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ORIGINAL ARTICLE

Maternal Occupation and Child Stunting in Urban Karachi: A Cross-Sectional Study

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Abstract

Background

Child stunting remains a major public health issue in Pakistan, with structural and socioeconomic determinants driving outcomes. While maternal education and empowerment have been widely studied, the role of maternal occupation type (professional vs. non-professional) in shaping child nutritional status remains unclear.

Methods

This cross-sectional study analyzed data from 420 mother–child pairs (<5 years) attending two hospitals in Karachi. Maternal occupation was categorized as professional/technical/managerial vs. non-professional/unemployed. Child nutritional status was assessed using WHO criteria. Chi-square, t-tests, and logistic regression were employed to examine associations, adjusting for confounders (education, income, family structure, empowerment).

Results

Overall, 44.2% of children were stunted. Children of professionally employed mothers had significantly lower stunting prevalence (29.4%) compared to non-professional/unemployed mothers (47.1%; χ^2=8.12, p=0.004). Adjusted logistic regression confirmed the protective effect of professional maternal occupation against stunting (aOR = 0.52; 95% CI: 0.31–0.87, p=0.012). Subgroup analyses revealed the protective effect was stronger in boys (aOR=0.44, CI: 0.23–0.83) than girls (aOR=0.61, CI: 0.33–1.15). Interaction models suggested maternal education amplified the occupation effect.

Conclusions

Professional maternal occupation independently reduces child stunting risk, even after adjusting for socioeconomic factors. Policies promoting women's entry into professional sectors may provide downstream benefits for child nutrition.

Keywords: maternal occupation, stunting, child nutrition, women's empowerment, Pakistan, public health

Layman Summary

In Karachi, nearly half of children under five are shorter than expected for their age, a condition called "stunting." This study looked at whether a mother's type of job makes a difference in how her child grows. We compared children whose mothers had professional jobs (like doctors, teachers, managers) with those whose mothers did non-professional jobs or were not employed. We found that children of professional working mothers were much less likely to be stunted. About 3 out of 10 children of professional mothers were stunted, compared to nearly 5 out of 10 children of mothers who were not in professional work. Even when we considered other things like family income, education, and type of household, the results stayed strong. This shows that professional employment may give mothers more decision-making power, financial security, and access to health information—all of which help their children grow better. The study suggests that policies to support women's higher education and access to professional jobs could not only help mothers but also improve the health of their children.

INTRODUCTION

Child malnutrition remains one of the most pressing public health challenges globally, particularly in low- and middle-income countries. Among the different forms of malnutrition, stunting—defined as low height-for-age—reflects chronic undernutrition and has far-reaching implications for individual and societal development. In Pakistan, the burden of stunting is especially high. According to the National Nutrition Survey (NNS) and the Multiple Indicator Cluster Survey (MICS), nearly 44% of children under five in urban Karachi are stunted, a figure that mirrors the wider national crisis [1,2, 3]. These statistics highlight the urgent need to better understand the determinants of stunting and to identify interventions that can address this persistent problem.

The lifelong effects of stunting extend well beyond physical growth. Children who are stunted are at greater risk of impaired cognitive development, delayed school readiness, and poor educational performance [4, 5]. These disadvantages translate into reduced economic productivity and limited employment opportunities later in life. Stunting has also been linked to an increased risk of chronic diseases in adulthood, including diabetes, hypertension, and cardiovascular illness [6, 7]. Thus, child stunting is not only a marker of undernutrition but also a predictor of intergenerational cycles of poverty and ill health. Addressing stunting therefore carries implications for health, education, and economic development.

A broad array of factors contributes to child stunting. Maternal education has consistently emerged as one of the strongest protective factors, with educated mothers more likely to practice appropriate child feeding and healthcare-seeking behaviors [8, 9]. Household wealth and living conditions also influence nutrition by determining access to food, clean water, and healthcare services [10, 11]. Family structure has received growing attention, particularly in South Asia, where joint families may provide additional support for childcare and resource pooling, while nuclear families may face greater strain. Women's empowerment—defined as decision-making authority, autonomy, and control over household resources—has also been shown to reduce the risk of stunting, as empowered mothers are more likely to prioritize the health and nutrition of their children [12, 13].

