Mother empowerment in reducing the risk of stunting: An integrative review

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Abstract

Background: Stunting is a global chronic nutritional problem, with mothers playing a crucial role in its prevention. Mother empowerment is essential in reducing the risk and prevalence of stunting.
Purpose: This study aimed to identity and synthesize qualitative and quantitative research evidence on empowerment mothers to improving children's nutritional status and reducing the risk of stunting.
Methods: This research employed an integrative review methode, and its was registered with the International Prospective Register of Systematic Reviews as a reseach-implementation protocol (ID number CRD 42023415771). Eight databased were searched for relevant literature, including Embase, PubMed, ScienceDirect, Scopus, ProQuest, JSTOR, Taylor & Francis, and Google Scholar. The evaluation of articles quality used the 2018 version of the Mixed Methods Appraisal Tool. While content analysis was employed for data analysis.
Results: The result indicated that 53 articles fulfilled the inclusion requirement, out of the 54,987 articles found during the search phase. The analysis resulted in the discovery six themes: Indicators of empowerment, factor influencing empowerment, instrument for measuring empowerment, intervention to improve maternal empowerment, impact of intervention base on empowerment indicators and Stunting interventions across countries. These themes collectively form a conceptual model of mother empowerment to reduce the risk of stunting in children. It can be concluded that mother empowerment, by considering various indicators, can increase mothers' active participation in reducing the risk of stunting in children.
Conclusion: That mother empowerment, by considering various indicators, can increase mothers' active participation in reducing the risk of stunting in children. Integrating empowerment-based interventions into maternal and child health programs is recommended to improve nutritional outcomes and reduce the prevalence of stunting.

Keywords: childcare; integrative review; mother's empowerment; nutrition; stunting

Introduction

Stunting is a chronic condition of impaired growth resulting from long-term malnutrition, representing a failure of growth and development that begins in early life. It is characterized by a length-for-age (LAZ) or height-for-age (HAZ) index below -2 standard deviations (SD) (Ministry of Health Republic of Indonesia, 2018a; World Health Organization, 2018) Stunting is defined as a chronic form of undernutrition during the growth and developmental period, caused by prolonged nutritional deficiencies starting from pregnancy through the first 24 months of life (the first 1,000 days) (Ministry of Health Republic of Indonesia, 2018a).

Stunting is one of the most prevalent nutritional problems worldwide. It contributes to approximately 14% of under-five mortality and remains a major

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public health concern, particularly in developing countries. Stunting is associated with increased risks of morbidity and mortality (Simanjuntak, 2018), also leads to suboptimal brain development, which hampers motor and cognitive growth. In Indonesia, stunting is one of the five priority health issues with long-term implications for both individuals and society, including reduced cognitive and physical development, decreased productivity, poor health outcomes, and an elevated risk of degenerative diseases.

Multiple factors contribute to stunting, encompassing both internal and external determinants. Internal factors directly related to infant and child growth include parenting practices, exclusive breastfeeding, complementary feeding, complete immunization, dietary patterns, infection, and genetic predisposition. External factors include family socioeconomic status, maternal education, employment, and household income (Beal et al., 2018). Additional causes include maternal and child undernutrition, limited maternal knowledge about health and nutrition before and during pregnancy and childbirth, inadequate healthcare services such as antenatal care (ANC) and postnatal care, lack of access to quality early childhood education, and insufficient availability of nutritious foods.

The process of stunting develops gradually and requires multisectoral involvement for effective prevention and management. Ensuring adequate nutrition during the first 1,000 days of life is crucial, alongside addressing behavioral factors such as inadequate feeding practices among parents (Terfa et al., 2022a). Both nutrition-specific and nutrition-sensitive interventions are essential in tackling stunting. Nutrition-sensitive interventions, in particular, require cross-sectoral collaboration. These combined efforts aim to accelerate the reduction of stunting (Ministry of Health Republic of Indonesia, 2018a).

The primary focus in reducing stunting prevalence is prevention, which necessitates parental involvement in monitoring their children's growth and ensuring adequate nutritional intake from an early age. Prevention and care should be family-centred, with a particular emphasis on empowering parents and caregivers. Parents, especially mothers, are the closest caregivers and have the most comprehensive understanding of their children's health status. Therefore, empowering families—especially mothers—becomes a key strategy in improving child health outcomes (Komakech et al., 2022)

Parental empowerment is a process in which parents enhance and exercise their capacity to make decisions and take actions that influence their children's health (Ashcraft et al., 2019). Empowerment enables parents to engage actively in daily care, participate in healthcare decisions, manage their children's symptoms, advocate for their children and families, and contribute to collective empowerment initiatives (Ashcraft et al., 2019). By empowering parents to identify problems, plan, and make appropriate decisions independently, preventive behaviors against stunting can be strengthened.

Although numerous studies have examined the determinants of stunting and evaluated the effectiveness of nutrition-specific and nutrition-sensitive interventions, relatively few have focused on the role of parental empowerment as a preventive strategy. Most existing interventions emphasise biomedical and nutritional aspects (Bonilla et al., 2017; Chou et al., 2018; Dibley et al., 2020).

At the same time, the psychosocial dimension—particularly the capacity of parents to make informed decisions, manage childcare practices, and advocate for health resources—remains underexplored. Furthermore, evidence on how parental empowerment can be systematically integrated into community-based and family-centred stunting prevention programs remains limited, especially in low- and middle-income countries such as Indonesia. This gap underscores the need for systematic reviews that consolidate current evidence on parental empowerment in stunting prevention, informing policy and practice. The ultimate goal of stunting prevention efforts is to establish empowered parental practices. Accordingly, this study aimed to identity and synthesize qualitative and quantitative research evidence on empowerment mothers to improving children's nutritional status and reducing the risk of stunting

Materials and Methods

Design

This reseach adopts an integrative review approach following the framework proposed by Dhollande et all. (Dhollande et al., 2021) The implementation of this integrative review involved a systematic encompassing seven stages (Table 1). The review focused on mothers' empowerment in preventing stunting. This Integrative Review Research Protocol has been registered with The International Prospective Register of Systematic Reviews (PROSPERO) on April 17, 2023, and has gone through the review process and registered with registration ID number CRD 42023415771 on April 28, 2023.

Article Search Strategy

A systematic search was conducted across eight electronic databases: Embase, PubMed, ScienceDirect, Scopus, ProQuest, JSTOR, Taylor & Francis, and Google Scholar. The study used a multi-database approach to ensure a comprehensive and unbiased review process. These databases cover a wide range of health topics relevant to the research topic (Mendoza Vela, 2025; Nick & Sarpy, 2022). The search strategy was developed using the PICO framework, defined as follows:

Articles were included if they met the following criteria: (1) published within the last 10 years, (2)

peer-reviewed journal articles, (3) original research (quantitative, qualitative, or mixed-methods), (4) studies addressing parental, maternal, or family empowerment in relation to stunting prevention, child nutrition, or child health outcomes. Exclusion criteria were (1) non-research articles (e.g., reviews, commentaries, editorials), (2) publications in languages other than English, and (3) studies without accessible full text.

The literature search employed the PICO framework in conjunction with Medical Subject Headings (MeSH) terms to ensure comprehensive retrieval of relevant studies. Boolean operators (AND, OR) were applied as follows: *("stunting")* AND *("mother empowerment"* OR *"parent empowerment"* OR *"women empowerment")* AND *("knowledge"* AND *"self-efficacy"* AND *"competency"* AND *"nutritional status")*. The search was restricted to publications from the past decade.

The initial search identified 54,987 records: 62 from Embase, 88 from PubMed, 42,882 from ScienceDirect, 42 from Scopus, 505 from ProQuest, 586 from JSTOR, 22 from Taylor & Francis, and 19,800 from Google Scholar. After applying restrictions, 705 records remained. Titles and abstracts were screened, yielding 170 potentially relevant studies. Full-text screening identified 72 eligible studies. Following the removal of six duplicates and exclusion of 12 articles not meeting the criteria, 53 studies were included in the final review. The selection process is summarized in Figure 1. Screening and eligibility assessment were conducted independently by two reviewers to minimize selection bias.

Inclusion and exclusion criteria

Table 3 presents the inclusion and exclusion criteria in detail.

Data extraction

Data were extracted using a structured form in Microsoft Excel, which included study characteristics (author, year, country, study design, and sample size), type of intervention, empowerment components, and key outcomes (Table 5). EndNote software was used to manage references and remove duplicates.

Study Quality Assessment

The methodological quality of the included studies was assessed using the Mixed Methods Appraisal Tool (MMAT) version 2018 (Hong, et al.,2018) Two reviewers independently appraised each study, and disagreements were resolved through discussion with a third reviewer. The reviewer has relevant experience related to Child Health, has conducted extensive research using a systematic review approach and assessed that MMAT has a comprehensive coverage of various study designs, including qualitative, quantitative, and mixed methods and is in accordance with the integrative systematic review conducted (Hong et al., 2018). The checklist was carefully adapted to the specific research designs of the included studies, which comprised qualitative research, quantitative randomized controlled trials, quantitative non-randomized studies, quantitative descriptive studies, and mixed-methods studies. For each category of study design, all relevant appraisal items were systematically evaluated. The quality assessment procedure using MMAT 2018 commenced with the

Table 1. Stages an Integrative Review (Dhollande et al., 2021)

Stage	Description
1	Write the review question
2	Determine the search strategy
3	Critical appraisal of the search results
4	Summarise the search results
5	Data extraction and reduction
6	Analysis
7	Conclusions and implications

Table 2. PICO Framework

Population (P)	Children with stunting or at risk of stunting.
Intervention (I)	Mother empowerment, parent empowerment, or women empowerment programs/interventions aimed at improving child nutrition and care
Comparison (C)	Standard care, no intervention, or other non-empowerment-based interventions.
Outcome (O)	Improvements in: Knowledge of mothers/parents about nutrition and child care Self-efficacy in practicing nutrition-related behaviors Competency in caregiving practices Nutritional status of the child (e.g., reduction in stunting rates, improved growth indicators)

Table 3. Inclusion and Exclusion Criteria

Criteria	Inclusion	Exclusion
Publication year	Articles published within the last 10 years	Articles published more than 10 years ago
Type of source	Peer-reviewed journal articles	Reviews, commentaries, editorials, conference abstracts, theses/dissertations
Study design	Original research (quantitative, qualitative, or mixed-methods)	Non-research articles, opinion papers, and case reports with no relevance
Language	English	Non-English publications
Population	Studies on stunting prevention in children under five years	Studies not related to stunting or unrelated health issues
Intervention	Parental, maternal, or family empowerment programs/approaches	Interventions unrelated to empowerment
Outcomes	Knowledge, self-efficacy, competency, and/or nutritional status of children	Outcomes not related to stunting prevention or parental empowerment.
Accessibility	Full-text articles available	Articles with inaccessible full text

identification of two preliminary screening questions: first, whether the research question was stated with sufficient clarity, and second, whether the data presented were adequate to address and support the research question. Only when both screening criteria were satisfactorily met did the assessment proceed to the subsequent stage, in which the appraisal was conducted in accordance with the methodological characteristics of the respective study design. This structured and rigorous approach ensured that the evaluation of study quality was not only consistent across different types of research but also contextually aligned with the methodological diversity represented in the included articles.

