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Improving household-level nutrition-specific and nutrition-sensitive conditions key to reducing child undernutrition in India

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1. Introduction

Examining the relative importance of fifteen well-known risk factors of chronic child undernutrition, we observed that household factors that reflect both nutrition-specific (e.g., dietary diversity, low maternal stature and body mass index) as well as nutrition-sensitive (e.g., household wealth, maternal education) markers explained 67% and 70% of the burden of stunting and underweight, respectively, among children in India (Corsi et al., 2015). In an accompanying commentary, Bhutta makes three observations (Bhutta, 2016). First, he states that our selection of the risk factors was purely driven by data availability, and not guided by a conceptual framework. Second, he argues that the small-to-null effects for the “proximal” risk factors such as morbidity and water indicators is likely to be due to measurement and data quality issues. Finally, he notes that in order to make any substantial progress in reducing the burden of chronic undernutrition there

needs to wider improvements in the “social determinants of health”. We concur with this final observation; indeed, the conclusion of our paper was that “implementing strategies focused on a broader progress on social circumstances and infrastructural domains ... are required to ensure a long term trajectory of optimal child growth and development in India” (Corsi et al., 2015), which, Bhutta fails to acknowledge in his comment.

In this rejoinder, we first clarify the points related to choice of variables as well as data quality that Bhutta raises in his commentary. To underscore the importance of the broader household-level socioeconomic conditions, and not simply view the burden of child undernutrition from an exclusively “maternal” lens, which is too often the case (Bhutta et al., 2013), we report results that additionally include education, stature and body mass index of the father. Finally, prompted by Bhutta’s comment whether our conclusion also apply to wasting - a marker of acute undernutrition (Corsi et al., 2011) - we present the results of the analysis using wasting as an outcome.

2. Clarifications on data and variables

Contrary to the observation made by Bhutta that our selection of variables are entirely driven by the availability of the data, as we explicitly stated in our paper, our choice of variables was based on conceptual models of child undernutrition proposed by UNICEF and by the global Maternal and Child Undernutrition Study Group (Corsi et al., 2015) [p.2].

Bhutta raises specific concerns around choice of variables for breastfeeding and dietary diversity/complimentary feeding. Our selection was motivated based on capturing these risk factors in the most efficient and robust manner from available data. Early initiation of breastfeeding was chosen as a marker of breastfeeding, which is less prone to measurement error than parental reporting of breastfeeding duration. In addition to contributing to reductions in infectious disease and neonatal mortality (Debes et al., 2013), early initiation has been associated with maternal education, delivery in a health facility, antenatal visits, and with long-term breastfeeding making it a robust variable for study in relation to

