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CONTENTS

TABLES

FIGURES

ABSTRACT

Children's malnutrition is a global concern that has multifaceted consequences for both short-term health and long-term development. The National Family Health Survey-5 (NFHS-5) 2019–21 indicated that 36% of children under age 5 in India were stunted, 19% were wasted, and 32% were underweight, indicating that child malnutrition remains a significant public health concern in India. Efforts to tackle malnutrition have increasingly incorporated measures to enhance maternal empowerment. Given that women often hold the primary responsibility for child care, their empowerment has been linked to improved child health outcomes. Although the body of literature exploring the relationship between women's empowerment and child nutritional status is growing, a need exists for more comprehensive and context-specific research, particularly in low- and middle-income countries like India. Using data from the NFHS-5, this study investigated how different dimensions of women's empowerment (such as control over cash earnings, attitudes toward domestic violence, and mobility) were associated with child malnutrition. Data from 30,024 pairs of women age 15–49 and their children under 5 were analyzed through bivariate analysis to determine associations between women's empowerment and child malnutrition. Both linear and logistic regressions were used to measure the strength of these associations.

Key findings revealed that maternal education, mobile phone ownership, and the age at which a woman first engaged in sexual activity or cohabitation were significantly associated with child stunting, wasting, and underweight status. These results highlight the importance of specific empowerment factors, particularly maternal education and mobile access, in tackling child undernutrition. The results provide essential insights for policymakers aiming to address child malnutrition through targeted interventions that promote women's empowerment.

Key words: child nutrition, gender, India, nutritional outcomes, women's empowerment

ACRONYMS AND ABBREVIATIONS

DHS	Demographic and Health Surveys
HAZ	height-for-age *z* score
LMIC	low- and middle-income country
NFHS	National Family Health Survey
SD	standard deviation
SE	standard error
WAZ	weight-for-age *z* score
WHZ	weight-for-height *z* score

1 INTRODUCTION

1.1 Background

Malnutrition in children under 5 is a serious global concern with multifaceted consequences for both short-term health and long-term development. Acute malnutrition characterized by wasting or having low weight-for-height increases the risk of mortality, with severely wasted children being 11 times as likely to die as their well-nourished peers.[1] Chronic malnutrition, evidenced by stunting or having low height for age, impairs cognitive development, educational performance, and productivity in adulthood, perpetuating the cycle of poverty and inequality.[2] The National Family Health Survey-5 (NFHS-5) 2019–21 indicated that 36% of children under 5 in India were stunted, 19% were wasted, and 32% were underweight.[3] The current under-5 mortality rate in India is 31 deaths per 1,000 live births,[4] and a recent report in *The Lancet* attributed 65.8%–70.7% of under-5 deaths to child and maternal malnutrition.[5] This indicates that child malnutrition remains a significant public health concern in India.

The underlying causes of malnutrition are complex and interlinked, including inadequate diet, high disease burden, poor maternal health, insufficient health care services, and socioeconomic factors such as poverty, food insecurity, and lack of education.[6] The interplay of these factors exacerbates the vulnerability of children to malnutrition, particularly in low- and middle-income countries (LMICs). Efforts to tackle malnutrition have increasingly incorporated measures to enhance maternal empowerment. This is because the greater responsibility of caring for children often rests with women, and their empowerment is well-documented as having a significant influence on child well-being and survival.[7]

Empowerment encompasses various dimensions, including women's access to education, economic resources, decision-making autonomy, and social and political participation.[8] The link between women's empowerment and improved maternal and child nutrition and food security is well established. For example, in Bangladesh, increased empowerment of women (measured by factors such as attitudes toward abuse, decision-making power, and mobility), alongside endowments like education, has been linked to reduced child stunting and improved dietary diversity scores.[9] Similarly, in Pakistan, women's relative status within the household—determined by variables such as age at marriage, education, age differences between the women and their spouses, and income—was associated with better food security for their children.[10] In Ethiopia, female empowerment has been positively correlated with both child education and nutrition.[11] Empowered mothers are more likely to access and utilize health services, make informed dietary choices, and implement effective child care practices, all of which contribute to improved nutritional outcomes for their children.[12]

Programs that integrate nutrition interventions with initiatives aimed at improving women's education, economic status, and decision-making power have shown promising results. For example, the Alive & Thrive initiative in Bangladesh combined nutrition-specific interventions with strategies to enhance women's agency, leading to significant improvements in child feeding practices and nutritional status.[13] Empowering women can also mitigate the effects of economic and social disparities on child nutrition. Research by Ruel and Alderman suggests that enhancing women's control over household resources and decision-making can buffer children against the negative impacts of poverty and food insecurity.[14] In a study conducted in Nepal, women's control over income emerged as a significant correlate of child

outcomes such as dietary diversity and stunting.[15] The study also found that women's empowerment mitigates the negative consequences of low production diversity (that is, a limited variety of crops or livestock produced) in households.[15] Additionally, empowered mothers are more likely to seek out and utilize health care services, ensuring timely interventions for preventing and treating malnutrition.[16]

On the other hand, women who are not empowered often have limited control over household resources, face greater time constraints, experience poorer mental health and self-esteem, and have reduced access to health service information.[9] Emerging evidence also underscores the negative link between domestic violence—a marker of profound disempowerment—and child nutrition. Experiences or acceptance of domestic violence have been tied to child undernutrition in Ethiopia[9,17] and Liberia.[18] Moreover, domestic violence has been linked to reduced uptake of antenatal care and lower rates of child immunization and breastfeeding in Colombia, the Dominican Republic, and Haiti,[19] and to a heightened risk of infant and under-5 mortality in Nicaragua, primarily due to maternal stress and detrimental caregiving behaviors.[20]

Although the body of literature exploring the relationship between women's empowerment and child nutritional status is growing, a need for more comprehensive and context-specific research remains, particularly in LMICs like India.[21] Existing studies have established a general link between maternal empowerment and child nutrition; however, the pathways through which various dimensions of empowerment influence nutritional outcomes are not fully understood. Furthermore, empowerment is often measured using narrow proxies, such as decision-making power or education, which may not capture the full scope of women's agency. Research efforts need to also take into account the cultural, socioeconomic, and regional diversity within India, as these factors can mediate the relationship between maternal empowerment and child nutrition.[22] Although previous studies[23,24] provide valuable insights, nationally representative data remain limited. This scarcity of data highlights the need for further robust analyses to inform evidence-based policies and targeted interventions addressing child malnutrition.

The current study investigated the association between women's empowerment and malnutrition among children under 5 using the 2019–21 Demographic and Health Surveys (DHS) dataset from India, collected as the NFHS-5. By incorporating more comprehensive and multidimensional measures of empowerment, such as women's control over cash earnings, attitudes toward domestic violence, and mobility, this study could provide a deeper understanding of how different aspects of empowerment influence child nutrition.

1.2 Research Question

The primary objective of this study was to explore the relationship between women's empowerment and malnutrition among children under 5 in India using recently collected nationally representative data. We describe nutrition status in terms of stunting, wasting, and underweight status among children under 5. Women's empowerment is described using proxy indicators that include level of education, employment status, age at first marriage, age at first sexual intercourse, age at first birth, control over cash earnings, ownership of bank/savings accounts and mobile phones, household decision-making, and attitudes toward wife beating.

1.2.1 Definitions of women's empowerment

Women's empowerment is multidimensional and context-dependent, leading to variations in how it has been defined and assessed over time in the literature. The United Nations Development Fund for Women

defines it as "having access to and control over the means to make a living on a sustainable and long-term basis and receiving the material benefits of this access and control."[25] This definition, however, is limited in its scope, as it does not cover other dimensions of women's empowerment. Malhotra, Schuler, and Boender include economic participation and decision-making power as vital components of empowerment.[21] They argue that financial independence enhances women's status and their ability to make choices that positively affect their families. Sen highlights the role of education in expanding women's capabilities and opportunities, asserting that educated women are more likely to be involved in decision-making and have greater autonomy.[26] Zimmerman discusses psychological empowerment or self-efficacy as a process by which individuals gain control over their lives, make autonomous decisions, and achieve their goals.[27] This dimension is critical for fostering a sense of empowerment that transcends tangible measures like economic status and education.

To facilitate the development of survey-based empowerment indexes suitable for cross-country comparisons, indexes leveraging readily available data from routine cross-country surveys, such as DHS surveys, are increasingly being created.[28,29] Given they are relatively new, these indexes have faced criticism regarding the conceptualization of empowerment domains and indicators, highlighting the need for more detailed and disaggregated evaluation and refinement of the tools.[30,31] According to van den Bold, Quisumbing, and Gillespie,[32] because empowerment processes are difficult to observe directly, proxy indicators are commonly employed to measure women's empowerment. Empowerment can occur across multiple dimensions, including economic, sociocultural, familial, interpersonal, legal, political, and psychological dimensions, and can manifest at different levels, ranging from household and community levels to national, regional, and global levels.[21]

1.2.2 Conceptual framework

Our conceptual framework (Figure 1) is drawn from Kabeer's empirical work, which continues to shape how empowerment is understood, measured, and promoted in development and feminist discourse. Kabeer defines empowerment as "the expansion in people's ability to make strategic life choices in a context where this ability was previously denied to them."[8] Changes in the ability to exercise choice are conceptualized as changes in three interrelated domains: enabling resources, which form the conditions in which choices are made; agency, which is at the heart of the process by which choices are made; and achievements, which are the outcomes of choices—in this case, child nutritional status.

