that are the data sources, robust monitoring and weak surveillance leave opportunities to find solutions to expedite action against malnutrition.

Index Terms – Malnutrition, Nutrition Surveillance, Early Detection of Acute Food Shortage, Community.

I. INTRODUCTION

In nutrition epidemiology, the significance of community and community-based approaches is increasingly being recognized as advantageous from the perspective of prevention of malnutrition by supporting nutrition surveillance and commensurate action. Nutrition surveillance has been understood as "watching over nutrition... to make decisions to improve nutrition in populations" (Mason & Mitchell 1983). Monitoring is essential to overcome data gaps and get more reliable and comparable data, an activity that contributes to effective surveillance (Ramachandran ND). However, monitoring is different from surveillance. Monitoring, as Ramachandran (ND) puts it, "...refers to the collection, analysis, and feedback of quantitatively accurate data at periodic intervals for relatively large and statistically representative samples of a population essentially for purposes of assessing time trends and describing population sub-group differences in diet, nutritional status, and nutrition-related health and disease risks as inputs to the formulation of a national nutritional policy". He further distinguishes between monitoring and surveillance. He wrote, "Surveillance, on the contrary, refers to collection, analyses, and feedback of data at sub-state levels to guide program implementation. Early detection of an occurrence of adverse events and prompt institution of remedial measures to achieve present goals gets precedence over completeness and scientific accuracy of data". Early detection and monitoring are activities that are part of the surveillance process. Concerning nutrition surveillance, India has a robust nutrition monitoring system producing trends in nutritional status at higher aggregated levels periodically, nutrition surveillance with an emphasis on early warning of collective community level acute food shortages, however, is still nascent. The role of the community in nutrition monitoring, prevention and mitigation is narrowed as well. This paper argues that early warning of acute food shortage mechanisms tapping into the social processes that precede biological

manifestation as malnutrition will allow for preventive action and mitigation before serious consequences unfold such as starvation deaths. It is based on an imagination that employs the community's experience and tacit knowledge in documenting signs of food shortages early as a part of nutrition surveillance. It provides room to initiate the prevention and action against malnutrition early enough to be effective in the particular instance at community level.

Existing Mechanisms for Nutrition Surveillance and Monitoring in India

Before 1972, respective states were responsible for data collection on nutritional status through the State Nutrition Bureaus. However, they were not protected from loopholes like sporadic frequency, different methodologies, and sample size inadequacy (Brahmam 2007). Thereafter, the National Nutrition Monitoring Bureau (NNMB) from 1974-79 onwards started producing national and state-level data on nutrition with 1975-79 as baseline survey years with 1988-89, 1996-97, and 2011-12 as repeat survey years. Thereafter, National Family and Health Surveys (NFHS) were initiated from 1992-93 as the first round followed by five others to date. NFHS was followed by the District Level Health Surveys (DLHS) that began during 1998-99. Thereafter, three rounds of Annual Health Surveys (AHS) have been conducted. These large surveys providing information at the national, state, and/or district levels have provided a nutrition monitoring framework in India. However, from a nutrition surveillance perspective, this framework has limitations (Rathi K. et. al. 2018). Besides these major surveys, ICDS also produces reports that are accessible at the institute level and not devoid of limitations.

The National Nutrition Monitoring Bureau (NNMB)

The National Nutrition Monitoring Bureau (NNMB) was established in 1972 under the supervision of experts from the National Institute of Nutrition (NIN) an institution of the Indian Council of Medical Research (ICMR). It presented its first report in 1974-75, based on its study in 10 states, Andhra Pradesh, Karnataka, Kerala, Tamil Nadu, Maharashtra, Madhya Pradesh, Orissa, Uttar Pradesh, Gujarat, and West Bengal (Brahmam 2007). The NNMB was specifically designed for monitoring the nutrition of children and adults, and dietary intakes at the household level and, therefore, was one of its kind. The main objective of NNMB was to present time trends in dietary patterns and nutritional status and to recommend corrective measures for national nutrition programs. The NNMB maintained a database of the nutritional status of the communities through systematic data collection and analysis. Through a multi-stage sampling, it collected household and individual level data for the mentioned states and produced information related to the nutritional status and nutrition-related health problems along with distribution of it across demographic and socioeconomic characteristics. A unit in NNMB teams comprised "a medical graduate, a nutritionist, a social worker or an anthropologist, a field attendant and a driver with a vehicle" (Brahmam 2007). Standardized data was collected through re-orientation and training of technical staff and by using standard procedures and accurate instruments. The data so collected was aggregated and presented state-wise as well as overall aggregated across the 10 states. Apart from undertaking routine rural repeat surveys, it conducted special surveys to monitor specific subjects like micro-nutrient deficiencies, vulnerable populations of the tribal communities as well as urban communities (Brahmam 2007). The routine surveys assisted in generating trends in nutritional status. But as it covered only 10 states it could not be called nationally representative. Further, there was a time lag of around two years for bringing the findings of the surveys into the public domain which delays the early warning of any impending acute food shortage. Another aspect that was beyond the purview of NNMB was connecting to the communities, so, there was no feedback of data to the communities involved. Hence, the communities act as data sources for the monitoring program with no further role. Thereby, as per its objectives, it provided data for national or state levels of action that mainly contribute to policy and programmatic improvements. Further, local action for the prevention of malnutrition through community participation was not part of its design. As the largest nutrition-specific sample survey, NNMB was one of the reliable sources of population-level nutritional status data sets in the country that had been disbanded since 2017.