The studies represented a wide range of designs, including qualitative studies (n = 3), randomised controlled trials (RCTs, n = 10), non-randomised quantitative studies (n=37), descriptive quantitative studies (n = 1), and mixed-methods studies (n = 2). All studies met the two MMAT screening criteria: (1) research questions were clearly stated, and (2) data presented adequately addressed the research questions. A detailed appraisal revealed that the majority of quantitative non-randomized studies (n=37) adequately addressed issues of sample representativeness, outcome measurement, and confounding variables. All RCTs (n = 10) demonstrated appropriate randomization, comparability of groups at baseline, and adherence to intervention protocols. The qualitative and mixed-methods studies displayed coherence across research design, data collection, analysis, and interpretation. Table 5 provides a comprehensive detail of the quality appraisal for each included study.

Data Extaction and Data Analysis

Given the heterogeneity of study designs and outcomes, a narrative synthesis was employed. Findings were grouped thematically to capture key aspects of parental empowerment and its influence on knowledge, self-efficacy, competency, and child nutritional status. In the article selection, in the initial search stage, the researcher obtained 54,987 articles using eight databases. The databases produced 62 articles each from Embase, 88 from PubMed, 42,882 articles from Science Direct, 42 from Scopus, 505 from Pro Quest, 586 from JSTOR, 22 from Taylor and Francis and 19,800 from Google Scholar. In the next stage after obtaining articles according to keywords, researchers carry out restrictions or limitations using the criteria of articles published in the last ten years, source types in the form of journals and documents in the form of research articles, articles obtained 705 articles. Researchers made the initial selection by reading the title and abstract of each article obtained, resulting in 170 articles.

Further selection was carried out by viewing and reading the full text of each article that met the inclusion criteria, totaling 72 articles. Of the articles that have been analyzed, seven duplicate articles are included in the review list, and 12 articles need to meet the predetermined inclusion criteria. So, at the end of the analysis, 53 articles will be included in the review stage. The process of article selection is summarized in Figure 1.

The retrieval of information related to the study was carried out using an extraction form, namely: (1) Study identification: first author, title, year of publication; (2) Study haracteristics: country, design; (3) Population characteristics, sample and (4) Characteristics of maternal empowerment factors, interventions used: types of interventions, instruments used in conducting maternal empowerment studies. Each submitted article was compiled in Excel format, and notes were written regarding the characteristics of the intervention implemented and maternal empowerment factors. The next step is to categorize the interventions into 2 main categories: interventions to increase maternal empowerment and the impact of interventions on maternal empowerment indicators, namely knowledge, self-efficacy, skills and child nutritional status.

Table 4. Quality Assessment using the Mixed Methods Appraisal Tool (MMAT) version 2018 (Hong et al., 2018)

Author	Was the qualitative approach appropriate to answer the research question?	Were the qualitative data collection methods adequate to address the research question?	Were the findings derived from the data in a complete manner?	Was the interpretation of results sufficiently supported by the data?	Was there coherence between data sources, collection, analysis, and interpretation?
(Athavale et al., 2020)	Yes	Yes	Yes	Yes	Yes
(Wood et al., 2021)	Yes	Yes	Yes	Yes	Yes
(Tome et al., 2021)	Yes	Yes	Yes	Yes	Yes
Author	**Was randomization appropriately performed?**	**Were the groups comparable at baseline?**	**Was there complete outcome data?**	**Were outcome assessors blinded to the intervention?**	**Did participants adhere to the assigned intervention?**
(Tome et al., 2021)	Yes	Yes	Yes	Yes	Yes
(Heckert et al., 2019)	Yes	Yes	Yes	Yes	Yes
(Gelli et al., 2017)	Yes	Yes	Yes	Yes	Yes
(Azupogo, et al., 2020)	Yes	Yes	Yes	Yes	Yes
(Matare et al., 2021)	Yes	Yes	Yes	Yes	Yes
(Santoso et al., 2021)	Yes	Yes	Yes	Yes	Yes
(Olney et al., 2015)	Yes	Yes	Yes	Yes	Yes
(Gelli et al., 2018)	Yes	Yes	Yes	Yes	Yes
(Heckert et al., 2023)	Yes	Yes	Yes	Yes	Yes
Author	**Did the participants represent the target population?**	**Were measurements appropriate regarding outcome and intervention?**	**Was there complete outcome data?**	**Were confounders accounted for in design and analysis?**	**During the study period, was the intervention administered as intended?**
(Yaya et al., 2020)	Yes	Yes	Yes	Yes	Yes
(Mekonnen et al., 2021)	Yes	Yes	Yes	Yes	Yes
(Sey-Sawo et al., 2023)	Yes	Yes	Yes	Yes	Yes
(Walters et al., 2019)	Yes	Yes	Yes	Yes	Yes
(Khalid & Martin, 2017)	Yes	Yes	Yes	Yes	Yes
(Khalid & Martin, 2017)	Yes	Yes	Yes	Yes	Yes
(Paul & Saha, 2022)	Yes	Yes	Yes	Yes	Yes
(Terfa et al., 2022)	No	Yes	Yes	Yes	Yes
(Poudel et al., 2022)	Yes	Yes	Yes	Yes	Yes
(Saadah et al., 2022)	Yes	Yes	Yes	Yes	Yes
(Komakech et al., 2022)	Yes	Yes	Yes	Yes	Yes
(Baxter et al., 2023)	Yes	Yes	Yes	Yes	Yes
(Tesfaye & Egata, 2022b)	Yes	Yes	Yes	Yes	Yes
(Sharma & Subramanyam, 2021)	Yes	Yes	Yes	Yes	Yes
(P. & Bansal, 2022)	Yes	Yes	Yes	Yes	Yes

Cont. Table 4. Quality Assessment using the Mixed Methods Appraisal Tool (MMAT) version 2018 (Hong et al., 2018)

Author	Did the participants represent the target population?	Were measurements appropriate regarding outcome and intervention?	Was there complete outcome data?	Were confounders accounted for in design and analysis?	During the study period, was the intervention administered as intended?
(Bliznashka et al., 2021)	Yes	Yes	Yes	Yes	Yes
(McKenna et al., 2019)	Yes	Yes	Yes	Yes	Yes
(Abreha et al., 2020)	Yes	Yes	Yes	Yes	Yes
(Ickes et al., 2018)	Yes	Yes	Yes	Yes	Yes
(Egbuonye et al., 2021)	Yes	Yes	Yes	Yes	Yes
(Jisso et al., 2022)	Yes	Yes	Yes	Yes	Yes
(Besnier, 2023)	Yes	Yes	Yes	Yes	Yes
(Christian, et al., 2023)	Yes	Yes	Yes	Yes	Yes
(Imai, et al., 2014)	Yes	Yes	Yes	Yes	Yes
(Holland & Rammohan, 2019)	Yes	Yes	Yes	Yes	Yes
(Kulkarni et al., 2021)	Yes	Yes	Yes	Yes	Yes
(Kim et al., 2019)	Yes	Yes	Yes	Yes	Yes
(Malapit & Quisumbing, 2015)	Yes	Yes	Yes	Yes	Yes
(Sraboni & Quisumbing, 2018)	Yes	Yes	Yes	Yes	Yes
(Quisumbing et al., 2021a)	Yes	Yes	Yes	Yes	Yes
(Bonis-profumo et al., 2021)	Yes	Yes	Yes	Yes	Yes
(de Groot et al., 2022)	Yes	Yes	Yes	Yes	Yes
(Jones et al., 2019)	Yes	Yes	Yes	Yes	Yes
(Onah, 2021)	Yes	Yes	Yes	Yes	Yes
(Sraboni et al., 2014)	Yes	Yes	Yes	Yes	Yes
(Aziz et al., 2020)	Yes	Yes	Yes	Yes	Yes
(Tchakounté Tchuimi, 2023)	Yes	Yes	Yes	Yes	Yes
Authors	**Was the sampling strategy relevant to address the research question?**	**Did the sample represent the target population?**	**Were the measurements appropriate?**	**Was the risk of non-response bias low?**	**Was the statistical analysis appropriate to answer the research question?**
Ewerling et al., 2017	Yes	Yes	Yes	Yes	Yes

Cont. Table 4. Quality Assessment using the Mixed Methods Appraisal Tool (MMAT) version 2018 (Hong et al., 2018)

Authors	Was there an adequate rationale for using a mixed-methods design to address the research question?	Were the different components of the study effectively integrated to answer the research question?	Were the outputs of the integration of qualitative and quantitative components adequately addressed?	Were divergences and inconsistencies between quantitative and qualitative results adequately addressed?	Did each component of the study adhere to the quality criteria of its respective methodological tradition?
(Bonilla et al., 2017)	Yes	Yes	Yes	Yes	Yes
(Brar et al., 2020)	Yes	Yes	Yes	Yes	Yes
(Tasic et al., 2020)	Yes	Yes	Yes	Yes	Yes

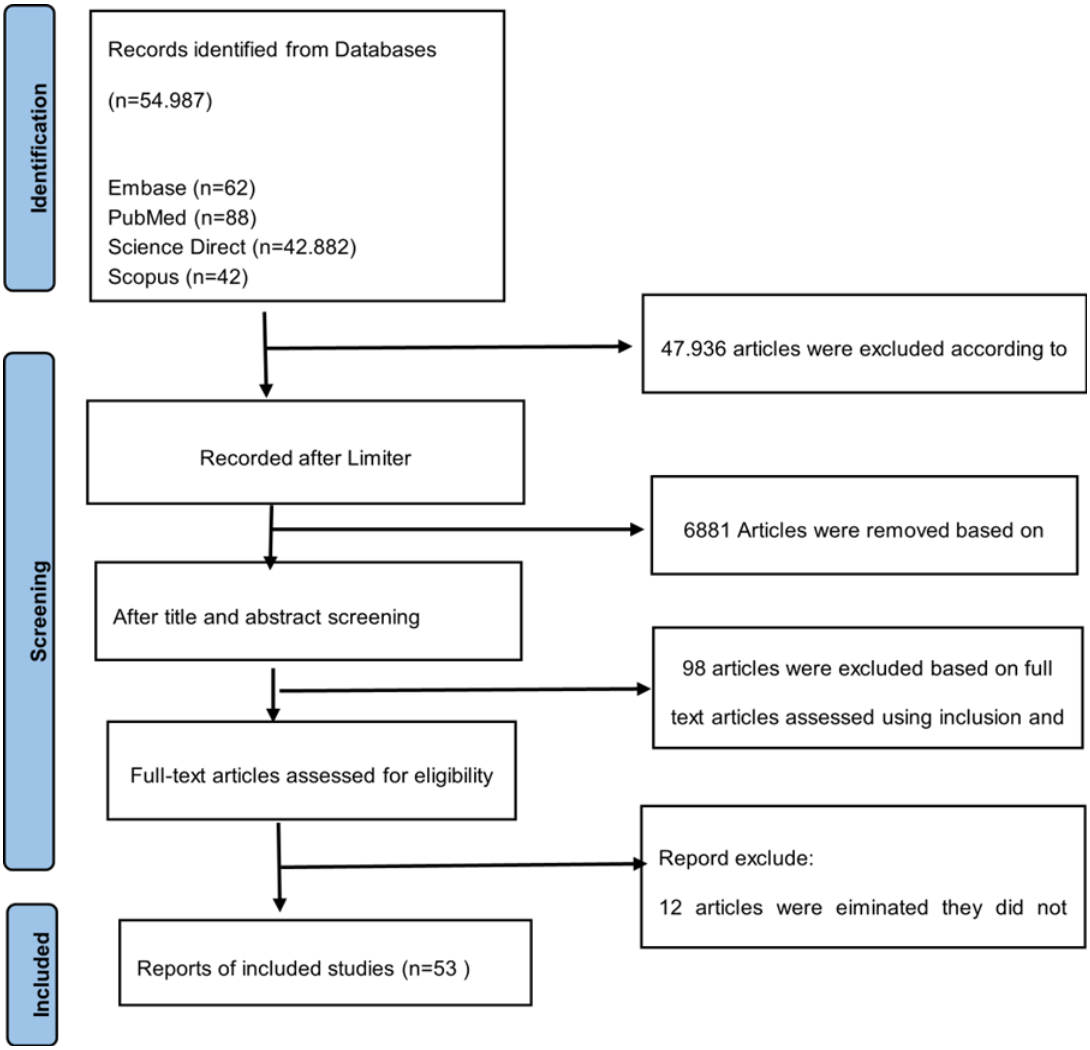

Figure 1. Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) flow diagram.