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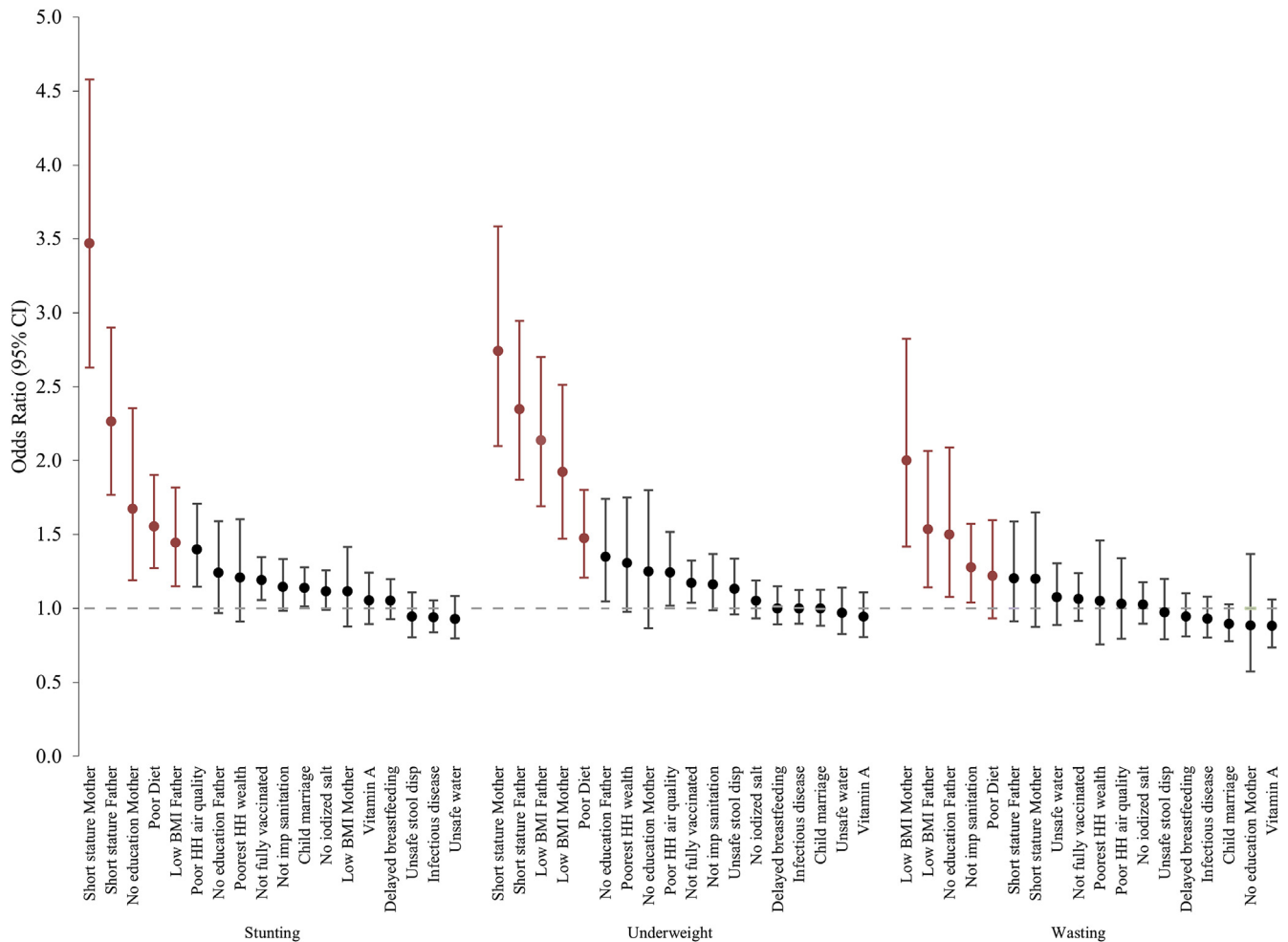


Fig. 1. Adjusted odds ratios (OR) and 95% confidence intervals for 18 risk factors of stunting, underweight and wasting among children in India (Note: Top five are red in color). (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of this article.)

undernutrition (Adhikari et al., 2014). Months of breastfeeding has shown spurious positive associations with child stunting in several studies using DHS data which are likely confounded due to longer duration of breastfeeding in situations where complementary feeding has not been initiated as a result of a lack of household resources (Caulfield et al., 1996; Fawzi et al., 1998). In addition, our measure of dietary diversity was based on a cross-country analysis of minimal dietary diversity and its association with child nutrition (Arimond and Ruel, 2004). We modified this index to account for child age and the introduction of semi-solid and solid foods after 6 months.

We acknowledged there are challenges in the measurement of certain components of these risk factors given the design of a retrospective household based survey (Corsi et al., 2015)[p.8]. For instance, reporting of childhood infectious disease and morbidities in such surveys is less than ideal. At the same time, previous studies have shown a robust relationship between anthropometric indices and childhood morbidity as reported by parents in the Indian National Family Health Surveys (NFHS) (Nandy et al., 2005). We also acknowledged the limitations of these data with regard to capturing “quality” of a particular risk factor (Corsi et al., 2015) [p.12]. While it is plausible that improved measurement of certain factors may increase the strength of these individual associations with child stunting/underweight we do not feel it is likely that such

associations would be greater than those observed for maternal stature, education, and household characteristics which were markedly stronger. For instance, the age and sex adjusted odds ratio of being stunted in relation to short maternal stature was 5.2 compared to an odds ratio of 2.3 for non-improved sanitary facilities and 1.3 for non-initiation of early breastfeeding.

Finally, Bhutta's also makes an erroneous observation that we did not consider maternal and paternal stature and body mass index even though as we reported these two risk factors are amongst the strongest risk factors of child undernutrition.

3. Moving from a “Maternal” to a “Household” lens

There is a need to move beyond what can be considered a ‘maternal’ perspective to addressing child undernutrition, reflected in the over emphasis of interventions related to breastfeeding, complementary feeding, micronutrient nutrition, and therapeutic and supplementary feeding. Such a perspective is not only limiting but also ignores the broader context of the household socio-economic vulnerabilities that both the child and mother (and other members) are exposed. In the absence of additional metrics on household-level nutritional vulnerabilities, over and above household wealth, one way to improve the characterization of household-level nutrition-specific and nutrition-sensitive

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