Proxy indicators available in the DHS data were used to operationalize the domains of enabling resources and agency. Enabling resources reflect women's human and social assets, capturing their reproductive and marital power throughout their lives. The indicators used to operationalize this domain include education, occupation, ownership of bank/savings accounts, ownership of mobile phones, age at first sex, age at first cohabitation, and age at first birth. Agency can be divided into two components: instrumental agency and intrinsic agency. Instrumental agency focuses on women's decision-making power within the household, with indicators measuring women's influence over large purchases, visits to family and friends, their own cash earnings, and their health decisions. Intrinsic agency measures whether women's gender attitudes reflect or reject normative beliefs about gendered violence, using items related to the justification of wife beating under various conditions.

Kabeer acknowledges that empowerment is context-specific, meaning that what constitutes empowerment in one setting may differ from what constitutes it in another.[8] This recognition is crucial for developing

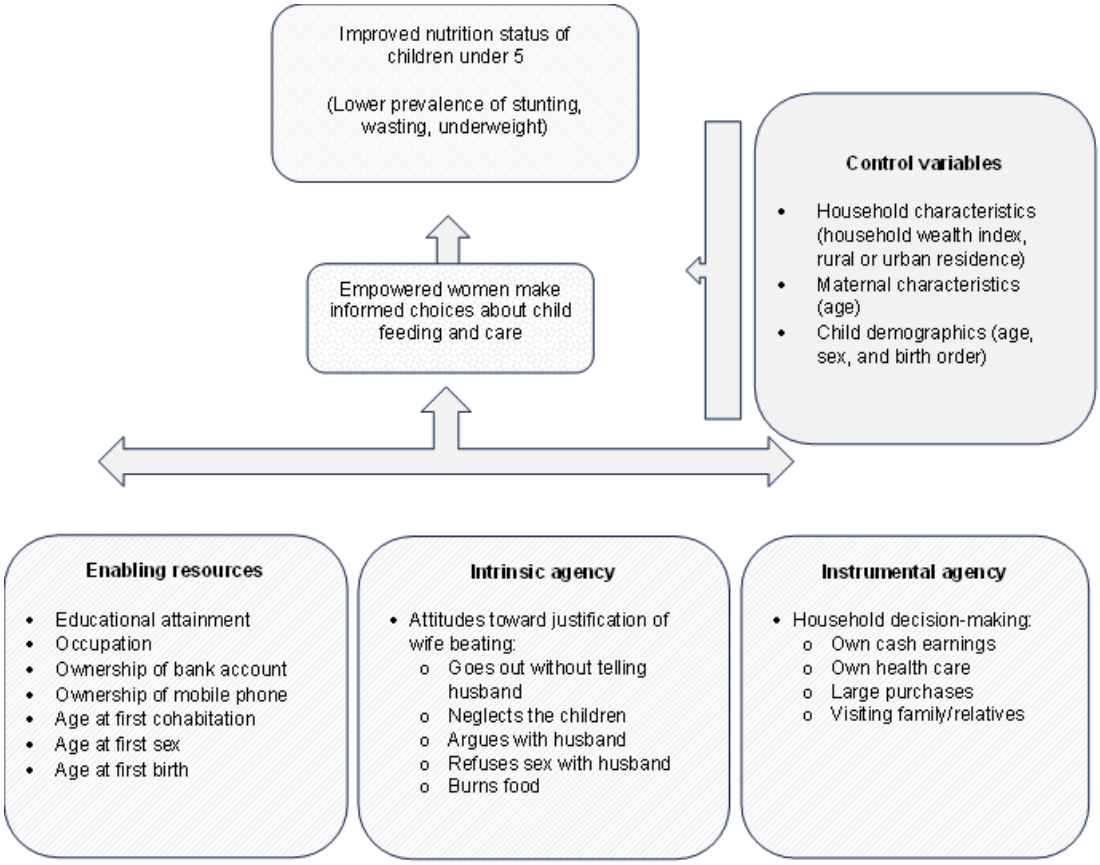
metrics that are sensitive to cultural, social, and economic differences. Kabeer's definition sees empowerment as a dynamic process rather than a static outcome. This perspective allows for the understanding that empowerment involves ongoing changes in women's lives and circumstances, and that it is not a one-time achievement. This view aligns with the lived experiences of many women and provides a more nuanced and holistic measure of empowerment.

1.2.3 Women's empowerment variables

For this study, variables describing women's empowerment within the domains of enabling resources and agency (both instrumental and intrinsic) were carefully selected based on a review of related literature and the availability of data in the NFHS-5 dataset. We expected that women who experience greater levels of empowerment would have children with better nutritional outcomes. Numerous studies have pinpointed socioeconomic, demographic, and household environmental factors that influence the nutritional status of children.[16,33,34] In our analysis, we controlled for these confounding variables to evaluate the link between maternal empowerment and child nutrition.

The control variables included the household characteristics of wealth quintile and place of residence (whether rural or urban), the maternal characteristic of age, and the child demographics of age, sex, and birth order. Because the DHS-8 Woman's Questionnaire was not designed to create an index or aggregated measure for women's empowerment, and to prevent conflating the distinct contributions of specific empowerment-related factors to child nutrition, we analyzed the relationships between each empowerment variable and the nutritional status of children under 5 separately.

Figure 1 Conceptual framework of women's empowerment leading to improved child nutritional outcomes



Source: Adapted from Kabeer's reflections on the measurement of women's empowerment[8]

2 DATA AND METHODS

2.1 Data Sources

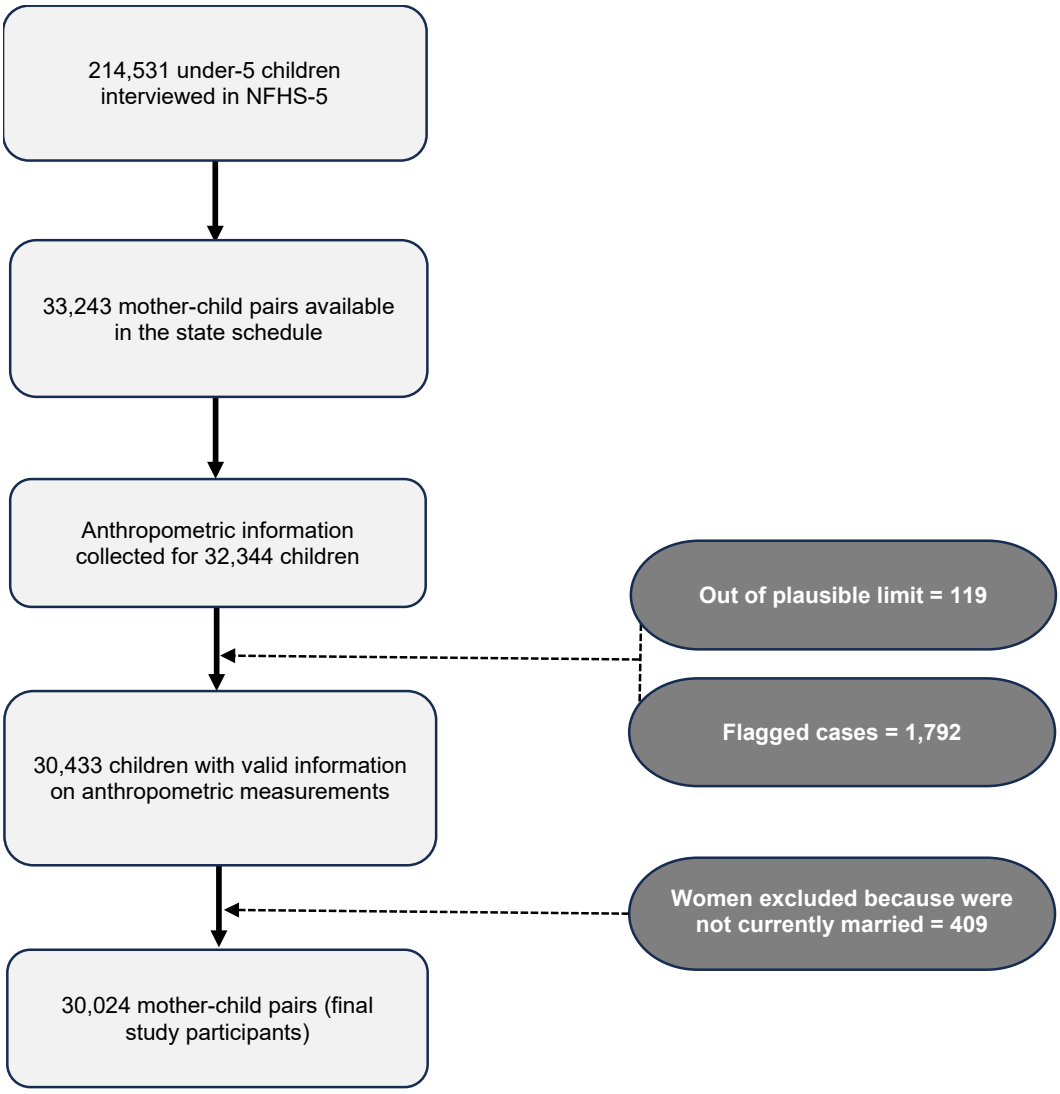
In this analysis, we used Demographic and Health Surveys (DHS) data from the National Family Health Survey-5 (NFHS-5), which is a large-scale, nationally representative, population-based survey covering all states and union territories of India. Data were collected in two phases—between June 2019 and January 2020 across 17 states and 5 union territories in phase 1, and between January 2020 and April 2021 across 11 states and 3 union territories in phase 2. The survey employed a two-stage stratified sampling design. In the first stage, primary sampling units (called clusters) were selected using probability proportional to size. In the second stage, complete household mapping was conducted in the selected clusters, and households were randomly selected from each cluster. Both male and female participants in sampled households were selected for interviews.