Table 5. Data Extraction of Included Studies (n=53)

Authors, Country, Year, Journal	Objective	Design	Sample	Intervention	Description	Results
(Yaya et al., 2020b) 202 Canada Global Health Research and Policy, 2020,5:1 https://doi.org/10.1186/s41256-019-0129-8	To examine the relationship between women's empowerment and children's nutritional status as a predictive factor for malnutrition	Cross-sectional	Data from DHS 2011-2017 in 30 sub-Saharan African countries Women aged 15-49 years and children aged five years	Women's empowerment	Women's empowerment was measured using three indicators: household decision-making index, attitudes towards violence, and lived experiences of violence.	1. Socio-demographic characteristics of women were significantly associated with childhood nutritional status (stunting and wasting) ($p < 0.001$) as well as women's empowerment indicators (decision-making, attitudes towards violence, and experiences of violence) ($p < 0.001$), except for child age and gender. 2. The association between childhood nutritional status and women's empowerment (across all three measures) remained significant after controlling for covariates ($p < 0.001$) 3. Attitudes towards violence and experiences of violence were positively associated with children's nutritional status, while decision-making showed a negative association.
(Mekonnen et al., 2021c) Ethiopia 2021 BMC Women's Health; 2021; 21:42 https://doi.org/10.1186/s12905-021-01183-x	To identify the determining factors related to women's empowerment and growth failure among children under five years	Cross-sectional	Ethiopian Demographic and Health Survey (EDHS) 2016 data; women aged 15–49 years and children under five	Women's empowerment	Women's empowerment was assessed using the Survey-based Women's Empowerment (SWPER) Index, which includes household decision-making, attitudes towards violence, and lifetime experiences of violence.	1. Attitudes towards domestic violence, social independence (social), and women's empowerment decisions were significantly associated with stunting and underweight.

Cont. Table 5. Data Extraction of Included Studies (n=53)

Authors, Country, Year, Journal	Objective	Design	Sample	Intervention	Description	Results
(Sey-Sawo et al., 2023b) Gambia 2023 BMC Public Health: 2023;23:583 https://doi.org/10.1186/s12889-023-15494-1	To examine the relationship between women's empowerment and malnutrition among children under five years	Cross-sectional	The Gambia Demographic and Health Survey (2019–2020); 7,123 mothers aged 15–49 years and their children under five	Women's empowerment	Women's empowerment Indicator: educational status (primary and above), employment (currently working), decision making (contraceptives, earnings, large household purchases), age at first sex, age at first birth, and acceptance of wife beating	1. Several factors were significantly associated with stunting, including number of children (p=0.020), place of residence (p=0.031), household wealth index (p=0.002), maternal thinness (p=0.021), intimate partner violence (p=0.001), child's age (p=0.026), birth order (p=0.042), and partner's welfare and education (p=0.028). 2. Maternal education remained a strong predictor: women with no formal education were 51% more likely to have stunted children under five (OR = 1.51; 95% CI: 1.11–2.07; p = 0.009) compared with those who had attained primary education or higher. 3. Exposure to domestic violence further increased the risk of child stunting by 69% (OR=1.69; 95% CI: 1.22–2.35; p=0.002).
(Walters et al., 2019): Malawi 2019 BMC Public Health; 2019; 19: 1503 https://doi.org/10.1186/s12889-019-7877-8	To assess mothers' ability in breastfeeding and complementary feeding practices, and their association with stunting.	Cross-sectional	The Malawi Demographic and Health Survey (MDHS) (2015-2016), Children aged 0-23 months N: 2294	Empowerment	Empowerment indicators included land ownership, wealth index, decision-making regarding income, and decision-making regarding health.	Maternal characteristics (ethnicity, number of children, region and area of residence, maternal height, maternal BMI, type of delivery, postnatal examination, wealth index, and radio use) and five empowerment domains were significantly associated with breastfeeding and complementary feeding practices.

Cont. Table 5. Data Extraction of Included Studies (n=53)

Authors, Country, Year, Journal	Objective	Design	Sample	Intervention	Description	Results
(Nsiah-Asamoah et al., 2022) Ghana 2022 BMC Pediatric; 2022; 22:251 https://doi.org/10.1186/s12887-022-03651-1	To examine maternal factors related to Infant and Young Child Feeding (IYCF) indicators, including Minimum Acceptable Diet (MAD) and Minimum Diet Diversity (MDD), in children up to 23 months of age	Cross-sectional	Ghana Demographic and Health Survey (GDHS) (2015) Children aged 0-23 months, with a gestational age of 37-42 weeks, weighing 2500-4000 grams, without physical and metabolic problems N: 935	Maternal decision-making power and financial independence	Maternal decision-making power Indicators include healthcare, large-scale household spending, visiting relatives, and childcare. Financial independence, including the freedom to control finances to buy food, clothing, medical treatment, jewelry, and give to relatives/family	1. Maternal employment (AOR=3.07; 95% CI: 1.71–5.49; p<0.001) and secondary or higher education (AOR=2.86; 95% CI: 1.42–5.78; p=0.003) significantly increased the likelihood of children receiving minimum acceptable diet (MAD). 2. Women's empowerment, reflected in decision-making autonomy (AOR=1.68; 95% CI: 1.02–2.76; p=0.040) and financial independence (AOR=1.55; 95% CI: 1.01–2.38; p=0.045), was positively associated with dietary diversity among children. 3. Maternal secondary or higher education (AOR=0.59; 95% CI: 0.36–0.97; p=0.040) and employment (AOR=0.71; 95% CI: 0.47–1.07; p=0.043) were linked to reduced risks of stunting (HAZ) and underweight (WAZ).
(Khalid & Martin, 2017) Pakistan 2017 Maternal Child Health Journal; 2017; 21:1967-1984 https://doi.org/10.1007/s10995-017-2314-z	To examine the relationship between women's empowerment within households and the incidence of stunting in children	Cross-sectional	Ghana Demographic and Health Survey (GDHS) (2015) Mother and child 1-4 years N 8985	Female empowerment: Female-headed household	Equating women's empowerment in the household with identifying women's role as head of the family	Households with women as heads of households have a 26% lower risk of stunting (OR 0.74, 95% CI 0.60-0.90).

Cont. Table 5. Data Extraction of Included Studies (n=53)

Authors, Country, Year, Journal	Objective	Design	Sample	Intervention	Description	Results
(Tome et al., 2021) Maternal & Child Nutrition; 2021: 17: e13122 https://doi.org/10.1111/mcn.13122	To develop an instrument for a quantitative survey on "Maternal Capability" and examine its relationship to child health status	RCT	Mothers (N = 4,025) and their babies (N = 4,073)	Sanitation Hygiene Infant Nutrition Efficacy (SHINE) Program	The Sanitation Hygiene Infant Nutrition Efficacy (SHINE), with the forms of intervention: 1. Standard of Care (SOC) + health promotion from the Government Maternal Health Services, IMD, ASI up to 6 months 2. WASH (SOC provides toilets, hand washing facilities, soap, chlorine, drinking water, and play areas 3. IYCF (all SOC + 20 g daily toap for fat consumption of children aged 6 to 18 months, MPASI 4. WASH+IYCF Maternal capability during pregnancy indicators: physical, mental, decision-making autonomy, social support, mothering self-efficacy (self-confidence in her role as a competent mother), workload, time stress and gender norm attitudes	1. Higher gender norm attitude scores, reflecting more equitable views, were associated with improved LAZ (+0.09; 95% CI: 0.02–0.16) and a reduced odds of stunting (AOR = 0.86; 95% CI: 0.74–1.01). 2. Greater social support was associated with higher LAZ (+0.11; 95% CI: 0.05–0.17; p = 0.010) and lower odds of stunting (AOR = 0.83; 95% CI: 0.73–0.96). 3. Each unit increase in decision-making autonomy reduced the probability of stunting by 6% (AOR = 0.94; 95% CI: 0.89–0.996; p = 0.04). 4. Maternal self-efficacy was positively associated with birth weight but not with child LAZ at 18 months.
(Paul & Saha, 2022) India; 2022 PLoS ONE, 17(5):e 0268126 https://doi.org/10.1371/journal.pone.0268126	To examine the relationship between women's autonomy and the nutritional status of children under five years	Cross-sectional	National Family Health Survey 2015–2016; mothers and children (N = 38,685)	Maternal Autonomy/ empowerment	Maternal Autonomy/ empowerment: measured by indicators household decision-making, freedom of physical movement, and access to economic resources/ control over assets	1. Mothers with more autonomy significantly reduce the likelihood of their children experiencing malnutrition. 2. Maternal autonomy was significantly associated with stunting [OR: 0.93; 95% confidence interval (CI): 0.87, 1.00] and wasting (OR: 0.92; 95% CI: 0.85, 1.00) after controlling for confounding variables.

