Nutritional Status And Shifting Burden Of Disease In India: A Three Decadal Review.

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Abstract:

This is a review paper which aims to observe the trends in changes in nutritional status and the shifting burden of disease in India. The objective of the paper is to analyze whether the increase in the economic growth rate has translated into an improvement in nutritional standards and health conditions. The study used data from five NFHS surveys (1992–2020), world bank reports and budget reports by the Government of India. The study employed a review approach to the data obtained from NFHS and budget reports. Despite several initiatives and regulations, this three-decadal analysis found that marginalized groups and women are disproportionately affected by the epidemiological transition in spite of a positive economic growth rate. Regardless of the fact that India has many grass-root level nutritional initiatives, the nutritional condition of women and children remains a significant public health problem. India suffers from a double burden of malnutrition and epidemiological transition despite having a positive growth rate in the economy since liberalization of the economy in India. There are differences in health between different parts of Indian society, and policies and programs need to be put in place to fix this.

Key-words Economic growth rate, Epidemiological transition, Marginalized sections, Nutritional status.

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Introduction:

The pandemic has exposed the vulnerable conditions of public health in India. In particular, the poor and marginalized sections are the most affected due to the unprecedented health crisis. This invokes an enquiry into the nutritional profile and shifting burden of disease in Indian society. In addition, an epidemiological transition was observed across all the states in India despite the increasing economic growth since the adoption of economic reforms in the country. Noncommunicable diseases [NCDs] account for 63% of fatalities in India, while they cause 23% of premature deaths [1]. In contrast to 1990, when the majority of the disease burden in most states of India was from CMNNDs (Communicable, maternal, neonatal, and nutritional diseases), India's disease epidemiology from 1990 to 2016 is remarkably different, with all states having a higher disease burden from NCDs and injuries than before [2].

The term "epidemiological transition" refers to the gradual combination of changes in health with a corresponding change in the population's disease and mortality profile. Patterns which occur as an outcome of demographic, economic, sociological, ecological, and biological shifts. "A long shift occurs in mortality and disease patterns whereby pandemics of infection are gradually displaced by degenerative and manmade diseases as the chief form of morbidity and primary cause of death" [3]. In particular, in emerging nations experiencing significant developmental transitions, such as India, economic growth adds to increased inequities and exposure to health-harming conditions and hence may contribute to an increase in NCD risk [4]. Within the last three decades, India has seen rapid structural changes in disease patterns. From the 1970s through the mid-1990s, the

period of disease transition experienced the increased burden of NCDs from 35.9 percent to 54.9 percent in rural areas of India, while the prevalence of communicable diseases decreased to 22.1 percent from 47.7 percent [5,6].

The present study focuses on the nutritional status and disease burden among various sections and the economic growth rate for the last three decades from NFHS-1 (1991-92) to NFHS-5 (2019-20). India continues to witness two-thirds of the deaths of children under five due to undernutrition [7]. The nutritional status, economic growth, and burden of disease are intertwined because they influence each other in society. The high levels of economic growth and low levels of malnutrition and disease burden indicate the potential of human capital formation [8].

Materials and Methods:

The present study has utilized the data from five NFHS reports from 1991-92 to 2019-20, which covers three decadal surveys on the Indian population's health profile. The data pertaining to economic GDP growth rate is taken from World Bank reports, while the data on spending on health and family welfare is extracted from the budgetary expenditure (1991-2020) from the Ministry of Finance, Government of India. In understanding and analyzing the shifting burden of disease from communicable diseases to non-communicable diseases (NCDs), the study focused on GDP growth rate, the nutritional profile of adults and children, and the anaemic conditions of the various sections of Indian society. Excel was used to make the graphs and tables that show the information from the NFHS surveys.

Using Dr. Dobbin's Quick Review Guidebook Steps for Conducting a Rapid Review, rapid reviews were guided through the evidence-based decision making (EIDM) process in five phases. The health Evidence TM tool was used to 1) find and gather evidence relevant to the research, 2) assess the research evidence based on methodological quality, and 3) synthesize the findings

Search strategies:

A combination of the quick review research questions and several different study disciplines led us to develop the key search phrases "Nutritional status and 'Disease burden". Truncations were employed to increase the number of relevant search results by adding keywords and synonyms for the Anaemia, Marginalized sections, Economic growth rate and shifting burden of disease

The final search string is as below:

(("Malnutrition" or "Epidemiological transition")). We employed four databases: PubMed, Cochrane, Google Scholar, and Scopus library to conduct a systematic narrative publication review. Despite the paucity of publications on shifting disease burden, PubMed and the Cochrane Library covered excellent peer-reviewed articles, but Google Scholar and Scopus covered grey literature more comprehensively.