To fulfill the study's objectives, we analyzed children's nutritional health outcomes based on DHS data from interviews with women age 15–49 who were married or living with partners during the survey period and who had children under 5 with anthropometric measurements. The DHS children's recode (KR) file included data for children born to interviewed women in the previous 5 years (that is, children age 0–59 months), including demographic and health-related characteristics such as height and weight. Questions on women's autonomy were asked to women from a subset of households specifically selected for the state module. A detailed description of the sampling design and survey procedure is provided in the NFHS-5 national report.[3]

2.2 Study Participants

A total of 214,531 children under 5 had their height and weight measured for the NFHS-5. Women's empowerment-related information was collected from a regional subsample comprising 15% of all eligible women age 15–49 in the survey. A total of 33,243 mother-child pairs were available in the NFHS-5 subsample. Anthropometric information was collected for 32,344 of the children. Among them, 119 had anthropometric measurements outside of plausible limits and 1,792 were flagged, leaving 30,433 children with valid measurements. Since only currently married women were asked questions on household decision-making, 409 women who were not currently married (that is, were widowed, divorced, separated, or not living with their partners) were also excluded from the study sample. Thus, 30,024 mother-child pairs constituted the final sample of study participants (Figure 2).

Figure 2 Flowchart depicting selection of study participants, India NFHS-5, 2019–21



NFHS = National Family Health Survey

2.3 Nutritional Outcome Variables

Child nutritional status was measured using three outcome variables: stunting, wasting, and underweight status. We examined these outcomes as both continuous and binary variables.

Stunting was measured using a child's height for age. The height-for-age *z* score (HAZ) was calculated by subtracting an age- and sex-appropriate median value from the standard population and dividing by the standard deviation (SD) within the standard population. Children whose HAZ was more than two SDs below the median of the reference population were considered stunted,[35] indicating chronic malnutrition. Stunting reflects long-term nutritional deprivation and can result from persistent insufficient nutrient intake, repeated infections, and poor health care.

Wasting was measured using a child's weight-for-height. The weight-for-height *z* score (WHZ) is a standardized metric used to assess a child's weight relative to the child's height, comparing it to a reference population. Children whose WHZ was more than two SDs below the median of the reference population were classified as wasted,[35] indicating acute malnutrition, which can be life-threatening if not properly addressed.

Underweight was assessed using the weight-for-age *z* score (WAZ) of children. The WAZ is a composite index of height for age and weight-for-height, and thus, a measure of both acute and chronic malnutrition. Children whose WAZ was more than two SDs below the median of the reference population were classified as underweight.[35]

2.4 Women's Empowerment Variables

Women's empowerment was measured using proxy indicators (independent variables) from the women's individual interview: educational level, employment status, ownership of bank/savings accounts, ownership of mobile phones, decision-making, age at first sexual intercourse, age at first marriage, age at first birth, and attitudes toward wife beating.

For employment status, occupations were grouped into categories and subcategories. Professional and clerical occupations were categorized as higher-skilled jobs. Sales, services/household labor, and skilled and unskilled manual labor were considered moderate- to low-skilled jobs, and agricultural work was its own category. Mothers who were unemployed were included in the reference group.

Ownership of a bank/savings account was determined via a binary yes/no response to the question "Do you have a bank or savings account that you yourself use?" Ownership of a mobile phone was determined via a yes or no response to the question "Do you have any mobile phone that you yourself use?" A woman's participation in decision-making was determined by her responses to questions about who normally makes decisions regarding how the money she earns will be spent, her own health care, large household purchases, and visits to family or relatives. Options for responses were mainly the respondent, mainly her husband, the respondent and her husband jointly, or someone else. Acceptance of wife beating was measured by a respondent's agreement that a husband was justified in hitting or beating his wife if the wife went out without the husband's permission, neglected the children, argued with the husband, refused sex with the husband, or burned the food.

2.5 Control Variables

We considered three control variables when assessing associations between women's empowerment and child nutritional status: child demographics, maternal characteristics, and household characteristics. Children's demographics were age (in months), sex (male or female), and birth order. Age was the only maternal characteristic considered. Household characteristics were place of residence (rural or urban) and household wealth quintile (lowest, second, middle, fourth, or highest).

2.6 Statistical Analysis

Bivariate analysis of the child nutritional outcome variables and women's empowerment variables was conducted using the chi-square test. We then used both linear and logistic regressions to measure the

strength and direction of the relationships between the women's empowerment variables and the nutritional outcome variables.

Linear regressions were run with HAZ, WHZ, and WAZ values and each of the women's empowerment variables, accounting for the control variables. Linear regression was appropriate due to the continuous nature of the dependent variables (HAZ, WHZ, and WAZ), allowing for the estimation of relationships and interpretations of effects in a linear manner. This method offers insights into how changes in independent variables can predict changes in the continuous outcomes of interest, providing a nuanced understanding of the factors influencing child nutrition. Unlike logistic regression, which focuses on binary outcomes, linear regression facilitates a more comprehensive exploration of the variations in child nutrition measures associated with maternal factors.

Logistic regressions were conducted to measure associations between the women's empowerment variables and the child nutritional outcome variables, modeling each measure of child nutritional status separately. Stunting, wasting, and underweight status were modeled as dichotomous variables, where 0 indicated a "normal" nutritional status and 1 represented a "malnourished" condition. The 95% confidence intervals and odds ratios were obtained, and p values $< .05$ were considered statically significant. Stata software (version 14.2) was used to analyze the data.

All regressions controlled for household characteristics (household wealth quintile and place of residence), maternal characteristics (age at time of interview), and child demographics (age, sex, and birth order). The reference categories for categorical independent variables were specified, and the regression coefficients, along with standard errors, were reported.

2.7 Ethics Statement

Information regarding ethical approval and considerations for the survey can be found in the NFHS-5 national report.[3] The NFHS-5 is a publicly available dataset with no identifiable information about the survey participants and is accessible upon a granted request from The DHS Program website.

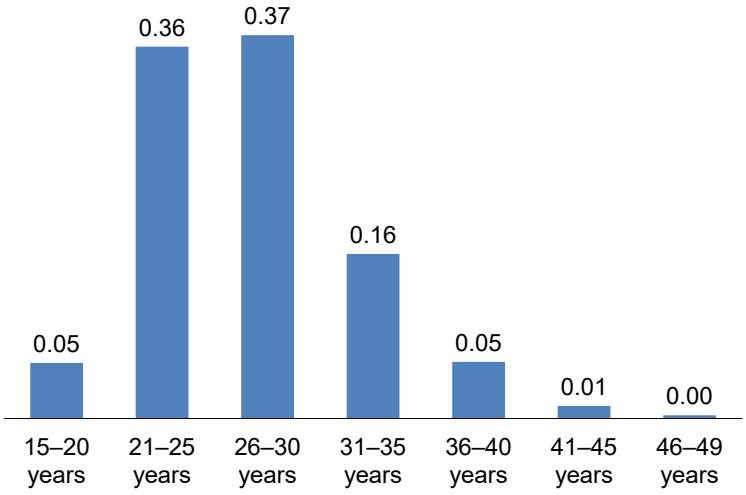
3 RESULTS

3.1 Women's Characteristics and Empowerment Variables

Data were analyzed for 30,024 women age 15–49 who were married or living with partners and who had living children under 5 with anthropometric measurements. Table A1 (see Appendix) provides the percentage distributions of women by household characteristics, maternal characteristics, and dimensions of empowerment.

The mean age of the women surveyed (N=30,024) was 27.4 years [standard deviation (SD) = 5.0]. The largest proportion of respondents were age 26–30 (36.6%), followed closely by those age 21–25 (35.5%) (Figure 3).