Cont. Table 5. Data Extraction of Included Studies (n=53)

Authors, Country, Year, Journal	Objective	Design	Sample	Intervention	Description	Results
(Terfa et al., 2022); Uganda; 2022 International Journal of Environmental Research and Public Health https://doi.org/10.3390/ijerph19116684	To examine the relationship between nursing care in the household microenvironment and the incidence of acute respiratory infection (ARI), diarrhea, and stunting in children under five years	Cross=sectional	Uganda Demographic and Health Survey (UDHS) 2016; women and children under five	Women empowerment	Women's empowerment with indicators: Free from violence, free to determine social decision-making	1. Independent women were associated with lower risk of ARI (OR = 0.91, 95% CI 0.84 to 0.98), diarrhea (OR = 0.93, 95% CI 0.88 to 0.99), and stunting (OR = 0.83, 95% CI 0.75 to 0.92). 2. Women's attitudes towards domestic violence were associated with recurrence of ARI (OR = 0.88, 95% CI 0.82 to 0.93) and diarrhea (OR = 0.89, 95% CI 0.84 to 0.93) 3. Access to sanitation facilities was associated with a lower risk of ARI (OR = 0.55, 95% CI 0.45 to 0.68), diarrhea (OR = 0.83, 95% CI 0.71 to 0.96), and stunting (OR = 0.64, 95% CI 0.49 to 0.86).
(Poudel et al., 2022); 2022; Nepal; Frontiers in Public Health Vol 10:817717 https://doi.org/10.3389/fpubh.2022.817717	To examine the relationship between women's empowerment and children's nutritional status	Cross-sectional	300 mothers with children aged 6–59 months in Nepal	Women's empowerment	Women's Empowerment Index Five indicators 1. Decision-making; 2. Involvement in communities/groups 3. Independent in income; 4. Home/land ownership; 5. Education Status Maternal Empowerment Index 7 Dimensions: 1. Health Decision Making 2. Household spending decision-making; 3. Freedom to visit relations; 4. Become a member of a community group; 5. Generate your income; 6. Home/land ownership; 7. Educational status Empowerment Level: Low, Moderate, and High;	1. Of the 300 mothers with children aged 6-59 months, 49% were very empowered, while around 38% had poor nutritional status. 2. 26.7% of children experienced stunting, 7% were wasting, 17.7% were underweight, and overall, 38% were malnourished. Mothers with low empowerment status will increase the incidence of wasting 5x, the possibility of stunting 30x, and the risk of underweight in children 29x.

Cont. Table 5. Data Extraction of Included Studies (n=53)

Authors, Country, Year, Journal	Objective	Design	Sample	Intervention	Description	Results
(Heckert et al., 2019); Burkina Faso; 2019; Social Science & Medicine 233 (2019) 93-102 https://doi.org/10.1016/j.socscimed.2019.05.016	To examine the relationship between women's empowerment and children's nutritional status	RCT	Mothers and children aged 3-12 months (1058), consisting of Age 3-5 months (404) and 6-12 months (654) Total sample 1035 intervention (610) control (425)	Helen Keller International Program	Helen Keller International Program; E-HFP (The Enhanced Homestead Food Production), a nutrition and gender-sensitive agriculture program: 1. Agriculture Training and Input; 2. Behavior Change Communication (BCC) Programs; agriculture activities and optimal infant and young child feeding (IYCF), health, hygiene, care, and nutrition practices; 3. Community-focused activities;Women Empowerment Indicators (5): spousal communication, purchasing decisions, health care decisions, family planning decisions, and Infant and Young Child Feeding /IYCF	The E-HFP program, through women's empowerment, can reduce the prevalence of wasting,
(Saadah et al., 2022) 2022 Indonesia Macedonian Journal of Medical Sciences 2022 Mar 09; 10(G):649-655 https://doi.org/10.3889/oamjms.2022.8759	To develop a maternal empowerment model for stunting prevention through early detection training	Quasi-experiment	Mothers aged 20-45 years with toddler-aged children N:150	Mother empowerment	Mother empowerment: Using a questionnaire measuring tool. The indicators measured included maternal knowledge, family support, nutritional status, maternal commitment, the child's physical health, and the environment both outside and within the home.	1. The primary factors influencing stunting intervention were maternal commitment (commitment to the action plan), followed by maternal characteristics (personal factors) and family support (interpersonal influences).; 2. Mothers with favourable personal characteristics demonstrated a significant increase in knowledge, as measured by a 0.423 increase (p = 0.000).;3. Higher maternal knowledge was associated with a 0.230 increase in maternal commitment (p = 0.004).;4. Mothers exhibiting strong commitment contributed to a reduction in child stunting by 0.448 (p = 0.000).;5. Increased maternal knowledge also enhanced family support by 0.236 (p = 0.040). 6. Greater family support was associated with a 0.257 reduction in stunting (p = 0.011).

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Authors, Country, Year, Journal	Objective	Design	Sample	Intervention	Description	Results
(Komakech et al., 2022)' Africa; 2021; Maternal & Child Nutrition; 2022; 18; e13421; https://doi.org/10.1111/mcn.13421	To examine the relationship between women's empowerment and children's nutritional status	Cross-sectional	Demographic and Health Survey (DHS) data of Burundi 2016-2017, Ethiopia 2016, Kenya 2014, Malawi 2015-2016, Rwanda 2014-2015, Tanzania 2015-2016, and Uganda 2016 Sample: mothers (15-49 years) and children (6-23 months)	Women empowerment	Women's empowerment measures: Physical factors (economic empowerment, legal empowerment) Environmental Factor (Self-esteem empowerment) Development Factor (Decision autonomy, Health decision control empowerment)	1. Globally, 32%–59% of children experience developmental failure.; 2. Only 18%–45% of children achieve Minimum Diet Diversity (MDD).; 3. Women's self-confidence was associated with a lower likelihood of stunting, wasting, underweight, and overall growth failure (AOR = 0.62 in Rwanda, 0.38 in Uganda, 0.60 in Tanzania, and 0.57 in Uganda).;4. In Burundi, women's influence over health-related decisions was associated with a lower risk of stunting and child developmental failure, and an increased likelihood of meeting MDD (AOR = 2.50).;5. Legal empowerment among women was associated with higher likelihoods of stunting (AOR = 1.79 in Burundi), underweight (AOR = 1.77 in Uganda), and overall growth failure (AOR = 1.87 in Burundi).
(Baxter et al., 2023): Pakistan, 2023, BMJ Open 2023; 13:e063734 https://doi.org/10.1136/bmjopen-2022-063734	To identify the determinants of malnutrition in late adolescence and young adulthood in Pakistan	Cross-sectional	25447 Late adolescent and young adult women since June 2017-July 2018	Material Power and Preconception Supplementation Trial (MaPPS)	1. The Maternal Power and Preconception Supplementation (MaPPS) trial was a cluster-randomised intervention in rural Pakistan that assessed the effects of skills development, multiple micronutrient supplementation, health, and empowerment on women.;2. Empowerment was measured through self-efficacy (Generalized Self-Efficacy Scale) and decision-making autonomy (Pakistan Demographic and Health Survey), covering personal food consumption, healthcare, household purchases, and intra-household food distribution.; 3. Decision-making was classified using the Women's Empowerment Index (WEI) into four levels: all decisions made by the family, most decisions made by the family, joint deci-	Adolescents who experience stunting tend to have lower self-efficacy and decision-making abilities compared to their peers who do not experience stunting.

sions, or independent decisions.

Cont. Table 5. Data Extraction of Included Studies (n=53)

Authors, Country, Year, Journal	Objective	Design	Sample	Intervention	Description	Results
(Athavale et al., 2020); India; 2020 Journal of Health, Population and Nutrition (2020) 39:7 https://doi.org/10.1186/s41043-020-00215-w	To assess barriers and facilitators affecting caregivers' implementation of recommended infant and toddler feeding practices in two urban communities in Mumbai, within a nutrition education-based intervention	Qualitative	Families with children are categorized into 3 age groups 6-12 months (n: 9); 13-18 months (n: 9), 19-24 months (n:9) N Total; 27	Self-efficacy; empowerment family support.	Self-efficacy, empowerment, and family support	1. Barriers to implementing IYCF practices included limited knowledge and experience, exposure to conflicting information from multiple sources, inadequate social support, and low maternal self-efficacy in decision-making. 2. Recommended facilitators for IYCF practices encompassed the provision of professional nutritional guidance, enhancement of maternal self-efficacy and empowerment, and strengthened family support.
(Wood et al., 2021); 2021; Tajikistan; BMC Women's Health 2021; 2:91 https://doi.org/10.1186/s12905-021-01227-2	To explore perceptions of Tajik men and women regarding gender-based violence (GBV) and to understand gender norms in Tajik society	Qualitative	234 participants (men and women aged 18–46 years) from 12 villages in Khatlon Province	Women empowerment	Women's Empowerment: This participation is important for gathering their perceptions about women's empowerment, gender, violence, and decision-making. Semi-structured interview Indicators of Women empowerment: Education, employment, decision making, marital status, Good relationship and mutual respect, Violence, Mental Health, Forms of Violence	Significant differences were observed between men's and women's perceptions of societal gender norms.

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Authors, Country, Year, Journal	Objective	Design	Sample	Intervention	Description	Results
(Gelli et al., 2017b), Burkina Faso, 2017, BiomedCentral 2017; 18:814 https://doi.org/10.1186/s13063-017-2156-4	To evaluate the impact of the SELEVER agricultural and nutrition intervention package, including Behavior ChangeCommunication, strengthening poultry value chain services, and sensitivity to women's empowerment	RCT	Women aged 15–35 years with at least one child aged 0–5 years	Selever Activity: Women's empowerment	The Women's Empowerment in Agriculture Index (WEAI) measures empowerment across multiple domains, including decision-making in agricultural production, access to and control over productive resources, access to financial resources, leadership roles within the community, and allocation of time.	The intervention led to improvements in women's empowerment, particularly in decision-making and time allocation, and contributed to positive changes in women's overall well-being.
(Tesfaye & Egata, 2022), Ethiopia, 2022, Journal of Health Population and Nutrition 2022; 41: 13 https://doi.org/10.1186/s41043-022-00291-0	To evaluate the prevalence and factors associated with stunting in children aged 6–59 months in Chelenko District, East Haraghe Zone, Ethiopia, comparing PSNP and non-PSNP program recipients.	Cross-sectional design with community approach comparison.	1555 Children and their mothers/caregivers	Productive Safety Net Program (PSNP)	The Productive Safety Net Program (PSNP) is an Ethiopian government initiative that provides direct support to economically vulnerable and low-income households. The program aims to alleviate poverty and enhance food security through various interventions, including the development of water resources, road maintenance, and school construction.	Women's empowerment was assessed using indicators of household decision-making. Children whose mothers lacked decision-making autonomy at the household level were 3.5 times more likely to experience stunting (AOR = 3.48; 95% CI: 2.36–5.12).