Eligibility criteria:

The literature search was limited to English-language publications and covered Nutritional status and epidemiological transition in India. Theses and review papers published from January 1991 to before April 2022; GDP Growth rate from World Bank and health allocation from total budgetary expenditure from Indian Budgets from 1991 to 2020. Data was extracted from NFHS and World bank reports.

Data Extraction:

Reviewers from the university fraternity ensured the selection process was not biased by reviewing the articles with two impartial reviewers. There has been an agreement of eighty percent between both reviewers with regard to the additional data extraction on the finished list of publications. It was not consistent in the methodology because the investigations were conducted by a wide range of experts. Based on levels of evidence, the quality was graded. [9]

Results of the literature search:

We filtered out non-related articles based on their non-English language, title, abstract, and chapter of a book, and 97 potentially relevant articles from 403 articles were retrieved after the pre-screening procedure was completed. Final data extraction included 97 studies from developing and developed countries based on the inclusion criteria. (Figure 4: Health Evidence TM tools: Literature search results).

Inclusion criteria:

Original nutritional status and shifting burden of disease related articles met the requirements for inclusion.

Exclusion criteria:

Research studies with lack of sufficient information about community efficacy and surveillance data or evaluations, abstracts, short communications, conference posters, and letters to the editor.

Nutritional Status and Anaemic conditions:

Malnutrition and anaemia indicate that economic prosperity has not trickled down to the people of the society [10]. Despite the improvement in child nutritional status from NFHS-1 to NFHS-5 (fig.1), India continues to suffer from high levels of child malnutrition; underweight, wasting, and stunting. The children and women suffer from anemia across the communities. However, children from ST and SC communities, while women from all communities, show high levels of anemia conditions in the country. This pattern of development suggests that economic growth is not inclusive enough to address the nutritional and health conditions of the marginalized in India [11].

Fig.3 shows the health-wealth conundrum in that India's economic growth rate has increased after the economic (LPG) reforms in the 1990s, but malnutrition still remains a major obstacle to a healthy India, if not a wealthy India. Despite a positive GDP growth rate during the pre-covid period, spending on health and family welfare did not exceed 5% of total budgetary expenditure (fig.3). The paradox of economic development and rising anaemic levels among various communities (figs. 2 and 3) amounts to saying that the marginalized sections of India cannot benefit economically. The malnutrition (fig.1) and anemia conditions (fig.2) show the hidden hunger of the people despite the positive economic growth rate (fig.3).

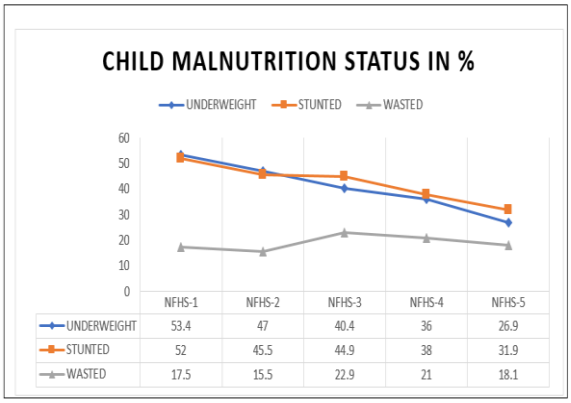


Fig.1. Nutritional Status of Children from in Percentages (1991-92 to 2019-20)

Source: NFHS-1 to NFHS-5. (NFHS-5 data is calculated for 18 states only due to the prevailing covid-19 constraints).

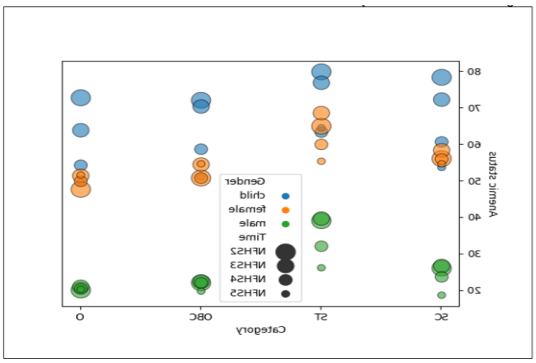
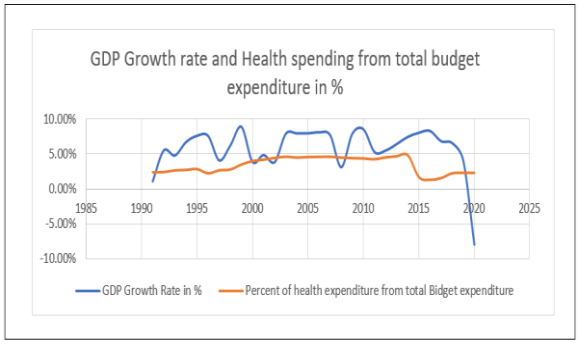