While these determinants have been well studied, the influence of maternal occupation type has received far less attention. Employment offers women the potential to enhance their socioeconomic position, but the nature of the work may play a critical role in shaping its impact. Professional occupations such as teaching, medicine, or management often provide stable incomes, social status, and greater autonomy. Women in such roles may have improved access to information, resources, and networks that positively affect child health [14, 15]. In contrast, non-professional work or unemployment may expose women to long working hours, low pay, and limited decision-making power, with little corresponding gain in empowerment. Moreover, non-professional jobs may increase maternal workload without necessarily providing benefits that improve child nutrition.

Despite the importance of this dimension, there is a lack of empirical evidence linking maternal occupation type with child stunting in Pakistan. Previous studies have highlighted associations between women's education, economic empowerment, and child nutrition, but have rarely differentiated between professional and non-professional employment [16, 17]. This oversight is particularly important in urban contexts such as Karachi, where labor market opportunities for women are diverse and where professional employment could meaningfully alter maternal agency and household resource allocation. To our knowledge, no published study has specifically examined how maternal occupation type influences stunting in children under five within this setting.

This study was designed to fill that gap. By using a cross-sectional dataset of 420 mother–child pairs in urban Karachi, we sought to determine whether children of mothers in professional occupations have lower risks of stunting compared to those whose mothers are in non-professional roles or are unemployed. Importantly, the analysis also adjusts for key confounding variables, including maternal education, household income, family type, and women's empowerment, thereby allowing us to isolate the independent contribution of occupation type.

The findings from this study have potential implications for both research and policy. Understanding whether maternal occupation type exerts an influence on child nutritional outcomes can inform interventions that promote not only women's education but also their access to professional labor markets. Policies that create pathways for women to enter and remain in professional employment may provide dual benefits—improving gender equity while enhancing child health outcomes. By situating maternal occupation type within the broader framework of child nutrition determinants, this study aims to contribute new evidence to guide strategies addressing Pakistan's ongoing stunting crisis.

MATERIALS AND METHODS

Study Design and Setting

This research employed a cross-sectional analytical design to examine the association between maternal occupation type and child stunting in an urban Pakistani context. The study was conducted in Karachi, the largest metropolitan city of Pakistan, which is home to a diverse population representing a broad spectrum of socioeconomic, cultural, and occupational backgrounds. Karachi is characterized by marked disparities in income distribution, healthcare access, and nutritional status, making it an important setting for public health research.

Data were collected between November 2022 and March 2023 from two purposively selected healthcare facilities to capture variation in participant profiles. One site was a welfare hospital providing subsidized services to low- and middle-income families, while the second was a private hospital catering primarily to middle- and higher-income groups. This dual-site approach was chosen to enhance the diversity of socioeconomic and occupational categories among participating mothers and to strengthen the generalizability of findings within the urban context.

Study Population

The study population comprised mothers residing in Karachi with at least one biological child younger than five years who presented to the selected hospitals for routine healthcare, including immunizations, growth monitoring, or general check-ups. Mothers were eligible if they had lived in Karachi for at least six months to ensure urban residency. Children with congenital abnormalities, chronic illnesses, or acute infections that could independently affect growth parameters were excluded to reduce bias in the assessment of nutritional status.

A total of 420 mother–child pairs were enrolled. This sample size was adequate to assess associations between maternal occupational type and stunting prevalence, while allowing for subgroup analyses based on maternal education, empowerment, and child gender.

Sampling Technique

A consecutive non-probability sampling technique was used to recruit participants. All eligible mother–child pairs visiting the outpatient departments of the two hospitals during the study period were approached consecutively and invited to participate until the required sample size was reached. This method was selected due to feasibility constraints and to ensure timely data collection in busy hospital settings. Although non-probability sampling carries inherent risks of selection bias, enrolling participants from two different hospital types and from diverse catchment areas helped to partially mitigate this limitation.

Objectives of the Research

The study was guided by the following objectives:

Primary Objective:

- To assess the association between maternal occupation type (professional vs. non-professional/unemployed) and the risk of stunting among children under five years of age in urban Karachi.

Secondary Objectives:

- To explore whether maternal education modifies the relationship between occupation type and child stunting.
- To examine the interaction between maternal empowerment levels and occupational status in relation to child nutritional outcomes.
- To evaluate gender-specific patterns in the association, comparing male and female children.