Cont. Table 5. Data Extraction of Included Studies (n=53)

Authors, Country, Year, Journal	Objective	Design	Sample	Intervention	Description	Results
(Sharma & Subramanyam, 2021b) India,2020, BMJ Open 2020-047276 https://dx.doi.org/10.1136/bmjopen-2020-047276	To examine how fathers' gender-equitable attitudes, mothers' empowerment, and household wealth interact to influence stunting in India	Cross-sectional study Community settings	22,867 fathers and mothers with children aged five years and above, recorded in India's National Family Health Survey (NFHS) 2015–2016	Women's level of empowerment	Women's empowerment was assessed using multiple indicators, including participation in household decision-making (healthcare, household purchases, visiting friends/relatives, and control over the husband's income), attitudes toward wife-beating (perceived justification in various situations), ownership of land and housing, and current employment status.	Children from households with mothers or fathers who hold gender-equitable attitudes had lower odds of stunting (adjusted OR = 0.92; 95% CI: 0.84–1.02) and severe stunting (adjusted OR = 0.87; 95% CI: 0.77–0.98) compared to children from households without such parental empowerment.
(P. & Bansal, 2022) India, 2022: PLOS Global Public Health 2(1)e0000134 https://doi.org/10.1371/journal.pgph.0000134	To determine the relationship between maternal autonomy and the incidence of stunting in children aged <35 months	Cross-sectional	17,439 children aged 7–35 months, from the 2015–2016 National Family Health Survey (NFHS).	Women's Autonomy in the household,	1. Decision-making autonomy – including self-care, large-scale household purchases, and visiting family or relatives.; 2.Physical autonomy – the ability to go shopping, access health services, and participate in community activities outside the home.; 3.Financial autonomy – knowledge of loans for business development, ownership of a bank account, and independent control over personal funds.; 4.Domestic violence-related autonomy – the ability to refuse sex, negotiate household responsibilities, manage child care, go out without notice, and maintain autonomy in domestic decision-making.	Financial autonomy was found to significantly influence the incidence of stunting; mothers with financial autonomy were 0.91 times less likely to have stunted children (95% CI: 0.85–0.98).

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Authors, Country, Year, Journal	Objective	Design	Sample	Intervention	Description	Results
(Bliznashka et al., 2021b); 2021, Sub Africa Safari; PLOS Medicine, 18(9):e1003781; September 16, 2021 https://doi.org/10.1371/journal.pmed.1003781	To examine the relationship between women's empowerment and child development, early education, and nutritional status in sub-Saharan Africa.	Cross-sectional	21,434 mothers aged 15–49 years and their children aged 36–59 months, from DHS data 2011–2018 across 9 SSA countries	Women's empowerment	Women's empowerment was measured using three indicators: 1. Access to and control over resources – including seasonal or fixed income from a spouse. 2. Decision-making – covering use of partner's income, own health care, household purchases, and family visits. 3. Attitudes toward wife-beating – including perceptions regarding engaging in activities without informing the partner, neglecting children, or refusing sex.	Children of highly empowered women demonstrated multiple positive outcomes: 1. Lower risk of suboptimal cognitive development (RR = 0.89; 95% CI: 0.80–0.99).; 2.Higher height-for-age z-score (HAZ) with a mean difference of 0.09 (95% CI: 0.02–0.16).; 3.Reduced risk of stunting (RR = 0.93; 95% CI: 0.87–1.00).; 4.Higher dietary diversity score (DDS) (MD = 0.17; 95% CI: 0.06–0.29).; 5.Greater access to learning resources, with an additional 0.07 resources (95% CI: 0.01–0.13).; 6.Increased stimulation activities, with 0.16 additional activities from mothers (95% CI: 0.06–0.25) and 0.23 from fathers (95% CI: 0.17–0.29).
(McKenna et al., 2019); Congo; 2019; PloS One 14(12):e0226401 https://doi.org/10.1371/journal.pone.0226041	To evaluate the relationship between women's decision-making power and stunting or wasting among children under five years in the Democratic Republic of Congo	Cross-sectional	3,721 mothers and their children, using 2013–2014 DRC DHS data	Women's decision-making:	Women's decision-making, as one indicator of women's empowerment, was assessed through employment, property ownership, attitudes toward domestic violence, and decision-making power. The specific decision-making indicators according to the DRC DHS were: 1. Use of own income.; 2.Spending of the husband's income.; 3. Decisions regarding self-health care.; 4. Purchase of household necessities.; 5. Decisions concerning visits by relatives.	Multivariate regression analysis indicated that none of the five dimensions of women's decision-making power were significantly associated with stunting or wasting among children.

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Authors, Country, Year, Journal	Objective	Design	Sample	Intervention	Description	Results
(Abreha et al., 2020); Ethiopia: 2020; PLoS ONE 15(7):e0235825 https://doi.org/10.1371/ journal .pone.0235825	To assess the extent to which women's empowerment is related to children's health status in Ethiopia	Cross-sectional	10,641 women aged 15–49 years with children under 5, using 2016 EDHS data	Women's empowerment	1. Decision-making participation: Involvement in healthcare, household expenditures, visits from relatives, and control over personal income.; 2. Attitudes toward wife-beating: Views on issues related to activities, childcare, sexual autonomy, and food practices.; 3.Healthcare access barriers: Constraints related to permission, finances, distance, and personal limitations.; 4.Asset ownership: Ownership of house and land.; 5.Socio-economic status: Education level and access to information (reading materials, television, internet), financial resources (bank account), and telephone ownership.	1. Women with higher empowerment within the household, particularly in terms of socio-economic status (e.g., greater access to education, information, media, and savings promotion), were less likely to have children who were stunted or wasted ($p < 0.05$). 2. Greater household decision-making power among women was also associated with improved child health outcomes, including lower incidence of pneumonia and anemia ($p < 0.05$).

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Authors, Country, Year, Journal	Objective	Design	Sample	Intervention	Description	Results
(Ickes et al., 2018); Uganda; 2017; Maternal & Child Nutrition 2018:14:e12483 https://doi.org/10.1111/mcn.12483	To examine the relationship between maternal capabilities (social support, psychological health, decision-making, and empowerment), infant feeding practices, and child nutritional status	Cross-sectional	195 mothers with children aged 0–24 months from the Uganda DHS data	Maternal Capabilities	Maternal Capabilities Indicators: 1. Social Support – measured using the Duke-UNC Functional Social Support Questionnaire (Broadhead et al., 1988).; 2. Psychological Health – assessed according to OECD Guidelines on Measuring Subjective Well-Being (2013).; 3.Decision-Making / Agency – includes: Household and financial decision-making, Ability to make appropriate choices for children, Control over family size and reproductive decisions, Health decision-making: managing serious child health problems, taking health actions according to expectations, and exercising autonomy in personal and child health decisions 4.Freedom / Empowerment – overall autonomy in maternal and child-related choices.	1. Mothers with higher social support scores were significantly more likely to adhere to recommended infant feeding practices, including minimum meal frequency (OR = 1.38; 95% CI: 1.10–1.73), dietary diversity (OR = 1.56; 95% CI: 1.15–2.11), consumption of iron-rich foods (OR = 1.47; 95% CI: 1.14–1.89), and achieving a minimally acceptable diet (OR = 1.55; 95% CI: 1.10–2.21). 2. Maternal empowerment was positively associated with the likelihood of providing diverse and adequate child feeding. 3. The overall maternal capability index was significantly correlated with minimum daily feeding frequency (OR = 1.29; 95% CI: 1.03–1.63), dietary diversity (OR = 1.44; 95% CI: 1.06–1.94), and minimally acceptable diet (OR = 1.43; 95% CI: 1.01–2.01). 4.Higher maternal psychological satisfaction was unexpectedly associated with an increased likelihood of stunting in children (OR = 1.31; 95% CI: 1.06–1.63).

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Authors, Country, Year, Journal	Objective	Design	Sample	Intervention	Description	Results
(Azupogo, Abizari, Aurino, & Gelli, 2020); Ghana, 2020 Nutrients; 2020,12,2737 doi:10.3390/ nu12092737	This study aims to examine the relationship between malnutrition, pre-hyper-tension/ hypertension (PHH) and sex among adolescents.	RCT	Dhana DHS 2014 Non-pregnant female adoles-cents (n=857) and male adolescents (n=870) aged 15-19 years.	Autonomy and em-powerment	Autonomy and em-powerment indicators: 1.Attitudes towards wife beat-ing (going out without tell-ing, neglecting children, ar-guing with him, refusing to have sex, processing food). 2.Property ownership (land and house ownership)	1. The empowerment index significantly reduced the risk of stunting among female ado-lescents (PRR = 0.82; 95% CI: 0.67–0.99) but increased the risk of obesity (PRR = 1.31; 95% CI: 1.02–1.68).;2.High Wealth In-dex (HWI) increased the risk of obesity in female adolescents but decreased stunting and pre-hypertension/hypertension in male adolescents.;3.Improved household water, sanitation, and hygiene (WASH) condi-tions reduced the risk of stunt-ing by 15% in male adolescents.
(Egbuonye et al., 2021); Nigeria, 2021; Nutrients 2021,13,2961 https://doi.org/10.3390/ nu13092961	To assess Children's Diet Diver-sity (CDD) among children aged 6–23 months in Ni-ger, examine differences in CDD between chil-dren living in urban and rural areas, and identify maternal fac-tors influenc-ing CDD."	Cross-sec-tional	Data from the Niger DHS 2012 Mothers aged 15-49 years and chil-dren aged 6-23 years totalled 1265	Women's empow-erment: women's decision-making	Women's empowerment was assessed through maternal deci-sion-making in household matters, including healthcare, spending income, making large household purchases, and deciding on visits to family members or relatives.	1. A positive association was observed between women's decision-making scores and children's diet diversity (CDD) among children aged 6–23 months; higher maternal deci-sion-making scores were associ-ated with a 0.05 increase in CDD (p = 0.009; 96% CI: 0.056–0.088). 2. Children residing in ur-ban areas had a 0.146 high-er CDD score compared to those living in rural areas."

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Authors, Country, Year, Journal	Objective	Design	Sample	Intervention	Description	Results
(Jisso et al., 2022); Ethiopia; 2022; JNS/Journal of Nutritional Science (2022) Vol 11, e92, pages 1-9 https://doi.org/10.1017/jns.2022.86	To examine the relationship between women's empowerment and the components of the empowerment domain with children's nutritional status.	unity-Based cross-sectional	Mothers/caregivers aged 15-49 years and children aged 6-59 years are not as many as 429	Women empowerment	Women's empowerment was measured using the Abbreviated Women's Empowerment in Agriculture Index (A-WEAI), encompassing five domains: (1) Production – decision-making in production, (2) Resources – asset ownership and access to/decision-making for credit, (3) Income – control over the use of income, (4) Membership – participation in groups or communities, and (5) Time – allocation of working hours."	1. The multidimensional five-domain empowerment index (5DE) was not a significant predictor of children's nutritional status (P > 0.05). 2. Specific factors predictive of child stunting included powerlessness in production decision-making (AOR = 8.85), empowerment in income control (AOR = 0.35), and the availability of livestock (AOR = 0.38).
(Besnier, 2023); 2023 Norway Global Public Health 2023, Vol 18, No. 1, 1849348 https://doi.org/10.1080/17441692.2020.1849348	To explore women's empowerment, particularly political empowerment, in relation to improving the health status of children aged five years and older.	Cross-sectional	Data on children under five years of age who experience death, stunting, and immunization from 161 countries (Global Burden of Disease Collaborative Network 2018)	Women's political empowerment	The role of women in child health, in the context of women's political empowerment, was assessed through three components: 1. Women's agency participation, influenced by (a) the socio-economic and political context, including the role of women in government, policies, norms, and values, and (b) the socio-economic position of women, including education, occupation, income, gender, and ethnicity. 2. Women's choices are influenced by both individual characteristics and material, social, psychological, behavioral, and biological factors.	1. The Women's Political Empowerment Index (WPEI) was associated with modest improvements in child nutrition and immunization. 2. Women's political empowerment had a greater impact on child mortality in low-income and less-developed countries. 3. The effect of women's political empowerment on stunting was stronger in middle-income countries. 4. The impact was less pronounced in developed countries