Fig.2. Anaemic Status Community Wise

Source: NFHS-1 to NFHS-5. (NFHS-5 data is calculated for 18 states only due to the prevailing covid-19 constraints). Scatter Plot.



Source: GDP Growth rate from World Bank and Health allocation from total budgetary expenditure from Indian Budgets from 1991 to 2020.

Fig.3.GDP Growth rate and Health spending from total budgetary expenditure (1991 to 2020)

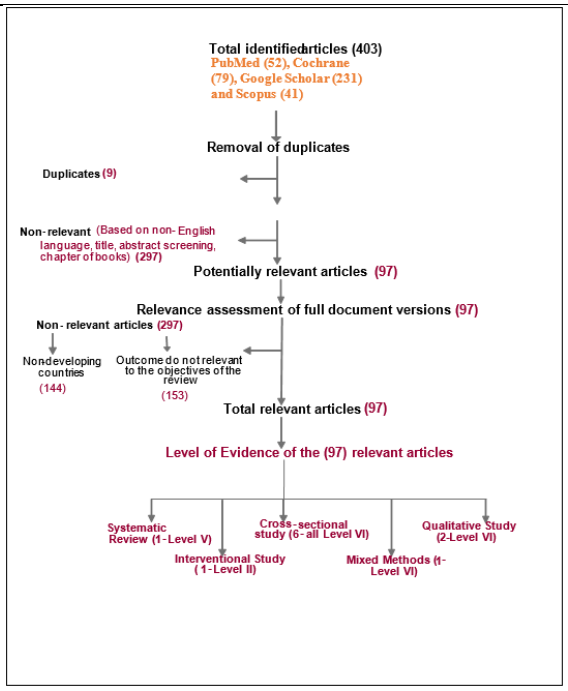


Fig.4: Health Evidence™ tools: Literature search results [9]

Epidemiological transition in India and its impact on marginalized sections:

The first National Family Health Survey (1992–1993) was primarily concerned with communicable and nutritional deficiencies, but the recent NFHS-5 (2019–2020) survey was mostly concerned with NCDs such as diabetes, cancer, and heart disease. This reflects a change in emphasis from communicable illnesses and dietary deficits to chronic and non-communicable diseases.

The three decadal NFHS data show that women are the most vulnerable to tuberculosis disease, with the disease burden increasing from 365 (NFHS-1) [12] to 375 (NFHS-5) [13] per 1 lakh population. Asthma disease exhibits a progressive decrease in both sexes from NFHS-1 to NFHS-5, but the disease rates among women and men show a public health concern. The morbidity rates of leprosy showed a considerable decrease in NFHS-1 and the focus was made on malaria in NFHS-1 and 2 [14], but since the NFHS-3 survey (2004-2005) [15], there has been a strong emphasis on chronic non-communicable conditions, The disease burden from these non-communicable diseases has risen dramatically. Diabetes prevalence in India increased from 881 women and 1051 men (NFHS-1) to 2208 women and 1966 men (NFHS-5) per 1 lakh population. The condition goiter is caused by a lack of iodine, one of the important micronutrients, and its prevalence has increased dramatically among women, from 949 (NFHS-3) to 3293 (NFHS-5). Heart disease and cancer have been steadily declining from NFHS-4 (2014) [16] to NFHS-5 (2019-20), but they are still very close. Hypertension is one of the cardiovascular diseases that poses a significant public health threat to those in socioeconomic and epidemiological transition. The blood pressure of both women and men (15–49 years) was measured in the NFSH-4. Hypertension was found in 15% of men and 11% of women (NFHS-4). This demonstrates that men are more hypersensitive and more prone to cardiovascular illnesses in India. From NFHS-1 to NFHS-5, the prevalence of communicable diseases such as tuberculosis (TB) kept growing, while chronic non-communicable diseases such as diabetes climbed significantly from NFHS-3 to NFHS-5. This clearly demonstrates the proof of India's dual illness burden.