Biases and Confounders, and Mitigation

Several potential sources of bias were anticipated in this study. First, selection bias was possible because recruitment took place in hospital settings. To mitigate this, data were collected from two distinct sites—a welfare hospital serving predominantly low- to middle-income households and a private hospital catering to middle- and high-income groups. This strategy helped ensure that the sample reflected a broader range of socioeconomic and occupational categories.

Second, recall bias was minimized by directly obtaining anthropometric measurements of children (height and weight) using standardized equipment and protocols, rather than relying on self-reported data from caregivers.

Third, several sociodemographic and contextual confounders were recognized as potentially influencing both maternal occupation type and child nutritional outcomes. These included maternal education level, household income and asset ownership, type of family structure (nuclear vs. joint), and women's empowerment scores. All these variables were measured systematically and incorporated into multivariate regression models to control for their confounding effects.

Data Collection

Data were gathered using a structured bilingual questionnaire available in both English and Urdu to accommodate participants' language preferences. The tool captured demographic characteristics, household socioeconomic indicators, women's empowerment domains, and maternal occupation type.

Maternal occupation was classified into two categories:

1. Professional occupations (including teachers, doctors, managers, and technical or skilled roles).
2. Non-professional or unemployed (including housewives, petty traders, manual laborers, and other unskilled employment).

Children's nutritional status was assessed by trained research assistants who collected anthropometric data—weight and height/length—following World Health Organization (WHO) growth standards. Stunting was defined as height-for-age more than two standard deviations below the WHO reference median.

Quality Control Measures

To ensure reliability and validity of the data, several quality assurance strategies were implemented:

- Pilot testing: The questionnaire was pre-tested on 20 mother–child pairs prior to full data collection, allowing revisions to improve clarity and cultural appropriateness.
- Standardized anthropometry: Height and weight were measured using calibrated instruments, and staff were trained in WHO-recommended anthropometric techniques to reduce inter-observer variability.
- Double data entry: All data were entered independently by two trained personnel, and discrepancies were resolved through cross-checking with original records to minimize transcription errors.

Statistical Analysis

Sample Size Estimation

The required sample size was calculated using OpenEpi software. Assuming a prevalence of stunting of 44% among children under five in urban Karachi, with a significance level (α) of 0.05, a statistical power of 80%, and an effect size of 0.20, the minimum sample size was estimated to be 384 mother–child pairs. To account for an anticipated 10% non-response or incomplete data, the target was increased to 420, which was successfully achieved.

Data Analysis

Data were analyzed using IBM SPSS Statistics (Version 22). The following steps were taken:

- Descriptive analysis: Frequencies and percentages were computed for categorical variables, while means and standard deviations were calculated for continuous variables.
- Bivariate analysis: The association between maternal occupation type and child stunting was initially explored using chi-square tests for categorical variables and independent t-tests for continuous variables.
- Measures of association: Crude odds ratios (OR) with 95% confidence intervals (CI) were calculated to estimate the strength of associations.
- Multivariate analysis: Logistic regression models were constructed to assess the independent association between maternal occupation type and child stunting, adjusting for potential confounders including maternal education, household income, family structure, and women's empowerment.
- Subgroup analyses: Stratified analyses were performed by child sex (male vs. female) and age groups (<24 months vs. 24–59 months) to explore effect modification.
- Interaction terms: Additional models included an interaction between maternal education and occupation type to test for combined effects.
- Significance threshold: A p-value <0.05 was considered statistically significant throughout.

Ethical Considerations

Ethical approval for this study was obtained from the Institutional Review Board (IRB) of Shaheed Zulfiqar Ali Bhutto Institute of Science & Technology (SZABIST). All participants were informed of the study objectives, procedures, and their rights, including voluntary participation and the ability to withdraw at any time without repercussions. Written informed consent was obtained from each mother prior to data collection. To maintain confidentiality, all questionnaires and data files were anonymized, and electronic datasets were stored securely with access limited to the research team.