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(Christian, Atilo, et al., 2023); 2023 Africa Maternal & Child Nutrition; 2023; 19; e13520 https://doi.org/10.1111/mcn.13520	To determine the relationship between women's empowerment and children's nutritional status, considering the role of household leadership structure.	Cross-sectional	Demographic and Health Survey (DHS) data 2015-2018 in Sub-Saharan Africa: N: 25,665 mothers aged 15-49 years and children aged five years	Women's empowerment	Women's empowerment was assessed across three domains: 1. Household decision-making encompasses control over personal income, spending money, visiting family, making large household purchases, buying daily necessities, and decisions regarding health services. 2. Attitudes toward domestic violence include behaviors such as preparing food, arguing with the husband, leaving without notice, ignoring children, and refusing sexual relations. Ownership of assets, whether sole or joint ownership	1. Increasing the women's empowerment index was associated with a reduced likelihood of children being anemic and experiencing both anemia and stunting [coeff (SE), −0.114 (0.025) and −0.072 (0.032)]. 2. Higher asset ownership or greater empowerment in household decision-making significantly reduced the likelihood of anemia and the co-occurrence of anemia and stunting in children. 3. Girls from male-headed households were more likely to be anemic and to experience concurrent anemia and stunting compared to peers from female-headed households.
(Imai, Annim, Kulkarni, et al., 2014b); 2014 India World Development 2014 Vol 62, pp 88-105 https://dx.doi.org/10.1016/j.worlddev.2014.05.001	To determine the relationship between women's empowerment (education, domestic violence, and autonomy) and children's nutritional status.	Cross-sectional	National Family Health Survey (NFHS) data for 1992-1993, 1998-1999, 2005-2006	Women's empowerment	Women's empowerment was assessed using three indicators: 1. The ratio of maternal to paternal education. 2.Experienceofdomesticviolence. 3. Wife's autonomy in household decision-making.	1. Higher maternal education was associated with better child nutritional status. 2. Exposure to domestic violence was positively associated with poorer children's nutritional status. 3. Greater autonomy in household decision-making has been shown to reduce the risk of child stunting.

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Authors, Country, Year, Journal	Objective	Design	Sample	Intervention	Description	Results
(Holland & Rammohan, 2019); Bangladesh 2019 World Development 124(2019) 104648 https://doi.org/10.1016/j.worlddev.2019.104648	To determine the influence of women's empowerment in agriculture on children's food security	Cross-sectional	Data from The Bangladesh Integrated Household Survey (BHS) 2011-2012 and 2015 486 children	Women's empowerment	Women's empowerment with five domains:;1. Production: Decision-making regarding agricultural production and autonomy in production. ;2. Resources: Ownership of assets, decision-making in spending, sales, and transfer of assets, as well as access to and decision-making regarding credit. ;3. Income: Control over income and its utilisation.;4. Leadership: Participation in groups, community membership, and confidence in public speaking.;5. Time: Allocation of time for work and rest.;Mother's knowledge (as a confounding variable): breastfeeding, the practice of providing additional food and drink, purchasing supplements, and the ability to recognise symptoms of iron deficiency/anemia	1. Women's empowerment across the five domains showed a positive association with children's height-for-age. 2. Women's autonomy in agricultural production and confidence in public speaking were positively associated with height-for-age and negatively related to the incidence of stunting. 3. Women's empowerment across the five domains was positively associated with household dietary diversity.
(Ewerling et al., 2017); 2017 Africa Lancet Global Health, 2017; 5: e916-23 https://dx.doi.org/10.1016/S2214-109X(17)30292-9	To develop women's empowerment indicators using individual-level Demographic and Health Survey (DHS) data	Demographic Survey	Demographic Health Survey data from 34 African countries; Women aged 15-49 years total 280209	Gender Development Index And Survey-based Women's Empowerment Index (SWPER)	Survey-based Women's Empowerment Index (SWPER) Dimensions:;1. Attitude to Violence / Attitude towards violence (leaving without permission, leaving children, arguing with husband, refusing to have sex, finishing food);2. Socially Independent/ social freedom (Education, information, determining the age for first pregnancy, and age when deciding to live together);3. Decision Making (health services, household shopping, visiting relatives, and working after 12 months);Gender Development Index: ;Taking into account the country's level of Health, Education, and command over economic resources	1. All dimensions of the SWPER demonstrated moderate to high correlations with the Gender Development Index (GDI). 2. The social independence dimension was positively associated with greater coverage of maternal and child health interventions. 3. Women's attitudes toward violence and their participation in decision-making were consistently associated with higher uptake of modern contraceptive methods.

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(Matare et al., 2021); 2021 Zimbabwe The Journal of Nutrition ; Community and International Nutrition; 2021; 151:685-694 him: https://doi.org/10.1093/jn/nxaa255	To identify factors influencing maternal parenting capabilities	RCT	Hygiene Infant Nutrition Efficacy (SHINE) program	Maternal Capability	SHINE Program: It is a community-based intervention conducted in two adjacent villages in Zimbabwe, implemented through home visits by nurses responsible for 1-4 areas.Interventions are grouped into four groups of interveners 1.Standard care; 2.Water, sanitation & hygiene (WASH); 3.Infant and young child feeding (IYCF) 4.WASH + IYCF Home Visits are conducted after two weeks of data collection, 32 weeks of gestational age and when the baby is 1, 3, 6, or 18 months old. Maternal Capability 1.Autonomy of decision-making; 2.Taking part in a decision; 3.Depression; 4.Gender norm attitudes; 5.Mother's self-efficacy; 6.Perception of Health Status; 7.Perception of Social Support; 8.Perception of a stressful time Parenting Sense of Competence scale 1.Normal delivery; 2.IMD; 3.breast milk; 4.Immunization; 5.MPASI; 6.Availability of water and soap for washing hands until 12 months postpartum	1.Mothers with more egalitarian gender norm attitudes were significantly more likely to have a vaginal delivery (AOR 2.06; 95% CI 1.57–2.69), initiate breastfeeding within one hour of birth (AOR 1.38; 95% CI 1.03–1.84), and exclusively breastfeed from birth to three months (AOR 2.55; 95% CI 1.95–3.35) and from three to six months (AOR 1.75; 95% CI 1.36–2.25), particularly among households receiving WASH interventions (AOR 1.76; 95% CI 1.29–2.39). 2.Mothers experiencing time-related stress were less likely to exclusively breastfeed from birth to three months (AOR 0.79; 95% CI 0.66–0.93). Greater social support was positively associated with vaginal delivery (AOR 1.53; 95% CI 1.37–1.98) and with breastfeeding outcomes among mothers receiving IYCF interventions (AOR 1.18; 95% CI 1.01–1.37). 3.Depressed mothers were significantly less likely to have a vaginal birth (AOR 0.63; 95% CI 0.44–0.88) and to have a fully immunised child (AOR 0.67; 95% CI 0.50–0.90), corresponding to 37% and 33% reduced likelihoods, respectively

Cont. Table 5. Data Extraction of Included Studies (n=53)

Authors, Country, Year, Journal	Objective	Design	Sample	Intervention	Description	Results
(Kulkarni et al., 2021) Nepal 2021 The Journal of Nutrition: Community and International Nutrition 2021; 151:1018-1024 https://doi.org/10.1093/jn/nxaa399	To examine the relationship between women's and men's intrahousehold bargaining power and children's nutritional status (height-for-age z-score, HAZ)	Cross-sectional	2,170 mothers and fathers with children aged 0–59 months; Suaahara 1: multi-sectoral maternal and child nutrition program funded by USAID	Intrahousehold bargaining power	Intrahousehold bargaining power It consists of 4 Domains: 1.Ownership and control of assets 2.Social participation 3.Utilization of time for activities (working hours) 4.Control over decision-making in the household	1. Women's ownership and control of assets were positively associated with child height-for-age z-scores (HAZ) when both women's and men's domains were modelled together (β = 0.0597, P = 0.026).;2. Male social participation was positively related to HAZ in the male-only model (β = 0.233, P < 0.001) and in the combined female–male model (β = 0.188, P = 0.001).;3. Women's workload was negatively associated with HAZ in the female-only model (β = −0.0503, P = 0.014) and in the combined model (β = −0.056, P = 0.008).;4. Household decision-making was negatively associated with HAZ in gender-specific models for both women (β = −0.0631, P = 0.007) and men (β = −0.0546, P = 0.017). 5.Women's social participation, men's ownership and control of assets, and men's workload were not significantly associated with HAZ.

Cont. Table 5. Data Extraction of Included Studies (n=53)

Authors, Country, Year, Journal	Objective	Design	Sample	Intervention	Description	Results
(Santoso et al., 2021) 2021 Tanzania The Journal of Nutrition; Community and International Nutrition 2021; 151:2010-2021 https://doi.org/10.1093/jn/nxab052	To evaluate nutrition-sensitive agroecology interventions to improve children's dietary diversity, food security, nutritional status, sustainable agricultural practices, women's empowerment, and women's welfare.	RCT	591 households with children aged ≤1 year in 20 villages (Control: 295; Intervention: 296); integrated curriculum on agriculture, nutrition, and women's empowerment over 2 years	The Singida Nutrition and Agroecology Project (SNAP-Tz) Intervention: Integrated curriculum on agricultural practices, nutrition, and women empowerment done for two years	1.Women's Empowerment: decision-making, revenue allocation, workload management, leisure time, husband-assisted activities. 2. Women's Well-being: minimal dietary diversity, social support, freedom from depression	1.The intervention significantly increased children's dietary diversity scores by 0.57 food groups (out of 7; $P < 0.01$), and the proportion of children achieving minimum dietary diversity (≥4 food groups) increased by 9.9 percentage points during the post-harvest season.;2. The intervention significantly reduced household food insecurity but had no significant effect on child anthropometric measures.;3.The intervention also promoted sustainable agricultural practices, enhanced women's empowerment, and improved women's overall welfare.