Figure 3 Percentage distribution of women by age at time of survey, India NFHS-5, 2019–21 (N = 30,024)

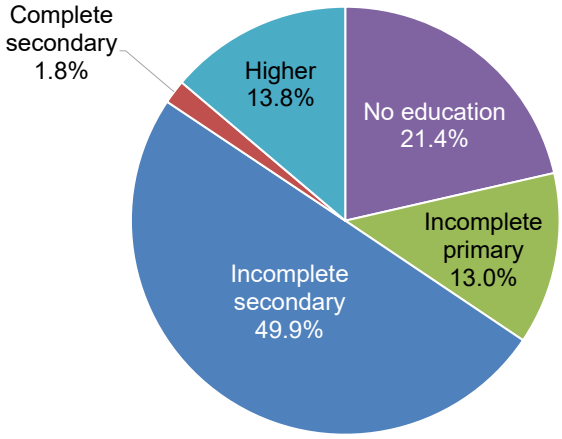


3.1.1 Enabling resources

Regarding educational attainment, nearly half (49.9%) of the women had incomplete secondary education, while one-fifth (21.4%) had not received any formal education and 13.8% had pursued higher education (Figure 4).

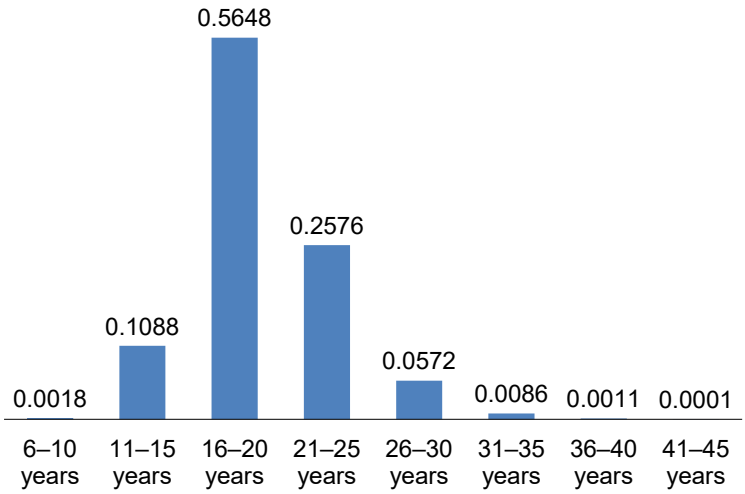
Approximately three-fourths (75.3%) of the women were not engaged in any paid employment, while 13.7% were involved in agricultural activities and 4.1% were involved in skilled or unskilled manual work.

Figure 4 Percentage distribution of women by educational attainment, India NFHS-5, 2019–21 (N = 30,024)



The mean age at first cohabitation was 19.5 years (SD = 3.7). More than half of the respondents (56.5%) entered into cohabitation at age 16–20 (Figure 5). The mean age at first sexual experience was slightly lower, at 19.4 (SD = 3.6), with the majority of women (59.2%) reporting their first sexual experience at age 16–20. The mean age at first birth was higher at 21.4 (SD = 3.7). However, the majority of respondents (43.5%) had their first birth at age 16–20, closely followed by those age 21–25 (41.4%). Most of the women (79.6%) owned bank/savings accounts, and 58.6% owned mobile phones.

Figure 5 Percentage distribution of women by age at first cohabitation, India NFHS-5, 2019–21 (N = 30,019)



3.1.2 Instrumental agency

Among the women with cash earnings (N = 5,688), the majority (80%) managed their earnings jointly with their husbands. Only 12.7% of the women independently controlled their earnings, while 15.3% reported that their husbands had primary control. In decisions related to health care, 72.3% of women reported joint decision-making, while 17.4% stated that their husbands made these decisions. Similarly, 71.8% of respondents made large household purchase decisions jointly with their husbands. However, 17.6% reported that their husbands were the main decision-makers in this regard. A similar trend was observed in decisions related to visiting family or relatives, as 73.4% of women participated in joint decision-making.

3.1.3 Intrinsic agency

The data on attitudes toward wife beating indicated a general disapproval of wife beating across all scenarios, although notable minorities still found it acceptable in certain contexts. Approximately 17.6% of women believed violence was justified if the wife went out without telling the husband, and 23.6% believed it was justified if the wife neglected the children. Additionally, 19.9% justified violence if the wife argued with the husband, and 12.7% considered it acceptable if the wife burned the food. The highest level of opposition to wife beating was when a wife refused to have sex with her husband, with 89.6% of respondents rejecting violence in this scenario.

3.2 Child Demographics and Nutritional Outcome Variables

The mean age among the 30,024 children in the study was approximately 30 months, slightly more children were male than were female, and the majority were either the first or second born to their mothers (see Table A2 in the Appendix). In terms of nutritional status, the mean height-for-age *z* score (HAZ) was -1.366 (SD = 1.7) (Figure 6). Approximately two-thirds (64.2%) of the children were classified as being a normal height for age, 20.9% were moderately stunted, and 14.9% were severely stunted (Figure 7). This indicated that about one-third of the children had experienced chronic malnutrition.

Figure 6 Distribution of height-for-age *z* scores, India NFHS-5, 2019–21

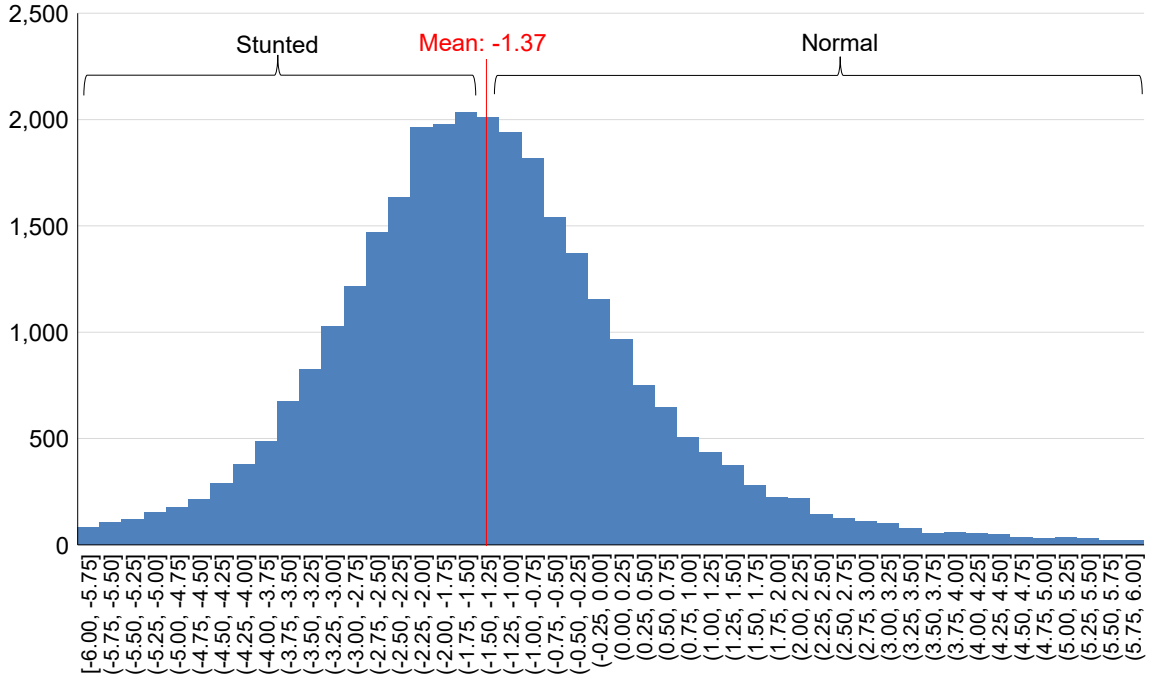
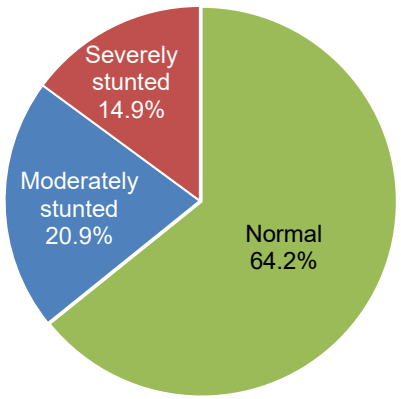


Figure 7 Percentage distribution of children by stunting status, India NFHS-5, 2019–21



The mean weight-for-height *z* score (WHZ) was -0.806 (SD = 1.5) (Figure 8), and the majority of children (81.4%) were a normal weight-for-height (Figure 9). However, 11.2% of children were moderately wasted and 7.4% were severely wasted, pointing to acute malnutrition in a substantial subset of the population.