National Family and Health Survey (NFHS)

NFHS is a multi-round large-scale nationally representative survey conducted on a sample of households distributed throughout India. It began in 1992 in India in collaboration with the Ministry of Health and Family Welfare (MoHFW), Government of India, Indian Institute of Population Studies (IIPS) coordinates it. NFHS has conducted five rounds of surveys, NFHS-1 (1992-93), NFHS-2 (1998-99), NFHS-3 (2005-06), NFHS-4 (2015-16), and NFHS-5 (2019-2021). NFHS-4 provides estimates at the district level and NFHS-5 provides district-level estimates for selected indicators. The NFHS provides information related to a wide range of socioeconomic, health, maternal, and child health and nutrition heads which includes infant feeding and child nutrition practices including breastfeeding and supplementary nutrition. However, it takes 1 to 2 years for the information to reach the public domain. It does not connect the findings with the vulnerable sub-groups of participants to provide early or timely remedial action to the targeted population. The interval period between the surveys is between three to six years.

Other Sources of Nutrition Information

Nutrition-related consumer expenditure and Socioeconomic Analysis in NSS

Apart from the NNMB which focuses particularly on Nutrition and information related to it, and the NFHS, other surveys like the National Sample Survey (NSS) also provide some information on nutrition and related socioeconomic consumption indicators. The NSS in its quinquennial surveys collects data on Household Consumer Expenditure and includes information on the nutrition intake of the population and estimates it at the state/Union Territory (UT) level among the various consumption heads on which it collects data. However, this information is reported in the public domain with a time lag of 2-3 years. A national survey, "Nutritional Intake in India", conducted during the period 2011-12, particularly studied nutrition concerning social aspects affecting it. The irregular intervals between special surveys support nutrition monitoring more than nutrition surveillance which requires continuity for effective analysis and prediction. As NSSO too analyses and produces findings ex-post even though strengthens nutrition monitoring, especially about the socioeconomic factors associated with nutritional status, it contributes little to nutrition surveillance.

District Level Household Survey (DLHS)

District Level Household Survey (DLHS) produces estimates on Reproductive and Child Health at the district level and produces decentralized facility level including Primary Health Centres and Sub-Health Centres. There have been four rounds of DLHSs, DLHS-1 (1998-1999), DLHS-2 (2002-2004), DLHS-3 (2007-2008) and DLHS-4 (2012-2013). Nutrition data was included in the second and the fourth DLHS rounds. The DLHS-4 included data from Clinical Anthropometric and Bio-chemical tests. The findings were reported in December 2006 with a time lag of more than a year. Like the other large-scale surveys, the DLHS produces *post facto* analysis which does not include getting back to the communities with the findings of the data collected from them.

Annual Health Survey (AHS)

The Annual Health Survey (AHS), implemented by the office of the Registrar General of India, Ministry of Home Affairs, Government of India, and sponsored by the MoHFW (Rathi 2018) was conceived so that it "...monitors the performance of government's health interventions...". With 2010-11 as the baseline, it covered the states of "Assam, Bihar, Chhattisgarh, Jharkhand, Madhya Pradesh, Odisha, Rajasthan, Uttar Pradesh and Uttarakhand... that account for about 50 percent of the total population of India, 61 percent of births, 71 percent of infant deaths, 72 percent of under 5 deaths and 62 percent of maternal deaths". The purpose was to cover the long-time lags of the NFHS (Krishnan 2013). Besides, in contrast to NFHS and DLHS, AHS followed the same sample in subsequent surveys. Nutrition data was collected from the perspective of child health and included the prevalence of low birth weight, vitamin A and iron supplementation, breastfeeding practices, and supplementary nutrition. Three rounds of AHS were conducted, 2010-2011, 2011-2012, and 2013. However, it was discontinued after 2013 citing duplicity of data. The nine Empowered Action Group (EAG) states covered by AHS were not included in the DLHS-4 (2012-2013) survey. Nutrition data was collected in the third round of AHS. The second round of AHS

contained limited information related to nutrition. It mainly comprised information on nutrition supplementation, food, and breastfeeding among children under 5. AHS mainly covers information on health indicators. Further, there is limited information available in the public domain on them.