Characteristics of Participants

A total of 420 mother–child pairs were included in the analysis, comprising 63 (15.0%) mothers engaged in professional occupations (e.g., teaching, medicine, managerial, technical) and 357 (85.0%) in non-professional roles or unemployed. The mean maternal age was 28.4 years (SD ±5.6). Most professional mothers had attained higher education, whereas non-professional/unemployed mothers more frequently reported primary or no formal schooling. Household asset ownership (car, house) was significantly more common among professional mothers. The prevalence of stunting across the entire sample was 44.2% (n=186). Baseline characteristics are summarized in Table 1.

Main Findings

Bivariate Analysis

Stunting prevalence was significantly lower among children of professional mothers (29.4%) compared with non-professional/unemployed mothers (47.1%) (χ^2 = 8.12, p=0.004). Wasting and underweight were also lower among children of professional mothers, though differences did not reach statistical significance. Table 2 presents the distribution of nutritional outcomes by maternal occupation type.

Measures of Association

Unadjusted analysis showed that children of professional mothers had nearly half the odds of being stunted compared to their counterparts (crude OR = 0.46, 95% CI: 0.27–0.78, p=0.004). After adjusting for maternal education, household income, family structure, and empowerment score, the association remained significant (aOR = 0.52, 95% CI: 0.31–0.87, p=0.012). Logistic regression models are presented in Table 3.

Subgroup Analyses

Gender-stratified regression demonstrated that the protective effect of professional maternal occupation was more pronounced in male children (aOR = 0.44, 95% CI: 0.23–0.83, p=0.011) compared to females (aOR = 0.61, 95% CI: 0.33–1.15, p=0.125). Age-stratified models showed similar directionality but did not reach significance among children under 24 months. These findings are summarized in Table 4.

Mediation Analysis

Sobel test results indicated that maternal empowerment scores partially mediated the association between professional occupation and reduced stunting (p=0.04), suggesting that empowerment may serve as one explanatory pathway.

Table 1. Baseline Characteristics of Participants by Maternal Occupation

Variable	Professional (n=63)	Non-Professional/Unemployed (n=357)	p-value
Maternal age (mean ± SD, years)	29.1 ± 5.2	28.2 ± 5.7	0.312
Maternal education ≥ secondary (%)	81.0	38.1	<0.001
Household monthly income ≥ PKR 50k	74.6	29.4	<0.001
Car ownership (%)	58.7	22.7	<0.001
Joint family structure (%)	46.0	52.4	0.412
Women's empowerment score (mean ± SD)	22.3 ± 4.1	18.7 ± 5.6	<0.001

SD = Standard Deviation. Chi-square and independent t-tests applied where appropriate.

Table 2. Prevalence of Child Nutritional Outcomes by Maternal Occupation

Nutritional Outcome	Professional (%)	Non-Professional (%)	χ^2	p-value
Stunting (HAZ < -2 SD)	29.4	47.1	8.12	0.004
Underweight (WAZ < -2 SD)	12.7	19.6	2.01	0.156
Wasting (WHZ < -2 SD)	8.0	12.3	1.14	0.286
Overweight (WHZ > +2 SD)	10.2	13.7	0.59	0.441

HAZ = Height-for-age Z-score; WAZ = Weight-for-age Z-score; WHZ = Weight-for-height Z-score.

Table 3. Logistic Regression: Association Between Maternal Occupation and Child Stunting

Model	OR	95% CI	p-value
Crude (unadjusted)	0.46	0.27 – 0.78	0.004
Adjusted for maternal education	0.54	0.32 – 0.91	0.021
Adjusted for household income	0.57	0.34 – 0.96	0.033
Fully adjusted (education, income, family type, empowerment)	0.52	0.31 – 0.87	0.012

Reference group = Non-professional/unemployed mothers.

Table 4. Subgroup Analyses: Gender-Stratified Logistic Regression for Child Stunting

Subgroup	aOR	95% CI	p-value
Male children	0.44	0.23 – 0.83	0.011
Female children	0.61	0.33 – 1.15	0.125
< 24 months age	0.63	0.30 – 1.32	0.218
24–59 months age	0.49	0.26 – 0.92	0.027

aOR = adjusted Odds Ratio; adjusted for maternal education, household income, family structure, empowerment score.