Figure 8 Distribution of weight-for-height *z* scores, India NFHS-5, 2019–21

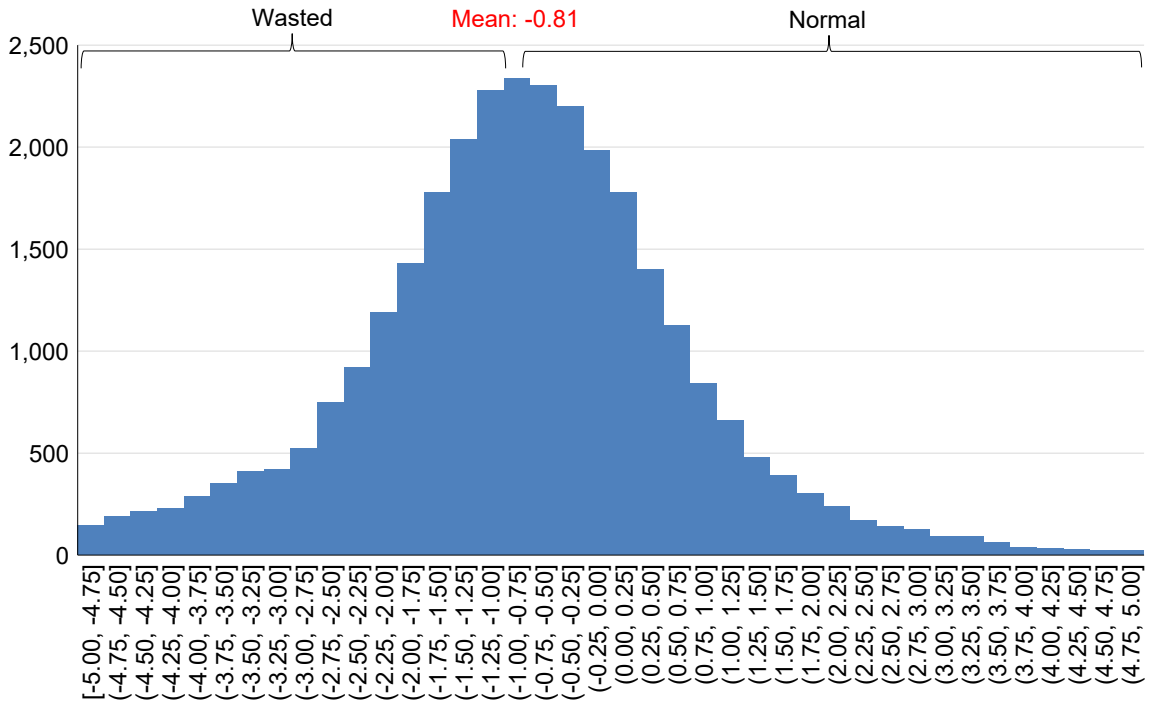
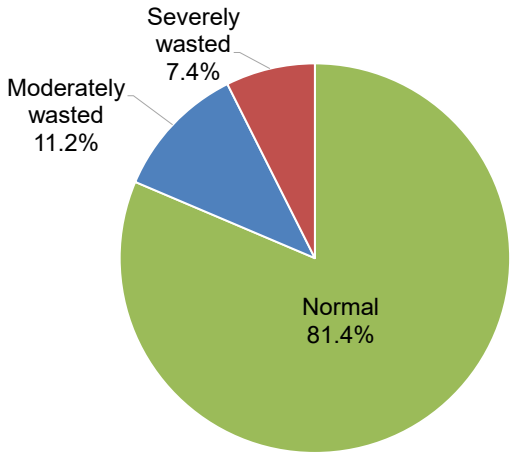


Figure 9 Percentage distribution of children by wasting status, India NHFS-5, 2019–21



The mean weight-for-age *z* score (WAZ) was -1.353 (SD = 1.2) (Figure 10), reflecting low weight-for-age across the cohort (Figure 11). While 70.7% of children were classified as having a normal weight-for-age, 21.1% were moderately underweight, and 8.2% were severely underweight.

Figure 10 Distribution of weight-for-age *z* scores, India NHFS-5, 2019–21

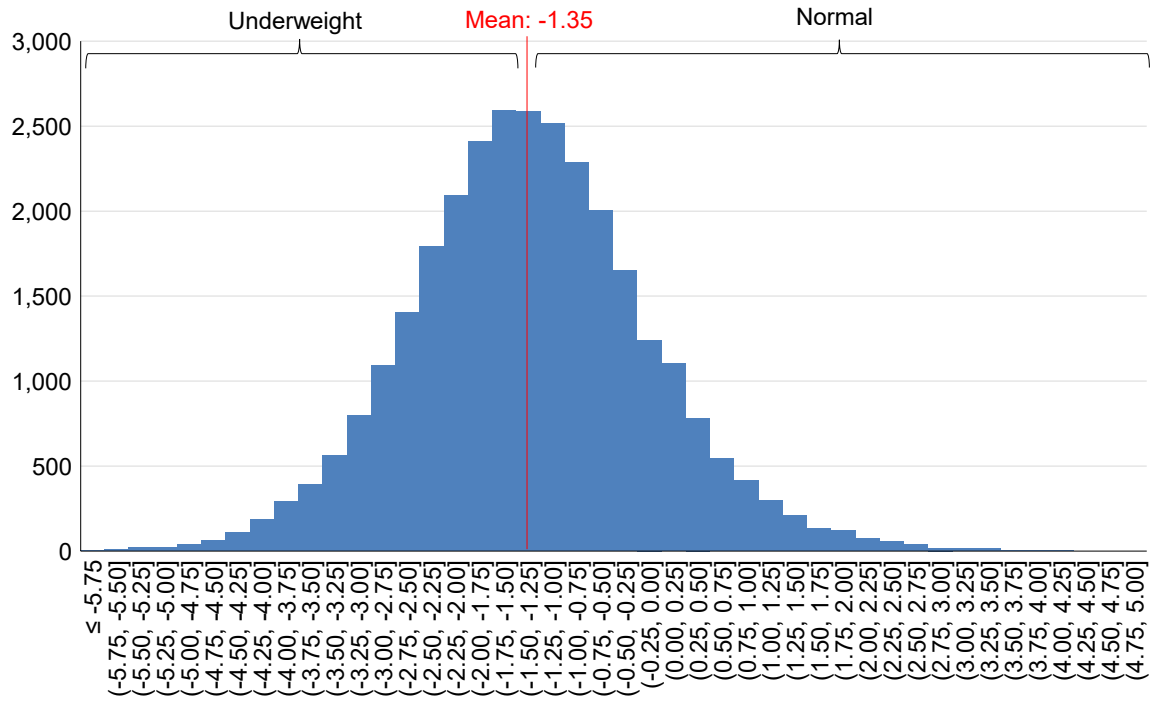
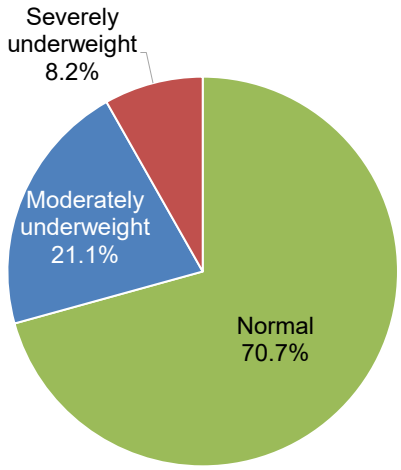


Figure 11 Percentage distribution of children by underweight status, India NHFS-5, 2019–21



3.3 Multiple Linear Regression

The results of the linear regression analysis examining the relationships between various women's empowerment variables and HAZ, WHZ, and WAZ after controlling for household characteristics, maternal characteristics, and child demographics are presented in Table 1.

3.3.1 Height-for-age *z* scores

Nearly all variables that showed significant relationships with HAZ were within the enabling resources domain of women's empowerment. Each increase in maternal education level, from no education to higher education, was positively associated with HAZ. Mothers with incomplete primary education had children with HAZ values that were, on average, 0.084 ($p < .01$) *z* scores higher than those of children whose mothers had no formal education. The positive association strengthened with higher education levels, reaching a β of 0.323 for higher education (significant until the level of complete secondary education).

A large positive relationship was found between HAZ and maternal employment in high-skilled occupations (0.163; $p < .05$), indicating that children of mothers with these occupations tended to have better height outcomes. By contrast, maternal employment in moderate- to low-skilled labor or agricultural labor was not significantly associated with HAZ.

A negative association between age at first birth and HAZ (-0.011; $p < .05$) indicated that younger maternal age at first birth was correlated with poorer HAZ.

Children of mothers who owned mobile phones exhibited significantly higher HAZ values (0.142; $p < .01$) than did those whose mothers did not own mobile phones. However, neither mother's ownership of a bank/savings account nor any instrumental agency variables were significantly associated with HAZ.

Regarding intrinsic agency variables, the only significant association with HAZ was for the scenario in which wife beating was "not justified" if the wife burns the food (0.063, $p < .05$).

3.3.2 Weight-for-height *z* scores

Higher maternal educational attainment also positively impacted WHZ, particularly for mothers with complete secondary education or higher, for which WHZ values were significantly higher (0.113; $p < .05$).

In the case of maternal employment, agricultural labor was negatively associated with a child's WHZ (-0.056; $p < .05$).

As it was with HAZ, mobile phone ownership was also associated with higher WHZ (0.154; $p < .01$), while ownership of a bank/savings account was not significantly associated.

Age at first cohabitation and age at first sex were both positively associated with WHZ (0.011; $p < .01$), indicating that women who first lived with a partner and first had sex at older ages were more likely to have children with higher WHZ values.