Cont. Table 5. Data Extraction of Included Studies (n=53)

Authors, Country, Year, Journal	Objective	Design	Sample	Intervention	Description	Results
(Olney et al., 2015) Burkina Faso 2015 The Nutrition Journal; Community and International Nutrition; 2015 him: https://doi.org/ 10.3945/jn.114.203539	To evaluate the impact of an integrated agriculture, nutrition, and behavior change program on stunting, wasting, malnutrition, hemoglobin, anemia, and diarrhea in children aged 3–12.9 months	RCT	Mothers and children aged 3–12.9 months in 55 villages; Intervention: 15 villages, Control: 25 villages. Program included home visits twice a month for six months	Helen Keller International Program "Integrated agriculture and nutrition and health behavior change communication program"	Helen Keller International Program – Intervention Details, consisted of three groups: 1.Control Group: 25 villages received no IPR intervention. 2.Intervention 1 (OWL – Older Women Leaders): 15 villages received agricultural production support combined with Behavior Change Communication (BCC). OWL focused on prenatal and postnatal counseling, including guidance on the birthing process. 3.Intervention 2 (HC – Health Committee): 15 villages received agricultural production support combined with BCC. HC focused on nutrition and health interventions, including maternal nutrition, prevention and treatment of anemia, iodine supplementation, prevention of vitamin A deficiency, promotion of breastfeeding, complementary feeding, and nutrition for sick or malnourished children. Program Delivery: Home visits were conducted twice a month for a period of six months. Evaluation outcomes: The mothers' knowledge was assessed regarding Infant and Young Child Feeding (IYCF, including breastfeeding and complementary feeding), handwashing practices, dietary diversity, and iron intake.	The integrated agriculture, nutrition, and health behavior change communication program had modest but notable effects (P < 0.10): 1.Hemoglobin increased (DID 0.51 g/dL; P = 0.07). 2.Wasting decreased (DID 28.8 percentage points; P = 0.08). 3.Diarrhea prevalence decreased significantly (DID 215.9 pp; P < 0.05). 4.Anemia prevalence decreased (DID 214.6 pp; P = 0.03), and mean hemoglobin increased (DID 0.74 g/dL; P = 0.03) in Health Committee (HC) intervention villages compared to controls. 5.There was no significant impact on the prevalence of stunting or underweight. 6.Women's knowledge regarding Infant and Young Child Feeding (IYCF) practices and handwashing before feeding children increased.

Cont. Table 5. Data Extraction of Included Studies (n=53)

Authors, Country, Year, Journal	Objective	Design	Sample	Intervention	Description	Results
(Gelli et al. , 2018) Malawi 2018 The Journal of Nutrition: Nutritional Epidemiology; 2018:148: 1587-1597 https://doi.org/10.1093/jn/nxy148	To evaluate the impact of a 1-year early childhood development (ECD) program integrating agriculture and nutrition interventions on household production diversity, maternal nutrition knowledge, feeding practices, child diet, and child nutritional status	RCT	1,248 preschool-aged children (36–72 months) and 304 younger siblings (6–24 months) across 60 community-based child centers (CBCCs)	1-y early childhood development (ECD)	Intervention: The intervention combined the Save the Children's Early Childhood Development (ECD) program with NEEP Agriculture & Nutrition. This integrated program aimed to increase household production diversity and included Behavior Change Communication (BCC). Outcomes Assessed: Time allocation and decision-making related to childcare and stimulation, food preparation for preschool children, maternal nutrition knowledge, and effective farming techniques.	1.Preschool children in the intervention group demonstrated improved nutrient intake and dietary diversity compared to the control group. 2.Among younger siblings, the intervention increased height-for-age z-scores (HAZ) (DID 0.44; $P < 0.05$) and reduced the incidence of stunting by 17 percentage points (DID −17 pp; $P = 0.05$). 3.The intervention also enhanced maternal knowledge, particularly regarding the importance of dietary diversity.

Cont. Table 5. Data Extraction of Included Studies (n=53)

Authors, Country, Year, Journal	Objective	Design	Sample	Intervention	Description	Results
(Kim et al., 2019) Ethiopia 2019 The Journal of Nutrition; Community and International Nutrition 2019; 149:1470-1481 https://doi.org/10.1093/jn/nxz087	To evaluate the impact of Alive & Thrive (A&T) on complementary feeding practices, maternal knowledge, and children's nutritional status	Cross-sectional	Household Survey of children aged 6-23.9 months in 2015 – 2016 N: 2720 (Intervention: 1360; control 1360) each of the ten areas	A live & Thrive (A&T) Program	Intervention: The Alive & Thrive (A&T) program, a behavioral change package including intensive interpersonal communication (IPC), nutrition-sensitive agriculture (AG), community mobilization (CM), and mass media (MM) campaigns. Control: Standard interpersonal counseling and mass media campaigns. Outcomes assessed: maternal knowledge and complementary feeding practices based on WHO indicators, including:1. Minimum dietary diversity (≥4 of 7 food groups/24h);2.Age-appropriate meal frequency;3. Minimum acceptable diet;4. Consumption of iron/iron-rich foods;5.Appropriate timing of the introduction of food textures	The intervention significantly reduced the risk of stunting in children aged 6–23.9 months. The differential effect estimate (DDE) indicated a 5.6 percentage point reduction (P < 0.05), with stunting prevalence decreasing from 36.3% in the control group to 22.8% in the intensive intervention group.
(Heckert et al., 2023) Burkina Faso 2023 Journal of Rural Studies (2023)103026 https://doi.org/10.1016/j.jrurstud.2023.103026	To evaluate the impact of the SELEVER program (livestock and nutrition-sensitive intervention) on women's empowerment	Mix Method/ RCT	1763 families	SELEVER: Family farming program promoting poultry production to improve rural economy; compared SELEVER vs SELEVER + WASH interventions	1.Empowerment Indicators: intrinsic (income autonomy, self-efficacy, attitudes toward IPV, family respect), instrumental (decision-making, asset ownership, financial access, income control, work hours, mobility), and collective agency (group membership/influence).;2.Health & Nutrition Agency: decisions on diet/health during pregnancy and breastfeeding, healthcare use, and access to food/health products.;3. Livestock-specific Empowerment: production decisions, farm ownership, farming income, and time allocation.;4.Additional Measures: self-efficacy, exposure to violence, production and asset decisions, funding, income, time use, mobility, and group influence.	SELEVER and SELEVER + WASH interventions did not significantly improve women's empowerment in intrinsic, instrumental, collective, or livestock-specific domains.

Cont. Table 5. Data Extraction of Included Studies (n=53)

Authors, Country, Year, Journal	Objective	Design	Sample	Intervention	Description	Results
(Habtu et al., 2023); Rwanda; 2023; Current Developments in Nutrition 7(2023) 100018 https://doi.org/10.1016/j.cdnut.2022.100018	To explore the effects and challenges of integrated nutrition interventions for pregnant and breastfeeding women	Qualitative	25 health cadres, 27 nutritionists, 80 women (40 pregnant, 40 breastfeeding) in 10 discussion groups	Gikuriro Program: An integrated nutrition-intervention package including nutrition education and counseling (specific intervention) and agriculture promotion, financial literacy, economic resilience, and WASH access (sensitive interventions).	Gikuriro Program: An integrated nutrition-intervention package comprising one specific intervention (nutrition education and counseling by health cadres and nutritionists) and three sensitive interventions (promotion of agricultural products, financial literacy/economic resilience, and improved access to WASH services).	Results: The Gikuriro Program improved maternal knowledge and skills in nutrition (balanced cooking, saving, kitchen gardening, and hygiene), enhanced a healthy eating mindset, and strengthened financial empowerment and household economy. Challenges & Limitations: Low program awareness and participation, cultural/religious barriers, economic constraints, limited partner/family support, and restricted inclusivity targeting mainly higher social classes.
(Malapit & Quisumbing, 2015); 2015; Ghana Food Policy 52 (2015) 54-63 http://dx.doi.org/10.1016/j.foodpol.2015.02.003	To explore effects and challenges of integrated nutrition interventions for pregnant and breastfeeding women	Cross-sectional	2,027 mothers (15–49 years) and 147 children (5 years) from Feed the Future Population-based Survey, 2012	Women's empowerment in Agriculture Index (WEAI) = 5 Dimensions I Empowerment (5DE) + The gender parity index (GPI)	Intervention / Exposure: Women's Empowerment in Agriculture Index (WEAI), comprising five domains:1.Production – decision-making and autonomy in agricultural production;2. Resources – asset ownership, transactions, and access to financing;3.Income/Revenue – control over income;4.Leadership – group participation and public speaking;5.Time allocation to work and leisure includes the Gender Parity Index (GPI). Nutritional Outcomes:1.Child – IYCF practices (including breastfeeding and minimum acceptable diet) and anthropometry (HAZ, WHZ, WAZ);2. Mother – dietary diversity	1.Women's empowerment was strongly associated with better infant and young child feeding (IYCF) practices.;2. Empowerment in financial decision-making, especially regarding credit, was positively linked to maternal dietary diversity.

Cont. Table 5. Data Extraction of Included Studies (n=53)

Authors, Country, Year, Journal	Objective	Design	Sample	Intervention	Description	Results
(Sraboni & Quisumbing, 2018); Bangladesh; 2018; Food Policy 81 (2018) 21-36 https://doi.org/10.1016/j.foodpol.2018.09.001	To examine the relationship between women's empowerment in agriculture and individual diet quality indicators	Cross-sectional	N = 2,896 households (7,506 adults; 1,786 adolescents 11–17 years; 2,015 children 6–10 years; 1,024 children <5 years) from Bangladesh Integrated Household Survey (BIHS) 2012)	Women's empowerment in Agriculture Index (WEAI) = 5 Dimensions I Empowerment (5DE) + The gender parity index (GPI)	Intervention / Exposure: Women's Empowerment in Agriculture Index (WEAI), comprising five domains—Production (decision-making, autonomy), Resources (asset ownership and access to financing), Income/ Revenue (control over income), Leadership (group participation, public speaking), and Time (work and leisure)—plus the Gender Parity Index (GPI). Outcomes / Measures: Age-specific dietary diversity (7 food groups for children 6–59 months and 5–10 years; 9 food groups for adults ≥18 years) and nutrient intake (carbohydrates, protein, iron, zinc, vitamin A).	Women's empowerment was positively and significantly associated with dietary diversity and nutrient intake among adult men and women
(Quisumbing et al., 2021); Africa 2021 Food Policy, 100(2021)102001 https://doi.org/10.1016/j.cdnut.2022.100018	To examine the relationship between women's empowerment, household dietary diversity, maternal dietary diversity, and BMI.	Cross-sectional	Data from Feed the Future population-based survey in Bangladesh (2011), Cambodia (2012), Ghana (2012), Mozambique (2012-2013), Tanzania (2016), Suaahara (2012)	Women's Empowerment Agriculture Indexes	Women's Empowerment in Agriculture Index Women's empowerment is commonly assessed through three indicators: resources (material, human, and social), agency (decision-making and negotiation), and achievements (welfare outcomes). The Women's Empowerment in Agriculture Index (WEAI) comprises the Five Domains of Empowerment (5DE) and the Gender Parity Index (GPI). The five domains are: production (decision-making and autonomy), resources (asset ownership and financial access), income (control over earnings), leadership (group participation and public speaking), and time (work–leisure balance).	Significant association between empowerment scores and nutritional status. Women's empowerment scores were positively associated only with children's height-for-age z-scores (HAZ).