Integrated Child Development Scheme (ICDS)

The ICDS aims to improve the nutrition and health status of children below the age of six years and therefore provides a package of services to children below six years of age, pregnant women, lactating mothers, and adolescent girls that includes growth monitoring, supplementary nutrition, pre-school and non-formal education, nutrition and health education, immunization, health check-up and referral services. Growth monitoring in the ICDS includes tracking the growth in each child starting from birth to the age of 6 years. The Growth Monitoring Manual produced by the National Institute of Public Cooperation and Child Development provides guidelines for conducting it. It keeps a record of changes in the body weight of each child by monitoring her/him at regular intervals. For the first month, the infant is monitored weekly followed by once a month up to 3 years and once in each quarter of a year from 3 to 6 years. The growth chart of each child is prepared on an individual basis by plotting weight against age for each of them. Changes in the progress of the curve thus generated as upward, downward, or flat is the indicator of each child's growth. Based on the growth curve, the mother of the child is given the necessary guidance for taking care of the child the purpose being "to take action on the first signs of inadequate growth, no growth or weight loss in a child" (GOI ND).

The ICDS tries to address the early years of individual child growth, including targeting malnutrition in newborns through interventions during the mother's pregnancy and lactation period, and adolescent girls' health to take care of the anemia when they do become mothers. It takes cognizance of early detection of inadequate body weight of each child under its coverage as per the World Health Organization (WHO) growth standards.

At the level of its implementation that has been continuously under criticism, as Sachdev & Dasgupta (2001) put it,

"poor understanding of this activity by the AWW as well as the mother, erratic method of weight taking; nonavailability of weighing machine/growth charts; lack of knowledge about weight recording and paucity of time at the disposal of AWW. It is to be appreciated that this activity needs a great deal of time, training, supervision, and support."

It highlights the problems in reliable anthropometric measurement at regular intervals at the level of each child. NIPCCD established a Central Monitoring Unit (CMU) to verify the reliability of data collected at the Anganwadi Centres (AWC) (GOI ND:b:6). The sociocultural context of communities continues to remain unaddressed (*ibid*) that could be a snag in achieving its effectiveness.

Growth monitoring of individual children covered by the ICDS does not produce information to address vulnerabilities at the household or community level. This is important in the context of particularly vulnerable households. Household or community-level intervention using data on the increase in undernourished children is not part of the ICDS objective. Underdevelopment in children is symptomatic of a suffering household and a suffering household is symptomatic of vulnerabilities in the community. The ICDS provides only individual-level interventions to pregnant and lactating mothers and children while the data remains underused for any further analysis or action.

From the current prevalence as shown by the malnutrition indicators, there is a need for community-level detection of malnutrition and therefore the need for community-based mechanisms to detect immediate and long-term trends in the incidence and prevalence of malnutrition. Identifying vulnerable communities and the most vulnerable households within the communities will require community-based surveillance mechanisms that the existing monitoring and surveillance systems have not been designed to identify. Further, identifying situations in which even the less vulnerable households of communities facing food shortages encounter acute malnutrition is essential for community level action and mitigation.

Need for a community-based, community-level, nutrition surveillance and early warning tool

According to a National Nutrition Policy (1993) statement of the Government of India, “nutritional surveillance is another weak area requiring immediate attention” (Ramachandran ND). The various sources of nutrition information dispersed forward in time provide a fair strength to the nutrition monitoring system in India. However, from the limitations of the major large surveys and the ICDS growth monitoring framework for remedial action, it could be discerned that nutrition surveillance and the early detection of acute food shortage are areas that need to be strengthened for intensifying mitigative action against the problem of malnutrition. Concerns like the time lag in the dissemination of findings from national surveys and the absence of community-level and community-based mechanisms of supporting nutrition information weaken nutrition surveillance by delaying action at the grassroots level. Further, in 2019 according to the data of the ICDS- Computer Application Software (CAS), 7.07 % of children in India suffered from wasting which was in contradiction to the findings of NFHS-5 fact sheets in which the prevalence of wasting was 19.3 % (Ulahannan 2022). Such differences would adversely affect the action needed to remedy the deteriorating situation at the community level.

For the large-scale surveys, the unit of analysis is either the individual or a household and the levels of analysis are usually large administrative units such as the nation, state, or district. Village or urban cluster-level analysis has not been captured in the current nutrition information system. Further, these macro data sets are analyzed and published with a lag of a year or two, thereby informing policy and planning but not immediate action for preventing imminent acute malnutrition. Analysis of common factors operating at the community level affecting the population as a whole has not been addressed from the lens of early detection of food shortage in the current nutrition information system in India. Community participation in surveillance activity has been limited to households and individuals as data sources. Community potential as both data providers and data users together cultivating community ownership has not been harnessed yet. Community dissemination and feedback from data sources for capacity building of communities for achieving health goals have not yet been part of the nutrition monitoring and surveillance design. This might also be a reason that the segments who fall at the extremes and need immediate redressal at community level are missed in the current framework of monitoring and surveillance.

In India, the strengths of a nutrition surveillance system for accelerating the fight against malnutrition remains a gap. Given the continued prevalence and indefinite trends in indicators of acute malnutrition like wasting (weight-for-height) (Rohtagi 2017), the need of the hour is for nutrition surveillance that could be used for early detection of acute food shortage to initiate necessary action and could continuously monitor nutritional trends as well.

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