Women who contributed to household decisions independently or jointly, particularly regarding health care (0.078; $p < .01$), large household purchases (0.056; $p < .01$), and visits to family or relatives (0.054; $p < .01$), were significantly more likely to have children with slightly higher WHZ values.

We also found a positive association between WHZ and the attitude that wife beating is not justified when a wife refuses sex (0.061, $p < 0.05$).

3.3.3 Weight-for-age *z* scores

Maternal education had a strong positive correlation with WAZ across all educational levels, peaking at 0.280 ($p < .01$) for higher education. Mother's employment in a high-skilled job also showed a strong positive association with WAZ (0.127, $p < .01$). However, being employed in agricultural work showed a strong negative association with WAZ (-0.053, $p < .05$), meaning that mothers who worked in the agricultural sector were more likely to have a child with a lower WAZ than a mother who was unemployed (the reference group).

The mother's ownership of a mobile phone was positively associated with WAZ (0.190, $p < .01$), as was ownership of a bank/savings account (0.038, $p < .01$).

Age at first cohabitation and age at first sex were both positively associated with WAZ (0.009 and 0.012, respectively, $p < .01$ for both), reinforcing the notion that older age at these milestones is correlated with improved weight outcomes in children.

Table 1 Multiple linear regression analysis of nutritional outcomes in children under 5, India NFHS-5, 2019–21

Women's empowerment variables		HAZ Regression coefficient (SE)	WHZ Regression coefficient (SE)	WAZ Regression coefficient (SE)
Enabling resources				
Mother's education	Incomplete primary	0.084** (0.034)	0.039 (0.030)	0.085** (0.024)
	Incomplete secondary	0.188** (0.027)	0.025 (0.024)	0.136** (0.019)
	Complete secondary	0.260** (0.075)	0.024 (0.067)	0.183** (0.053)
	Higher	0.323 (0.039)	0.113* (0.035)	0.280** (0.027)
Mother's employment (binary)	Employed	0.008 (0.022)	-0.012 (0.020)	-0.004 (0.016)
Mother's employment (categorical)	High-skilled labor	0.163* (0.065)	0.072 (0.058)	0.127** (0.046)
	Moderate- to low-skilled labor	0.055 (0.037)	0.014 (0.033)	0.040 (0.026)
	Agricultural labor	-0.026 (0.029)	-0.056* (0.026)	-0.053* (0.021)
Ownership of bank/savings account(s)		0.033 (0.024)	0.023 (0.021)	0.038** (0.017)
Ownership of mobile phone(s)		0.142** (0.020)	0.154** (0.018)	0.190** (0.014)
Age at first cohabitation		0.004 (0.004)	0.011** (0.003)	0.009** (0.002)
Age at first sex		0.007 (0.004)	0.011** (0.003)	0.012** (0.002)
Age at first birth		-0.011* (0.005)	0.003 (0.004)	-0.005 (0.003)
Instrumental agency				
Control over women's cash earnings		-0.044 (0.059)	0.075 (0.052)	0.039 (0.042)
Respondent's health care		-0.014 (0.024)	0.078** (0.021)	0.049** (0.017)
Large household purchases		0.026 (0.023)	0.056** (0.020)	0.053** (0.016)
Visits to family or relatives		-0.004 (0.023)	0.054** (0.021)	0.036** (0.017)

Continued…

Table 1—*Continued*

Women's empowerment variables	HAZ Regression coefficient (SE)	WHZ Regression coefficient (SE)	WAZ Regression coefficient (SE)
Intrinsic agency			
Justified if wife argues with husband	0.044	0.023	0.042*
	(0.024)	(0.021)	(0.017)
Justified if wife burns the food	0.063*	0.015	0.044*
	(0.029)	(0.025)	(0.020)
Justified if wife refuses to have sex with husband	0.060	0.061*	0.072**
	(0.032)	(0.028)	(0.022)
Justified if wife goes out without telling husband	0.043	0.011	0.027
	(0.025)	(0.022)	(0.018)

** p < .05, ** p < .01*

HAZ = height-for-age *z* score; SE = standard error; WAZ = weight-for-age *z* score; WHZ = weight-for-height *z* score

3.4 Multiple Logistic Regression

The results of the logistic regression analysis exploring relationships between women's empowerment variables and child nutritional outcomes (after controlling for household characteristics, maternal characteristics, and child demographics) are presented in Table 2.

3.4.1 Stunting

Mother's education showed a significant relationship with stunting, with children of mothers with higher educational attainment demonstrating markedly lower odds of being stunted. Compared with children of mothers with no education (reference group), the odds of stunting decreased significantly as maternal education increased: incomplete primary (-0.111, $p < .01$), incomplete secondary (-0.250, $p < .01$), complete secondary (-0.297, $p < .01$), and higher education (-0.456, $p < .01$). These findings suggest a strong protective effect of maternal education against stunting.

Mother's occupation showed some mixed effects on stunting. Children of mothers in higher-skilled occupations were significantly less likely to be stunted (-0.211, $p < .05$) than were those with unemployed mothers, while those whose mothers worked in agriculture had higher odds of being stunted (0.085, $p < .05$). Employment as a binary variable was not significantly associated with stunting.

Ownership of mobile phones was significantly associated with reduced odds of stunting (-0.170, $p < .01$). Meanwhile, ownership of a bank/savings account was not a significant predictor.

Neither age at first cohabitation nor age at first sex was significantly associated with stunting. However, age at first birth (-0.016, $p < .05$) was associated with a reduced likelihood of stunting.

Regarding intrinsic agency, no significant relationships with stunting were observed for most justifications for wife beating, except for the scenario in which it was considered justified if the wife went out without informing the husband (-0.065, $p < .05$).

3.4.2 Wasting

By contrast to what we found for stunting, fewer variables related to enabling resources were significantly associated with child wasting. Mother's education showed a less pronounced relationship with wasting, with only higher education significantly associated with a reduction in the odds of wasting (-0.182, $p < .01$). Age at first cohabitation and age at first sex were also negatively associated with wasting, with each additional year reducing the odds of wasting (-0.016, $p < 0.01$ for both variables).

Mobile phone ownership significantly reduced the odds of child wasting (-0.161, $p < .01$), while ownership of a bank/savings account significantly reduced the likelihood that a woman's child would experience wasting (-0.086, $p < .05$).

In terms of instrumental agency, the likelihood of child wasting was significantly reduced if the mother made decisions regarding her own health care (-0.128, $p < .01$) or about large household purchases (-0.073, $p < .05$). However, a woman's control over her own cash earnings or decision-making power regarding visits to family or relatives did not significantly affect the likelihood of child wasting.

No significant relationships with child wasting were observed for maternal employment, maternal age at first birth, or any intrinsic agency variables.

3.4.3 Underweight

Mother's educational attainment was strongly and consistently associated with a child's likelihood of being underweight, with significant reductions in the odds observed at the levels of incomplete primary (-0.160, $p < .01$), incomplete secondary (-0.222, $p < .01$), complete secondary (-0.397, $p < .01$), and higher (-0.503, $p < .01$).

Mother's occupation was also significantly associated with a child's likelihood of being underweight, as children of mothers in high-skilled occupations had much lower odds of being underweight than those in the reference category (-0.424, $p < .01$). Mothers working in agriculture were also significantly more likely to have an underweight child, although this association was not as strong (0.093, $p < .05$).

Older age at first cohabitation was significantly associated with a reduced likelihood of a woman's child being underweight (-0.015, $p < .01$). Lastly, age at first sex was a significant predictor of a child being underweight, with older age at first sex associated with reduced odds (-0.021, $p < .01$).

Maternal ownership of a mobile phone was associated with reduced odds of a child being underweight (-0.271, $p < .01$), similar to the pattern seen with stunting and wasting.

Instrumental agency appeared to have a small effect on the likelihood of a child being underweight, as decision-making in regards to large household purchases was associated with slightly reduced odds (-0.069, $p < .05$).

Other proxy indicators of women's empowerment, such as ownership of bank/savings accounts, control over women's cash earnings, age at first birth, and intrinsic agency variables, had no significant effects on the likelihood of children being underweight.