The epidemiological transition in India, as evidenced by three decadal national family health surveys, has impacted the marginalized sections, where the prevalence of non-communicable diseases has risen dramatically. From NFHS-3 to NFHS-5, the diabetic status of women from scheduled castes and scheduled tribes increased significantly. Women from scheduled castes increased from 798 (NFHS-3) to 2713 (NFHS-5) per 1 lakh population, while women from scheduled tribes increased from 349 (NFHS-3) to 1417 (NFHS-5). Women from the Schedule Caste and backward castes had higher rates of asthma. Schedule caste women increased from 1494 (NFHS-1) to 1710 (NFHS-5) per 1 lakh population, while backward caste women increased from 1498 (NFHS-1) to 1717 (NFHS-5). In India, the frequency of goiter has risen among women from reserved and disadvantaged classes. Women from scheduled castes increased from 754 (NFHS-3) to 3427 (NFHS-5) per 1 lakh population, whereas women from backward castes increased from 819 (NFHS-3) to 3244 (NFHS-5) per 1 lakh population.

Hypertension was found to be more common among backward caste women and scheduled tribe men. Among scheduled tribe men, it climbed from 14.8% (NFHS-4) to 17.2% (NFHS-5), and among backward caste women, it rose from 10.5% (NFHS-4) to 14.4% (NFHS-5). The biggest occurrence of elevated blood glucose levels is among scheduled tribal women and other men

(other than SC, ST, and BC castes). This increase was observed among scheduled tribal women, rising from 2.8 percent to 4.7 percent, and among other men, rising from 4.6% to 6.5% (NFHS-4 to 5).

Policy Intervention:

As India is languishing with the burden of malnutrition, the Indian government introduced the "National Nutritional Mission", also called the "POSHAN Abhiyan", on March 18th, 2018 with a holistic approach. The target group of this initiative is children and women because inadequate nutrition during the first 1,000 days after childbirth causes stunted growth, resulting in a malnutrition cycle that passes down through generations [17].

Interventions aimed at improving women's and children's health and nutrition abound throughout India's policy environment. The POSHAN Abhiyaan offers a new opportunity to create remarkable change in women's and children's health. Its main purpose is to improve the nutritional condition of adolescent girls, women with pregnancy, mothers during nursing, and children with an age range from 0 to 6 in all 36 states and union territories [18]. By 2030, the POSHAN Abhiyaan initiative aims to accomplish SDG-2, which is to eliminate all types of malnutrition, incorporating the internationally agreed-upon 2025 aim of preventing stunting and wasting risk in under five-year-old children. It necessitates quick coordination across ministries, the correct coordination of health and nutrition initiatives from the period between childbirth and the child's five years of age, as well as critical observation of advancements made during the programme. Presently, 2.51 billion individuals throughout the country have participated in the program, including over 36 million activities [19]. The COVID-19 pandemic is stymieing efforts to meet the POSHAN Abhiyaan objectives.

According to the Global Nutrition Report 2020 [20], malnutrition remains India's one most significant problem. This clearly indicates that perhaps the pandemic of COVID-19 has the potential to undo recent success in eliminating malnutrition and hunger. According to the Global Hunger Index 2021, India ranks 101 out of 116 nations [21]. It is placed under the "serious hunger" category.

There have been efforts to subdue the condition of anemia in India since 1970, with the National Nutritional Anaemia Prophylaxis Programme (NNAPP) to the most recent intensified national iron plus initiative (Anemia Mukt Bharath) in 2019. Despite more than five decades of efforts, the anaemia condition of women and children is still a significant public health concern. As the impact of immunity and public health has been devastating during and aftermath of the COVID-19 pandemic, we must realize the concept of a malnutrition-free India.

Discussion and Conclusion:

The data on economic GDP growth rate and epidemiological trends from five NFHS surveys indicate that the economic growth rate is not inclusive enough to bring improvement in health indicators such as malnutrition and burden of disease after the liberalization of the economy in India. Child malnutrition, stunting, underweight, wasting and the persisting anaemic conditions of children and adults show the increasing trend of morbidity in India. Subsequently, during the last three decades (1991–2021), the epidemiological burden of diseases has shifted from communicable to noncommunicable. Non-communicable illnesses, such as cancer, diabetes, and heart disease, have a latent stage that might last months or years. Many of India's government health programmes target high-risk populations. However, the high-risk approach is perceived to have a disadvantage. While it might reduce disease among the high-risk population, the general population may not benefit from the intervention, including low-risk, asymptomatic, symptomatic, and healthy individuals. This methodology focused on communicable diseases through major health policies such as the "National Leprosy Eradication Programme" (NLEP) in 1955, the "National Tuberculosis Control Programme" (NTCP) in 1962, and the Pulse Polio Programme in 1988, and noncommunicable diseases through the "National Programme for the Prevention and Control of Cancer, Diabetes, Cardiovascular Diseases, and Stroke" (NPCDCS) and other initiatives. The recent Swachh Bharat programme, launched in 2015, aims at educating the people on health and sanitation. The diminishing nutritional standards and shifting burden of diseases impact the poor and vulnerable. In particular, the children, women, and marginalized