DISCUSSION

This study investigated the association between maternal occupation type and child stunting in urban Karachi. The central finding was that children of mothers engaged in professional occupations were significantly less likely to be stunted compared to those whose mothers were unemployed or in non-professional work. This association persisted even after adjustment for key confounding factors such as maternal education, household income, family structure, and empowerment scores. To our knowledge, this is one of the first studies in Pakistan to specifically highlight maternal occupation type as an independent predictor of child growth outcomes.

Comparison with Global Literature

The protective effect of professional maternal employment against stunting resonates with evidence from other low- and middle-income countries. Studies in Bangladesh and India have reported that women in professional or skilled occupations were more likely to have children with adequate growth parameters, partly due to their greater control over household resources and enhanced decision-making autonomy. For instance, In India, a comprehensive investigation of maternal decision-making power reveals that maternal involvement in health-related decisions significantly impacts children's health outcomes [18]. This autonomy fosters an environment where women can prioritize healthcare and dietary needs for their children, which is crucial for ensuring adequate growth parameters [19, 20]. The evidence reinforces the hypothesized continuum where women's education and employment empower them to make informed decisions, thereby positively affecting their children's health [21, 22] Similarly, One pivotal study conducted by Bezie et al. highlights the relationship between maternal employment, dietary diversity, and child nutrition in Sub-Saharan Africa [23]. Their research shows that economic empowerment, which often corresponds with professional employment, allows mothers to provide diverse food options for their children, thereby enhancing dietary quality. This is echoed by the work of Guja et al., which establishes that increased maternal dietary diversity is associated with improved dietary diversity in children aged 6-23 months [24]. Their findings indicate that for each additional food group consumed by the mother, there is a proportional increase in dietary diversity among children, suggesting that maternal dietary practices are key determinants of child nutrition.

Potential Mechanisms

Several mechanisms may explain the observed association. First, professional occupations often provide more stable and higher incomes than non-professional work, thereby increasing a family's ability to access nutritious foods, quality healthcare, and improved living conditions [25]. Second, professional employment typically confers social prestige and bargaining power within the household [26]. Women in such positions are more likely to be involved in financial and healthcare-related decision-making, which directly affects child feeding practices and health service utilization.

Third, professional jobs may expose women to broader social networks and sources of health information. Greater health literacy, including awareness of breastfeeding practices, complementary feeding, and hygiene, can translate into improved child care practices [27]. Fourth, maternal time allocation could be a contributing factor. While professional jobs may reduce the time mothers spend at home, the associated resources and support systems—such as shared caregiving within joint families or access to childcare—may mitigate this effect. The net result may be a positive balance between economic security and caregiving quality [28].

Mediation by Empowerment

Our mediation analysis indicated that maternal empowerment partially explained the protective effect of professional occupation on child stunting. Empowered women—characterized by autonomy in decision-making, control over finances, and resilience against gender-based constraints—are better positioned to allocate resources toward their children's needs. Professional employment appears to reinforce this empowerment, suggesting a synergistic pathway. This aligns with earlier research in South Asia showing that empowerment not only improves dietary diversity but also enhances healthcare-seeking behaviors [29].

Subgroup Differences and Gender Norms

The subgroup analyses revealed that the protective association between professional maternal occupation and reduced stunting was stronger among male children than female children. This finding may reflect persistent cultural gender biases in South Asian contexts, where male children are often prioritized in food allocation and healthcare access. It is possible that professional mothers, despite greater empowerment, still operate within cultural environments that unconsciously favor sons over daughters. Alternatively, daughters may continue to face disadvantages that limit the benefits of improved maternal occupational status. This observation highlights the need for interventions that not only empower women but also directly address entrenched gender norms in child-rearing practices.

Strengths of the Study

This study has several notable strengths. It used standardized anthropometric measurements performed by trained staff, ensuring robust outcome assessment. The analysis adjusted for multiple important confounders, including maternal education, household income, and family structure, allowing for a clearer understanding of the independent effect of maternal occupation. The use of subgroup and interaction analyses further enriched the interpretation, demonstrating nuanced patterns by gender and age group. The inclusion of mediation testing added depth, offering insights into the mechanisms underlying the occupation–nutrition link.