Table 2 Multiple logistic regression analysis of nutritional outcomes in children under 5, India NFHS-5, 2019–21

Women's empowerment variables		**Stunting** Regression coefficient (SE)	**Wasting** Regression coefficient (SE)	**Underweight** Regression coefficient (SE)
Enabling resources				
Mother's education	Incomplete primary	-0.111**	-0.067	-0.160**
		(0.041)	(0.051)	(0.043)
	Incomplete secondary	-0.250**	-0.061	-0.222**
		(0.033)	(0.041)	(0.035)
	Complete secondary	-0.297**	-0.187	-0.397**
		(0.097)	(0.121)	(0.106)
	Higher	-0.456**	-0.182**	-0.503**
		(0.051)	(0.061)	(0.055)
Mother's employment (binary)	Employed	0.020	0.026	-0.005
		(-0.028)	(-0.035)	(-0.030)
Mother's employment (categorical)	High-skilled	-0.211*	-0.087	-0.424**
		(0.092)	(0.108)	(0.106)
	Moderate- to low-skilled	-0.062	-0.027	-0.091
		(0.047)	(0.058)	(0.050)
	Agricultural labor	0.085*	0.073	0.093*
		(0.036)	(0.044)	(0.037)
Ownership of bank/savings account(s)		-0.046	-0.086*	-0.046
		(0.030)	(0.036)	(0.031)
Ownership of mobile phone(s)		-0.170**	-0.161**	-0.271**
		(-0.026)	(-0.031)	(-0.027)
Age at first cohabitation		-0.005	-0.016**	-0.015**
		(0.005)	(0.006)	(0.005)
Age at first sex		-0.008	-0.016**	-0.021**
		(0.005)	(0.006)	(0.005)
Age at first birth		-0.016*	-0.005	0.002
		(0.006)	(0.008)	(0.007)
Instrumental agency				
Control over women's cash earnings		0.031	-0.053	-0.008
		(0.075)	(0.091)	(0.079)
Respondent's health care		-0.177	-0.128**	-0.053
		(0.030)	(0.036)	(0.032)
Large household purchases		-0.324	-0.073*	-0.069*
		(0.029)	(0.035)	(0.030)
Visits to family or relatives		0.000	-0.066	-0.044
		(0.030)	(0.036)	(0.0317)

Continued…

Table 2—*Continued*

Women's empowerment variables	**Stunting** Regression coefficient (SE)	**Wasting** Regression coefficient (SE)	**Underweight** Regression coefficient (SE)
Intrinsic agency			
Justified if wife argues with husband	-0.050	0.013	-0.024
	(0.030)	(0.037)	(0.032)
Justified if wife burns the food	-0.052	-0.004	-0.026
	(0.036)	(0.044)	(0.038)
Justified if wife refuses to have sex with husband	-0.036	-0.068	-0.057
	(0.040)	(0.048)	(0.042)
Justified if wife goes out without telling husband	-0.065*	0.007	-0.029
	(0.031)	(0.039)	(0.033)

** p < .05, ** p < .01*

SE = standard error

4 DISCUSSION

This study investigated the associations between malnutrition in children under 5 and proxy indicators of women's empowerment using nationally representative data from the National Family Health Survey-5 (NFHS-5) in India. The findings highlight several significant associations and provide valuable insights into the multifaceted relationship between women's empowerment and child health outcomes. The analysis included a combination of linear and logistic regressions to provide a comprehensive understanding of child nutrition. Linear regressions examining changes in *z* scores can detect small differences in nutritional well-being that may be missed by binary categories, therefore allowing for a nuanced understanding of changes in nutritional status. By contrast, logistic regressions examining changes to the binary categorization of nutritional outcomes allow for discussions about the likelihood of children being malnourished, as the results are related to the threshold for malnutrition status.[36]

Maternal education emerged as a strong predictor of improved child nutritional outcomes across height-for-age *z* score (HAZ) and weight-for-age *z* score (WAZ) values, as well as a strong predictor of reduced stunting and underweight status. These results align with existing literature suggesting that higher levels of maternal education enhance women's knowledge and improve practices related to health and nutrition, leading to better health outcomes for their children.[37,38] Often, more highly educated mothers are more likely to adopt beneficial feeding practices, to utilize health care services effectively, and to be able to access nutritional information, which collectively contributes to improved child growth and development.[39,40] Despite significant progress in enhancing women's empowerment in India through legislative reforms and concerted efforts to achieve gender parity in primary education,[41] substantial gaps remain in educational attainment among Indian women. Notably, 21% of the women in this study had no formal education, and 13% had received only a partial primary education. This represents a critical missed opportunity for improving the well-being of both women and their children, highlighting the need for continued and intensified interventions in educational access and quality.[42,43] Programs like *Beti Bachao Beti Padhao* (Save the girl child, educate the girl child) aim to enhance education for girls, but more targeted efforts are needed to address regional disparities and dropout rates, especially in rural areas where barriers like early marriage and socioeconomic pressures persist.[44]

The role of maternal occupation in child nutrition is complex. Our results indicate that compared with mothers who are unemployed, mothers employed in highly skilled sectors tend to have children with higher HAZ and WAZ values, as well as reduced odds of stunting and underweight status. Conversely, mothers engaged in agricultural work exhibit an increased likelihood of having children with lower WAZ values and higher odds of having underweight children, suggesting that employment in informal or labor-intensive sectors may not confer the same health benefits to children. Recent literature indicates that women's involvement in agriculture can adversely affect nutrition through two main pathways: insufficient time for child care during peak agricultural seasons and seasonal energy deficits that impact the women's own health. Therefore, policies to improve nutrition must recognize women's time constraints.[45,46] These mixed effects underscore the nuanced relationship between maternal occupation and child nutrition, reflecting variations in job security, working conditions, and access to resources.

Another finding from this study is the significant association between mobile phone ownership and improved child nutritional outcomes. Mobile phone ownership was consistently linked to higher HAZ,

weight-for-height (WHZ), and WAZ values, as well as reduced odds of stunting, wasting, and underweight status. This may be explained by the increasing role of mobile technology in expanding access to health information, social networks, and maternal and child health services in rural and urban settings.[47] Previous research has documented the benefits of mobile phone-based interventions in improving maternal health behaviors, such as increased antenatal care visits and adherence to immunization schedules, which likely have downstream effects on child nutrition.[48,49] India's National Health Mission has implemented several mobile health (mHealth) applications that provide critical information on maternal and child health, including nutrition guidelines. These apps are designed to educate mothers about optimal feeding practices, growth monitoring, and dietary needs for children.[50] However, challenges related to digital access, particularly in rural and underserved areas, remain. Ensuring equitable access to mobile technology is crucial for the widespread impact of these programs.[51]

Our analysis also revealed that women who delayed their first sex and first cohabitation had children with higher WHZ and WAZ values, as well as reduced odds of having wasted or underweight children. Children of women who had their first child at an older age had higher HAZ values and were less likely to be stunted. Early marriage and childbearing can limit women's educational and economic opportunities, reducing their capacity to provide adequate nutrition and care for their children.[52] The effects of truncated educational and economic opportunities have been observed in the forms of poorer dietary diversity and delayed health care-seeking behavior.[53] Furthermore, younger mothers may lack the physical and emotional maturity to navigate the challenges of parenthood, which may exacerbate the risk of poor child growth and development outcomes.[54] Delaying marriage and first childbirth allows women more time to develop their human capital, leading to improved health and nutritional outcomes for their children.[55] These findings underscore the importance of policies and interventions aimed at delaying marriage and first childbirth as strategies to enhance child nutrition and overall well-being. In India, the Prohibition of Child Marriage Act, 2006, serves as a legal framework for preventing child marriages, indirectly impacting child nutritional outcomes by raising the age of marriage. Additionally, integrating sexual and reproductive health education into school curricula and community platforms can empower girls to make informed decisions regarding marriage and childbearing, thus contributing to better health outcomes for future generations.[56]

In general, decision-making over a respondent's own health care and over large household purchases showed significant and positive relationships with WHZ and WAZ values, and were associated with slightly reduced likelihoods of the related nutritional outcomes of wasting and underweight status. These same instrumental agency variables did not have significant relationships with HAZ or stunting, indicating that women's involvement in relevant decisions in their lives and households may come too late in their children's lives or may not be related closely enough to pathways for reducing the risk of chronic child malnutrition.

Most of the intrinsic agency variables demonstrated slightly significant relationships with improved WAZ. However, the same variables did not show strong relationships with the binary child nutritional outcomes. This suggests that while children of women who are opposed to wife beating under various scenarios may have slightly higher WAZ values than children of women who feel wife beating is justified, the difference in WAZ is not enough to push a child beyond the threshold of being underweight. These results could be due in part to the fact that the vast majority of women in this sample opposed wife beating in all proposed scenarios.

Contrary to our expectations, we did not observe consistent and significant associations of control over women's cash earnings and ownership of bank/savings accounts with child nutritional status. Previous studies have suggested that economic empowerment and progressive attitudes toward gender roles can positively influence child health outcomes.[57,58] However, our findings do not indicate that these factors play a significant role in determining the nutritional status of children under 5 in this context. The complexity of decision-making dynamics within households might mean that even when women participate in decision-making, it does not necessarily translate to improved child nutrition if other household members' priorities conflict with nutritional goals.[59] Hence, conditional cash transfer or social protection schemes to improve maternal health should consider several dimensions if they are to translate women's decision-making power to child nutrition and health outcomes.[60]

Our findings complement those of the recent study by Singh and Jha, which also investigated the relationship between maternal empowerment and child malnutrition using NFHS-5 data.[24] Their analysis, based on the Birth Recode dataset, categorized undernutrition broadly as the presence of stunting, wasting, or underweight status. By contrast, our study employed the children's recode dataset and adopted a more nuanced approach by analyzing the three forms of malnutrition individually, using both *z* scores and categorical measures. Additionally, we adopted Kabeer's framework to provide a theoretically robust understanding of women's empowerment while controlling for sociodemographic variables like household wealth, maternal age, child's sex, and birth order. By contrast, Singh and Jha explored these sociodemographic factors as independent variables, potentially broadening the scope but diluting the primary focus on empowerment. These distinctions not only enhance the theoretical rigor of our analysis but also provide complementary insights into the diverse dimensions of maternal empowerment and its implications for addressing child malnutrition.

