Harnessing the Power of Artificial Intelligence (AI) for Predicting Nutritional At-Risk Children

Somen Saha[1], Deepak B Saxena[2]

[1]Professor & Head of Centre of Excellence in Nutrition, Indian Institute of Public Health, Gandhinagar, Gujarat, India.
[2]Director, Indian Institute of Public Health, Gandhinagar, Gujarat, India.

Correspondence: Dr Deepak B Saxena, Email: deepak72@iiphg.org

Artificial intelligence (AI) is a new buzz word for various public health solutions, AI is expected to transform Indias dream of affordable universal healthcare into reality. India has been rapidly transformed the power of AI in diagnostic services, addressing shortage of human resource, and hospital management services. However, there is a huge potential to transform the power of machine learning for examining the huge data and records collected under mother and child tracking systems for health and nutrition at risk assessment. We reflect on use of AI for addressing Malnutrition in India.

Malnutrition is among the most critical reasons for child mortality in India, especially children below five years of age.[1] The first 1000 days, spanning from conception to a child's second birthday, represent a critical period characterized by rapid growth and development. States such as Gujarat, despite experiencing overall economic growth, faces significant challenges in several key areas of child well-being and survival, with malnutrition being the most common underlying problem, which has further deteriorated over the period.[2, 3] This calls for the need of adapting or reforming the existing strategies, otherwise, it may risk disempowering local managers and lead to a "business-as-usual" acceptance of unreachable goals.

Available evidence suggests malnutrition in children a result of several well-established risk factors including short maternal stature, mothers education, poverty, poor dietary diversity, maternal underweight, have been identified as some of the top risk factors.[4] These factors also reflect poor socioeconomic conditions and/or inadequate nutritional environments in children's households. Majority of this established risk factors are routinely captured by the programmatic trackers of health department and integrated child development scheme (ICDS). In Gujarat, the mother and child data are tracked through a name-based tracking system of Health & Family Welfare Department, called TeCHO+, while Poshan Tracker platform of the ICDS programme of Government of India remains an important platform for management of data gathering by the Women and Child Development Department, Gujarat. Despite a concern on reliability of both data sets, optimal analysis of the data thus gathered can lead to better decision making and targeted action.

The data captured through these trackers can be utilized to identify the pattern of risk factors of malnutrition and their regional variations. The power of machine learning can be harnessed to create a risk-based scoring approach for predicting families at risk of malnutrition as well as to develop regional forecast and identify high-risk pockets. With several evidence-based interventions already in place, based on the risk factor prediction, forecast

Quick Response Code	Access this article online	How to cite this article :
	Website : www.healthlinejournal.org	Saha and Saxena Harnessing the Power of Artificial Intelligence (AI) for Predicting Nutritional At-Risk Children. Healthline. 2023; 14 (4): 255-256
	DOI : 10.51957/Healthline_ 585_2023	

and high malnutrition risk pocket identification, implementation of targeted intervention with a mix of already existing strategies or newly devised area-specific strategies has a potential to better combat or prevent malnutrition.

We propose a two-phased approach. In the first phase, data analysis should be undertaken on the data captured in existing government nutrition tracker-based systems. Using the large pool of beneficiary data, machine learning algorithm can track the data to create an at-risk scoring. The collected data need to be preprocessed, which will be utilized for development and validation of an advanced predictive model of childhood malnutrition. Furthermore, it is possible to investigate the underlying mechanisms and pathways of identified risk factors, identified geographical and individual characteristics associated with a high risk of malnutrition, and generate forecasts of regional pockets with potential higher rates of malnutrition. In the second phase, a differentiated care model can be designed based on the forecasted findings, integrating insights from the predictive model. It is important that the model thus generated needs to be continuously refined, incorporating evidence-based findings and identifying the need for innovative strategies through literature review, consultative and validation workshops, and key informant interviews. Pilot testing and iterative improvement of the differentiated care model should be conducted to assess its feasibility, acceptability, and effectiveness. In the final phase, the scalability, sustainability, and potential challenges and opportunities of integrating the model into existing data tracking system should be assessed, considering resource requirements and long-term implementation strategies.

The model will support in predicting the children at risk of malnutrition. Based on this, a differentiated care package can be developed, which can support the State in selecting high impact interventions and allocation of resources. The predictive model and the differentiated care package can also help uncover the areas not addressed under the existing set of interventions and propel innovations, newer initiatives and undertake policy changes. With timely interventions, we anticipate a reduction in the prevalence of childhood malnutrition and its associated long-term health effects. The model's insights can also help develop evidence-based policies for child nutrition and development during the first 1000 days. The model can be adapted and applied in different regions and populations, contributing to efforts to combat childhood malnutrition.

As India is leading the Global partnership on Artificial Intelligence, it is important to undertake efforts to address the power of AI in prioritizing children at risk of malnutrition. We believe there is a huge potential to effectively harness the power of machine learning for faster progression towards identifying at risk children and pre-emptively plan activities for an intensified Poshan Abhiyaan, to begin with in nutrition high priority States. This also warrants on convergence of stake holders that includes members of academic (from Medical Colleges, Engineering college), Professional bodies like (IAP, IAPSM) and above all a strong political will and administrative will.

Declaration:

Funding: Nil

Conflict of Interest: Nil

References:

1. Swaminathan S, Hemalatha R, Pandey A, Kassebaum N. J, Laxmaiah A, Longvah T, Dandona L. The burden of child and maternal malnutrition and trends in its indicators in the states of India: the Global Burden of Disease Study 19902017. The Lancet Child & Adolescent Health.2019; 3(12): 855-870.
2. Comprehensive National Nutrition Survey. Available on https://www.unicef.org/india/media/2646/file/CNNS-report.pd 2019. Last accessed on 21 December 2023
3. International Institute for Population Sciences. National Family Health Survey (NFHS-5) 2019-20 India. Available onhttp://rchiips.org/nfhs/NFHS-5_FCTS/Gujarat.pdf. Last accessed on 21 December 2023
4. Top risk factors for child undernutrition in India identified. News. (2018, June 22). Available on https://www.hsph.harvard.edu/news/press-releases/top-risk-factors-for-child-undernutrition-in-india-identified/ Last accessed on 21 December 2023