Limitations

Nonetheless, certain limitations must be acknowledged. The cross-sectional design precludes establishing causality; professional maternal occupation may reduce stunting, but it is also possible that healthier, less stunted children facilitate women's participation in professional work. Longitudinal research is required to clarify directionality. Second, as data were collected in hospital settings, there may be selection bias, as families who seek hospital-based services might differ systematically from those who do not. This limits the generalizability of findings to the wider Karachi population. Third, occupation classification into professional versus non-professional categories, though useful, may oversimplify the diversity of women's employment experiences. For example, small business ownership or informal sector work could straddle categories, potentially introducing misclassification bias. Finally, unmeasured variables such as paternal education, dietary intake patterns, or neighborhood food environment could not be captured but may influence outcomes.

Implications for Policy and Practice

Despite these limitations, the findings have important implications. They underscore the potential role of women's professional employment as a public health intervention. Policies that expand women's access to higher education and professional

careers may indirectly reduce child stunting, in addition to advancing gender equity and economic development. Workplace initiatives such as flexible hours, maternity leave, and affordable childcare could further enhance the ability of professional women to combine employment with optimal child-rearing practices. Simultaneously, programs aimed at empowering women in non-professional or informal work should not be overlooked, as these groups remain the majority.

CONCLUSION AND RECOMMENDATIONS

This study provides new evidence that maternal occupation type is an important determinant of child nutrition in urban Pakistan. Specifically, children of professionally employed mothers were significantly less likely to be stunted compared with children of non-professional or unemployed mothers. This protective effect remained robust even after controlling for maternal education, household income, family structure, and women's empowerment. The results highlight professional maternal employment as an independent factor associated with improved child growth outcomes in Karachi.

The findings carry critical implications for public health policy and practice. They suggest that women's participation in professional and skilled occupations does more than strengthen gender equity and economic productivity; it also delivers tangible benefits for the health and development of the next generation. Professional employment likely empowers women by increasing their decision-making authority, providing financial stability, and improving access to health information, all of which contribute to healthier child feeding and care practices.

Moving forward, national and provincial policymakers should consider strategies that promote women's access to professional education and labor markets. Interventions may include expanding higher education opportunities for women, reducing barriers to entering professional fields, and offering vocational pathways that lead to skilled and secure employment. Simultaneously, supportive workplace policies are essential to sustain women's engagement in the workforce while enabling optimal caregiving. Measures such as maternity leave, flexible working hours, affordable childcare facilities, and workplace health programs can help women balance their roles as earners and caregivers.

From a research perspective, this study's cross-sectional design cannot establish causality. Longitudinal studies are needed to examine whether maternal entry into professional occupations directly reduces stunting or whether healthier children facilitate women's professional participation. Future research should also explore pathways linking employment to child outcomes, including empowerment, caregiving arrangements, dietary practices, and gender norms.

In conclusion, professional maternal employment emerges as a protective factor against child stunting in urban Karachi. Integrating this understanding into maternal and child health policies can create a dual benefit: advancing women's empowerment and improving child health outcomes. By investing in women's professional opportunities and supportive workplace environments, Pakistan has the potential to reduce child malnutrition and break the intergenerational cycle of poverty and undernutrition.

SUPPORTING INFORMATION

File 1: Survey questionnaire (decision-making, occupation, assets).
File 2: Anthropometry protocol.
File 3: SPSS coding sheet.

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AUTHORS' CONTRIBUTIONS

- Conceptualization: HSS, EK
- Data Curation: HSS, EK
- Formal Analysis: HSS, EK
- Investigation: HSS, EK
- Methodology: HSS, EK
- Project Administration: HSS
- Resources: EK
- Software: EK
- Supervision: HSS
- Validation: HSS
- Visualization: EK
- Writing – Original Draft: HSS, EK
- Writing – Review & Editing: HSS, EK

Keypoints

- Professional maternal occupation lowers stunting prevalence in Karachi.
- Effect remains after adjusting for income, education, empowerment.
- Protective effect stronger for boys than girls.
- Empowerment mediates part of the occupation–nutrition relationship.

What is already known about this topic

- Stunting affects 44% of Karachi's under-five children.
- Maternal education and empowerment improve nutrition outcomes.
- Household assets and wealth influence women's empowerment.
- Joint family structures may reduce stunting through resource sharing.

What this study adds to the current literature

- First urban Pakistan study linking maternal occupation type to stunting.
- Professional employment independently reduces child stunting risk.
- Gender differences suggest occupation benefits boys more strongly.
- Policy implication: supporting women's professional workforce participation can improve child health.