Our analysis results have important implications. The findings suggest that while many instrumental agency variables, and to a lesser extent, intrinsic agency variables, show significant relationships with child nutritional outcomes, these factors may not directly influence child nutrition unless accompanied by other enabling resources and supportive measures that address the practical constraints women face. Interventions should therefore be multifaceted, ensuring that economic empowerment is complemented by initiatives that reduce the time burden on women and promote equitable sharing of child care responsibilities within households.

4.1 Study Limitations

Several limitations of our analysis on the association between women's empowerment and child malnutrition using NFHS-5 2019–21 data should be acknowledged. The survey's cross-sectional nature limited the ability to establish causal relationships between women's empowerment variables and child nutritional outcomes. The associations observed are correlations and do not imply causation. Women's empowerment is a complex and multidimensional construct. The study may not have captured all relevant dimensions or nuances of empowerment, such as empowerment within social networks, which could influence child nutritional outcomes. Some variables, particularly those related to social norms and attitudes (for example, attitudes toward wife beating), rely on self-reported data, which may be subject to social desirability bias or inaccuracies in reporting. Although the study controlled for key variables such as wealth quintile, urban/rural residence, and maternal and child characteristics, other unmeasured factors may also influence the relationship between women's empowerment and child undernutrition. Factors such as

household food security, health care access, and environmental conditions might play a role but are beyond the scope of this study. Acknowledging these limitations is crucial for interpreting this study's findings accurately and for guiding future research and policy design. Addressing these limitations in subsequent studies could enhance our understanding of the complex relationships between women's empowerment and child nutritional outcomes, and could contribute to more effective policy and program interventions. Future research should continue to explore the mechanisms through which women's empowerment influences child health, particularly in low- and middle-income countries where gender inequality remains prevalent. More qualitative studies are also needed to unpack the complex ways in which different dimensions of empowerment interact to influence child nutritional outcomes.

4.2 Conclusion

Our findings reveal that aspects of women's empowerment are significantly associated with child nutritional outcomes. Specifically, higher levels of maternal education; maternal employment in high-skilled occupations; ownership of mobile phones; and older ages at which women first engage in sexual activity, begin cohabitation, and have their first child were found to significantly reduce the likelihood of their children being stunted, wasted, or underweight. These results underscore the importance of educational attainment, access to communication technologies, and delayed marriage and childbirth in improving child nutrition, highlighting that increasing women's agency and empowerment in these areas can have a positive impact on child health.

Conversely, the study found no significant associations between child malnutrition and some proxy indicators of women's empowerment, such as attitudes toward wife beating, household decision-making, and ownership of a bank/savings account. This lack of association suggests that while these factors may influence various aspects of women's lives, they may not directly relate to changes in children's nutritional outcomes as measured in this study, or that cultural factors may contribute to an attenuated relationship. The study's results highlight the need for continued research to explore the complex interactions between different dimensions of women's empowerment and child health in India. Policymakers should consider these factors when designing programs and interventions aimed at reducing child undernutrition and improving overall child health outcomes.

Policies and programs aiming to empower women should adopt a holistic approach, considering the diverse aspects of women's empowerment and their relationships with child health. By addressing the factors contributing to women's empowerment, it is possible to foster environments that support both women's empowerment and improved child nutritional outcomes, contributing to advancing broader public health and development goals.

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APPENDIX

Table A1 Distribution of women by household/maternal characteristics and dimensions of empowerment, India NFHS-5, 2019–21

	No.	%
Household characteristics		
Wealth quintile		
Lowest	7,944	26.5
Second	7,058	23.5
Middle	5,901	19.6
Fourth	5,184	17.3
Highest	3,937	13.1
Place of residence		
Urban	6,077	20.2
Rural	23,947	79.8
Maternal characteristics		
Age	N = 30,024	
Mean (SD)	27.4 (5.0)	
15–20	1,583	5.3
21–25	10,660	35.5
26–30	10,995	36.6
31–35	4,713	15.7
36–40	1,623	5.4
41–45	365	1.2
46–49	85	0.3
Empowerment variables		
Enabling resources		
Educational attainment	N = 30,024	
No education	6,419	21.4
Incomplete primary	3,912	13.0
Incomplete secondary	14,985	49.9
Complete secondary	550	1.8
Higher	4,158	13.8
Employment	N = 30,024	
Not working	22,614	75.3
Professional/technical/managerial	616	2.0
Clerical	88	0.3
Sales	434	1.5
Services/household and domestic	599	2.0
Agricultural	4,102	13.7
Skilled and unskilled manual	1,240	4.1
Other	304	1.0
Don’t know	27	0.1

Continued…

Table A1—*Continued*

	No.	%
Age at first cohabitation	N = 30,019[a]	
Mean (SD)	19.5 (3.7)	
6–10	54	0.2
11–15	3,267	10.9
16–20	16,956	56.5
21–25	7,733	25.8
26–30	1,717	5.7
31–35	257	0.9
36–40	32	0.1
41–45	3	<0.1
Age at first sex	N = 29,227[b]	
Mean (SD)	19.4 (3.6)	
6–10	99	0.3
11–15	2,992	10.2
16–20	17,301	59.2
21–25	7,075	24.2
26–30	1,502	5.1
31–35	232	0.8
36–40	24	0.1
41–45	2	<0.1
Age at first birth	N = 30,024	
Mean (SD)	19.4 (3.6)	
6–10	1	<0.1
11–15	605	2.0
16–20	13,061	43.5
21–25	12,425	41.4
26–30	3,184	10.6
31–35	642	2.1
36–40	93	0.3
41–45	12	<0.1
46–50	1	<0.1
Ownership of bank/savings account(s)	N = 30,024	
Yes	23,911	79.6
No	6,113	20.4
Ownership of mobile phone(s)	N = 30,024	
Yes	17,579	58.6
No	12,445	41.4

Continued…

Table A1—*Continued*

	No.	%
Instrumental agency		
Control over women's cash earnings	N = 5,688	
Mainly the respondent	721	12.7
Mainly her husband	871	15.3
Respondent and her husband jointly	4,038	71.0
Someone else	58	1.0
Household decision-making	N = 3,0024	
Respondent's health care		
Mainly the respondent	2,348	7.8
Mainly her husband	5,237	17.4
Respondent and her husband jointly	21,707	72.3
Someone else	474	1.6
Other	258	0.9
Large household purchases		
Mainly the respondent	1,621	5.4
Mainly her husband	5,280	17.6
Respondent and her husband jointly	21,542	71.8
Someone else	1,164	3.9
Other	417	1.39
Visits to family or relatives		
Mainly the respondent	1,774	5.9
Mainly her husband	5,068	16.9
Respondent and her husband jointly	22,022	73.4
Someone else	845	2.8
Other	315	1.0
Intrinsic agency		
Attitude toward wife beating	N = 30,024	
Justified if wife goes out without telling husband		
Yes	5,279	17.6
No	24,650	82.1
Don't know	95	0.3
Justified if wife neglects the children		
Yes	7,079	23.6
No	22,855	76.1
Don't know	90	0.3
Justified if wife argues with husband		
Yes	5,977	19.9
No	23,917	79.7
Don't know	130	0.4
Justified if wife refuses to have sex with husband		
Yes	3,007	10.0
No	26,888	89.6
Don't know	129	0.4

Continued…

Table A1—*Continued*

	No.	%
Justified if wife burns the food		
Yes	3,818	12.7
No	26,114	87.0
Don't know	92	0.3

SD = standard deviation
[a] Excluding women who responded with younger ages or whose data were missing
[b] Excluding women who didn't know, those who responded with younger ages, and those whose data were inconsistent or missing

Table A2 Child demographics and nutritional outcome variables, India NFHS-5, 2019–21

Child demographics	N = 30,024	
Age in months (mean, SD)	30.1 (17.2)	
	No.	**%**
Sex of child		
Male	15,407	51.3
Female	14,617	48.7
Birth order		
First born	11,414	38.0
Second	9,987	33.3
Third	4,662	15.5
Fourth	2,127	7.1
Fifth	989	3.3
Sixth	419	1.4
Seventh+	426	1.4
Nutritional outcome variables		
Child anthropometry (0–59 months)		
Height-for-age *z* score (mean, SD)	-1.366 (1.7)	
Normal	19,276	64.2
Moderately stunted	6,264	20.9
Severely stunted	4,484	14.9
Weight-for-height *z* score (mean, SD)	-0.806 (1.5)	
Normal	24,438	81.4
Moderately wasted	3,364	11.2
Severely wasted	2,222	7.4
Weight-for-age *z* score (mean, SD)	-1.353 (1.2)	
Normal	21,223	70.7
Moderately underweight	6,331	21.1
Severely underweight	2,470	8.2

SD = standard deviation