sections are the most affected by the issues of malnutrition and epidemiological transition despite the positive GDP growth rate. India should introduce a health budget to deal with the present burden of diseases and issues of nutritional and anaemic conditions in society. Policy interventions such as POSHAN Abhiyan should be strengthened further to prevent the epidemiological transition and ensure nutritional India.

Conflict of interest:

The authors declare that there is no conflict of interest for this study.

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References:

World Health Organization. (2020). Noncommunicable diseases: Progress monitor 2020.

Dandona, L., Dandona, R., Kumar, G. A., Shukla, D. K., Paul, V. K., Balakrishnan, K., et al(2017). Nations within a nation: variations in epidemiological transition across the states of India, 1990–2016 in the Global Burden of Disease Study. *The Lancet*, *390*(10111), 2437-2460.

Omran, A. R. (1971). The epidemiologic transition: a theory of the epidemiology of population change. The Milbank Memorial Fund Quarterly, 49, 509-538.

Shetty, P. S. (2002). Nutrition transition in India. *Public health nutrition*, *5*(1a), 175-182.

Yadav, S., & Arokiasamy, P. (2014). Understanding epidemiological transition in India. Global health action, 7(1), 23248.

Visaria, L. (2004). Mortality trends and the health transition (pp. 32-56).na

Sendhil, R., Kumara, T. K., Ramasundaram, P., Sinha, M., & Kharkwal, S. (2020). Nutrition status in India: Dynamics and determinants. *Global Food Security*, *26*, 100455

Ghosh, S. (2018). India: nutrition intake and economic growth, a causality analysis. *Development Studies Research*, *5*(1), 69-82.

Lachyan, A. S., Fui, W. M., Banerjee, B., & Zaki, R. A. (2020). International Journal of Medical and Pharmaceutical Research.

Swaminathan, S., Hemalatha, R., Pandey, A., Kassebaum, N. J., Laxmaiah, A., Longvah, T., ... & Dandona, L. (2019). The burden of child and maternal malnutrition and trends in its indicators in the states of India: the Global Burden of Disease Study 1990–2017. *The Lancet Child & Adolescent Health*, *3*(12), 855-870.

Bhuyan, B., Sahoo, B. K., & Suar, D. (2020). Nutritional status, poverty, and relative deprivation among socio-economic and gender groups in India: Is the growth inclusive? *World Development Perspectives*, *18*, 100180.

The Ministry of Health and Family Welfare (MOHFW), Government of India. (1992). National family health survey (1). http://rchiips.org/nfhs/india1.shtml

The Ministry of Health and Family Welfare (MOHFW), Government of India. (1998). National family health survey (5). http://rchiips.org/nfhs/factsheet_NFHS-5.shtml

The Ministry of Health and Family Welfare (MOHFW), Government of India. (1998). National family health survey (2). http://rchiips.org/nfhs/india2.shtml

The Ministry of Health and Family Welfare (MOHFW), Government of India. (1998). National family health survey (3). http://rchiips.org/nfhs/nfhs3_national_report.shtml

The Ministry of Health and Family Welfare (MOHFW), Government of India. (1998). National family health survey (4). http://rchiips.org/nfhs/NFHS-4Reports/India.pdf

Georgiadis A, Penny ME. Child undernutrition: opportunities beyond the first 1000 days. The Lancet Public Health. 2017 Sep 1;2(9):e399.

Ministry of Women and Child Development, Government of India, POSHAN Abhiyaan.

Ministry of Women & Child Development. Government of India, Poshan Abhiyaan.

Micha R, Mannar V, Afshin A, Allemandi L, Baker P, Battersby J, et al, 2020 Global nutrition report: action on equity to end malnutrition.

Siddiqui MZ, Biswas S, Jose S. Alarming Hunger in India. Economic & Political Weekly. 2021 Dec 11;56(50):13.