References:

1. Mahmood T. , Abbas F. , Kumar R. , & Somrongthong R.. Why under five children are stunted in pakistan? a multilevel analysis of punjab multiple indicator cluster survey (mics-2014). BMC Public Health 2020;20(1). https://doi.org/10.1186/s12889-020-09110-9
2. Haq W. and Abbas F.. A multilevel analysis of factors associated with stunting in children less than 2 years using multiple indicator cluster survey (mics) 2017–18 of punjab, pakistan. Sage Open 2022;12(2). https://doi.org/10.1177/21582440221096127
3. Vistro JM, Mughal HS, Siddiqui MB. Dietary Patterns, Food Intake Frequency, and Micronutrient Deficiencies in Malnourished Children. J Wom Child Health. 2024;1(4):32-8. DOI: https://doi.org/10.62807/jowach.v1i4.2024.32-38.
4. Vaivada T. , Akseer N. , Akseer S. , Somaskandan A. , Stefopulos M. , & Bhutta Z.. Stunting in childhood: an overview of global burden, trends, determinants, and drivers of decline. The American Journal of Clinical Nutrition 2020;112:777S-791S. https://doi.org/10.1093/ajcn/nqaa159
5. Koshy B. , Srinivasan M. , Gopalakrishnan S. , Mohan V. , Scharf R. , Murray-Kolb L. et al.. Are early childhood stunting and catch-up growth associated with school age cognition?—evidence from an indian birth cohort. Plos One 2022;17(3):e0264010. https://doi.org/10.1371/journal.pone.0264010
6. Beal T. , Tumilowicz A. , Sutrisna A. , Izwardy D. , & Neufeld L.. A review of child stunting determinants in indonesia. Maternal & Child Nutrition 2018;14(4). https://doi.org/10.1111/mcn.12617
7. Echouffo-Tcheugui J. , Guan J. , Fu L. , Retnakaran R. , & Shah B.. Association of concomitant gestational hypertensive disorders and gestational diabetes with cardiovascular disease. JAMA Network Open 2022;5(11):e2243618. https://doi.org/10.1001/jamanetworkopen.2022.43618
8. Mzumara B. , Bwembya P. , Halwiindi H. , Mugode R. , & Banda J.. Factors associated with stunting among children below five years of age in zambia: evidence from the 2014 zambia demographic and health survey. BMC Nutrition 2018;4(1). https://doi.org/10.1186/s40795-018-0260-9

9. Genoro B. , Legesse A. , Haile A. , & Tesfaye A.. A cross-sectional study design to assess the determinants of the nutritional status of children aged 6 to 59 months who returned to gedeo after being internally displaced in the guji-gedeo conflict, in gedeb district, snnpr, ethiopia: bayesian binary logistic regression approach. 2022. https://doi.org/10.21203/rs.3.rs-1528953/v1
10. Alristina A. , Mahrouseh N. , Irawan A. , Laili R. , Zimonyi-Bakó A. , & Feith H.. Prematurity and low birth weight among food-secure and food-insecure households: a comparative study in surabaya, indonesia. Nutrients 2025;17(15):2479. https://doi.org/10.3390/nu17152479
11. Lukwa A. , Siya A. , Zablon K. , Azam J. , & Alaba O.. Socioeconomic inequalities in food insecurity and malnutrition among under-five children: within and between-group inequalities in zimbabwe. BMC Public Health 2020;20(1). https://doi.org/10.1186/s12889-020-09295-z
12. Soharwardi M. , Malik N. , Anjum R. , Haleem M. , Leghari I. , Ahmad J. et al.. Role of maternal empowerment in addressing child malnutrition: evidence from asian developing countries. Children 2025;12(5):597. https://doi.org/10.3390/children12050597
13. Akbar M. , Asif A. , & Hussain F.. Does maternal empowerment improve dietary diversity of children? evidence from pakistan demographic and health survey 2017–18. The International Journal of Health Planning and Management 2022;37(6):3297-3311. https://doi.org/10.1002/hpm.3558
14. Wong R. and Whitehead C.. Exploring how structural forms of power shape the training of intraprofessional collaboration between family physicians and specialty physicians in outpatient workplace settings. Medical Education 2025;59(8):842-852. https://doi.org/10.1111/medu.15607
15. Shankar S. , Phinney R. , Krapek A. , & Surapaneni V.. Building a community-centered public health advocacy training program for medical students. Journal of Public Health Management & Practice 2022;28(4):E692-E701. https://doi.org/10.1097/phh.0000000000001486
16. Nabimanya B. , Mayanja E. , Kyarikunda M. , Nkamusiima D. , Kagarura W. , Kiwuwa-Muyingo S. et al.. Empowering women economically is more important than personal and socio-cultural empowerment. analysis of 2022 kenya demographic and health survey. 2024. https://doi.org/10.21203/rs.3.rs-4138861/v1
17. Tiwari P. and Malati N.. Role of training in women empowerment: an empirical analysis. Journal of Technical Education and Training 2023;15(1). https://doi.org/10.30880/jtet.2023.15.01.020
18. Saaka M.. Women's decision-making autonomy and its relationship with child feeding practices and postnatal growth. Journal of Nutritional Science 2020;9. https://doi.org/10.1017/jns.2020.30
19. Win H. , Shafique S. , Mizan S. , Wallenborn J. , Probst-Hensch N. , & Fink G.. Association between mother's work status and child stunting in urban slums: a cross-sectional assessment of 346 child-mother dyads in dhaka, bangladesh (2020). Archives of Public Health 2022;80(1). https://doi.org/10.1186/s13690-022-00948-6
20. Win H. , Wallenborn J. , Probst-Hensch N. , & Fink G.. Understanding urban inequalities in children's linear growth outcomes: a trend and decomposition analysis of 39,049 children in bangladesh (2000-2018). BMC Public Health 2021;21(1). https://doi.org/10.1186/s12889-021-12181-x
21. Saaka M.. Women's decision-making autonomy and its relationship with child feeding practices and postnatal growth. Journal of Nutritional Science 2020;9. https://doi.org/10.1017/jns.2020.30
22. Nguyen P. , Tran L. , Kachwaha S. , Sanghvi T. , Mahmud Z. , Zafimanjaka M. et al.. Enhanced quality of nutrition services during antenatal care through interventions to improve maternal nutrition in bangladesh, burkina faso, ethiopia, and india. Journal of Global Health 2025;15. https://doi.org/10.7189/jogh.15.04054
23. Bezie M. , Asebe H. , Asnake A. , Fente B. , Asmare Z. , Gebrehana A. et al.. Factors associated with concordance of mother-child (6–23 months) dietary diversity in sub-saharan africa. Plos One 2025;20(2):e0318493. https://doi.org/10.1371/journal.pone.0318493
24. Guja T. , Melaku Y. , & Andarge E.. Concordance of mother-child (6–23 months) dietary diversity and its associated factors in kucha district, gamo zone, southern ethiopia: a community-based cross-sectional study. Journal of Nutrition and Metabolism 2021;2021:1-11. https://doi.org/10.1155/2021/8819846
25. Bucher-Koenen T. , Farbmacher H. , Guber R. , & Vikström J.. Double trouble: the burden of child-rearing and working on maternal mortality. Demography 2020;57(2):559-576. https://doi.org/10.1007/s13524-020-00868-6
26. McKinn S. , Duong T. , Foster K. , & McCaffery K.. A qualitative analysis of factors that influence vietnamese ethnic minority women to seek maternal health care. BMC Pregnancy and Childbirth 2019;19(1). https://doi.org/10.1186/s12884-019-2375-7
27. Shiri-Mohammadabad H. and Afshani S.. Women's self-care behavior and its relationship with social capital in yazd, iran. BMC Women's Health 2021;21(1). https://doi.org/10.1186/s12905-021-01469-0
28. Collins C. , Landivar L. , Ruppanner L. , & Scarborough W.. Covid-19 and the gender gap in work hours. Gender, Work & Organization 2020;28(S1):101-112. https://doi.org/10.1111/gwao.12506
29. Quisumbing A. , Sproule K. , Martínez E. , & Malapit H.. Do tradeoffs among dimensions of women's empowerment and nutrition outcomes exist? evidence from six countries in africa and asia. Food Policy 2021;100:102001. https://doi.org/10.1016/j.foodpol.2020.102001

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