Cont. Table 5. Data Extraction of Included Studies (n=53)

Authors, Country, Year, Journal	Objective	Design	Sample	Intervention	Description	Results
(Bonis-profumo et al., 2021); East Timor; 2021; Food Policy 102 (2021) 102102 https://doi.org/10.1016/j.foodpol.2021.102102	To examine the relationship between women's empowerment, household production, and dietary diversity in children (12–59 months) and their mothers.	Cross-sectional	N: 1415 people, 259 adults (156 women, 103 men) and 156 children aged 12-59 months	Community Driven Nutrition Improvement Project (CDNIP), Women's Empowerment in Agriculture Index (A-WEAI)	The Community-Driven Nutrition Improvement Project (CDNIP) (2014–2018), funded by the World Bank and implemented by Catholic Relief Services, targeted pregnant and lactating women with children under two years in 50 remote villages of Baucau and Viqueque, Timor-Leste. Women's empowerment was measured using the WEAI, covering five domains: production, resources, income, leadership, and time, along with the Gender Parity Index (GPI).	1.The associations between various empowerment measures and dietary diversity were larger and more significant among women than children. 2.Diversity of food production has been consistently associated with improvements in children's diets. 3.small gender gaps in decisions about production, access to resources, and control over income
(de Groot et al., 2022); Ghana; 2022 Food Policy 107 (2022)102217 https://doi.org/10.1016/j.foodpol.2021.102217	To assess the impact of Ghana's cash transfer program with health insurance fee exemption on maternal and child nutritional status after one year.		Evaluation of 2,500 families; target population: 8,058 households; 3,619 received CT.	Cash Transfer (CT) Program	Cash Transfer (CT) Program (LEAP + NHIS): monthly benefits GH₵38–53 (USD 9.5–13.25) for 24 months; pilot in 10 districts of Northern and Upper Eastern Ghana.	1.No significant impact on maternal or child nutritional status. 2.Household food security improved, but the frequency of children's meals declined. 3.Cash transfers alone were insufficient to improve child nutrition
(Jones et al., 2019); East Africa; 2019 SSM-population Health 9 (2019)100475 https://doi.org/10.1016/j.ssmph.2019.100475	To examine the relationship between women's empowerment and children's nutritional status.		Demographic and Health Survey (DHS) 2011-2016) in East Africa: Married women (15-49 years) with children aged 6-24 months (N: 13780)	Women's Empowerment	Women's Empowerment: measured across three domains—(1) human and social assets (marriage, fertility, age at first intercourse), (2) intrinsic agency (mobility, childcare, household autonomy), and (3) instrumental agency (income, healthcare, major spending, family visits).	1.Women's empowerment domains showed positive associations with maternal BMI (assets: β = 0.17, SE = 0.03; intrinsic agency: β = 0.23, SE = 0.03; instrumental agency: β = 0.03, SE = 0.01).;2.Maternal BMI was positively associated with child HAZ (β = 0.08, SE = 0.04) and WHZ (β = 0.35, SE = 0.03).;3.Human and social assets influenced child HAZ and WHZ indirectly through intrinsic agency and maternal BMI.

Cont. Table 5. Data Extraction of Included Studies (n=53)

Authors, Country, Year, Journal	Objective	Design	Sample	Intervention	Description	Results
(Onah, 2021); South Asia 2021 SSm-Population Health 13 (2021)100718 https://doi.org/10.1016/j.ssmph.2020.100718	To examine the relationship between SWPER, Women's Wealth Index, and child nutritional status.	Cross-sectional	Demographic Health Survey in 5 South Central Asia countries 2012 N 24712	Survey-based Women's Power Index (SWPER) Women Wealth Index / socio-economic status	Survey-based Women's Empowerment Index (SWPER) includes three dimensions:1.Attitude toward Violence – perceptions of gender norms and tolerance of domestic violence.;2.Social Independence – education, access to information, and control over reproductive decisions (e.g., age at first pregnancy and cohabitation).;3.Decision-Making – autonomy in healthcare, household purchases, and visiting relatives.	Empowering women by enhancing social independence and decision-making power contributes to reducing the risks of stunting, wasting, and underweight in children, with the strongest effects observed among low-income households.
(Bonilla et al., 2017); Zambia; 2017; Women Development Vol 95 pp 55-72 http://dx.doi.org/10.1016/j.worlddev.2017.02.017	To evaluate the impact of the Government of Zambia's Child Grant Program on women's decision-making and empowerment	Mix Method	Quantitative – 5-year longitudinal RCT (2,519 households, 2,031 female caregivers, three rural districts); Qualitative – 30 in-depth interviews (IDIs) with women, 10 with male partners/decision-makers.	Cash Women Transfer is one of The Government of Zambia's Child Grant Program programs.	The Zambia Child Grant Program's Cash Transfer for Women provided bi-monthly cash payments of ZMW 120 (≈ approximately USD 24) to female caregivers. A 5-year RCT (2,519 households) and qualitative IDIs (30 women, 10 men) examined impacts on decision-making across nine domains (child health, schooling, income, spending, clothing, visits, own health), household dynamics, empowerment, and well-being.	1.Women in beneficiary households gained greater autonomy, making independent or joint decisions in five of the nine domains. 2.However, qualitative findings reveal that entrenched gender norms continue to position men as primary household decision-makers, limiting broader shifts in intra-household relations.
(Sraboni et al., 2014); Bangladesh; 2014 World Development vol 61 pp 11-52 http://dx.doi.org/10.1016/j.worlddev.2014.03.025	To examine the relationship between women's empowerment in agriculture and nutritional outcomes	Cross-sectional	Bangladesh Integrated Household Survey (BIHS) N 3273 Household	Women's Empowerment in Agriculture Index (WEAI)	The Women's Empowerment in Agriculture Index (WEAI) includes five domains of empowerment (5DE) and the Gender Parity Index (GPI): production (decision-making and autonomy), resources (ownership, transfer, and financial control), income (control over earnings), leadership (group participation and public speaking), and time (work–leisure balance). Outcomes were assessed through per capita calorie availability, household dietary diversity, and adult BMI.	1.Women's empowerment was positively associated with calorie availability and dietary diversity. 2.However, wealth, education, and employment had a stronger influence on adult nutritional status than women's empowerment.

Cont. Table 5. Data Extraction of Included Studies (n=53)

Authors, Country, Year, Journal	Objective	Design	Sample	Intervention	Description	Results
(Brar et al., 2020); Senegal; 2020; Am J Cin Nutr 2020; 112: 860S-874S https://doi.org/10.1093/ajcn/nqaa151	To identify the factors associated with stunting among children under five years old	Mix method (Systematic et al., Quantitative methods)	Systematic Literature Review; Data from November 2017 and December 2018 Qualitative : DHS for three decades Children aged <5 years who experience stunting with complete anthropometric data.	Stunting Reduction Program	Stunting Reduction Program: Immunization; 1. Community Nutrition; 2.Clean water sector; 3.Vitamin Supplements; 4.Ten years of education and training; 5.Coordination to combat malnutrition; 6.Nutrition opportunity program (1&2); 7.Long-term clean water supply; 8.Clean water and sanitation for millennials; 9.National program for local potential development; 10.Child nutrition and social transfers; 11.Child nutrition and food security;12.Family safety scholarship; 13.Gox; 14.Food fortification opportunities;15.Agriculture and nutrition development for food security;16.Agricultural investment;17.Integrated education and nutrition;18.Community Health Program;19.Multi-sector nutrition planning strategy	The prevalence of stunting declined significantly from 34.4% (1990) to 16.5% (2019).
(Tasic et al., 2020); Ethiopia; 2020; Am J Cin Nutr 2020; 112: 875S-893S https://doi.org/10.1093/ajcn/nqaa163	To identify factors associated with stunting in Ethiopia (2000–2016)	Mix method (Systematic et al., Quantitative methods)	Data from 10789 articles 1990 – 2019 Quantitative : DHS 2000, 2005, 2011, 2016 Children aged <5 years who experience stunting with complete data during four surveys.	Stunting Reduction Program	Stunting Reduction Program: 1.Immunization; 2.Basic education, technical and vocational training; 3.Development of the Health Sector; 4.Development of the Education sector; 5.Health Expansion; 6.Support strategy; 7.Increasing the range of strategies and targets for replacement food for surviving children; 8.Safe loan program; 9.Community-based nutrition; 10.Essential nutritional action; 11.National Nutrition Program; 12.Water and sanitation; 13.MTBS; 14.Agricultural development; 15.SUN (Sustainable Undernutrition); 16.Sustainable reduction in malnutrition; 17.One Wash National program; 18.National Indicative Program for Ethiopia; 19.Health sector transformation plan	Prevalence of stunting decreased from 66.9% (1990) to 38.4% (2018).

Cont. Table 5. Data Extraction of Included Studies (n=53)

Authors, Country, Year, Journal	Objective	Design	Sample	Intervention	Description	Results
(Aziz et al., 2020); Pakistan; 2020; Land use policy 94(2020)104529 https://doi.org/10.1016/j.landusepol.2020.104529	To examine the relationship between women's empowerment and food security in rural Pakistan.	Cross-sectional	600 women from 16 villages	Empowerment	Empowerment dimensions: legal rights, information & communication, family law, social support, infrastructure, ownership	1.Women's empowerment through legal rights, ICT, social support, and family rights significantly improved food security by enhancing bargaining power over resources, leading to better food quality and higher food expenditure.;2.Infrastructure and land rights had limited effects, suggesting the persistence of gender norms.;3.Women's restricted mobility, limited access to land and resources, and lack of confidence constrained their capacity to secure food independently.;4.Fear of conflict and domestic violence further hindered women's ability to claim their rights, negatively affecting food security.;5.The findings underscore the importance of gender-sensitive policies that address structural inequalities and enhance women's empowerment to enhance food security.
(Tchakounté Tchuimi, 2023); Cameroon; 2023; Taylor & Francis; Vulnerable Children and Youth Studies 2023, vol 18 No 2, 263-281 https://doi.org/10.1080/17450128.2022.2141405	To examine the relationship between maternal empowerment dimensions and child stunting and wasting	Cross-sectional	Data from the Cameroon Demographic and Health Survey 2018	Maternal empowerment	Maternal Empowerment Dimensions:1.Economic Status Index (ESI): Mother's employment, home ownership, and land ownership.;2.Control over Financial Resources Index (CFRI): Decision-making regarding the use of the mother's and husband's income, ability to conduct financial transactions via telephone, and ownership of bank or financial accounts.;3.Decision-Making Index (DMI): Participation in decisions related to maternal health services, household purchases, and visiting relatives	1.Higher maternal economic status increased the odds of childhood stunting but reduced the odds of wasting. 2.Greater maternal control over financial resources significantly decreased the likelihood of both stunting and wasting. 3.Maternal participation in household decision-making was also associated with reduced risks of stunting and wasting in children.

Results

A total of 53 studies were included in this integrative review, spanning publications from 2014 to 2023 (Figure 1). The studies originated from a diverse range of countries, reflecting the global nature of the stunting problem. Ethiopia and the broader Sub-Saharan Africa contributed the largest number of studies (n = 12), followed by India (n = 5), Ghana and Burkina Faso (n = 8 each), and Bangladesh and Pakistan (n = 6 each). Several countries, including Canada, Tanzania, Rwanda, Senegal, Timor Leste, and Indonesia, contributed only one study each. Notably, one study (Onah, 2021) utilised data from five South Asian countries (Kyrgyzstan, Tajikistan, Pakistan, Bangladesh, and Nepal), while another (Yaya et al., 2020) drew from the Demographic and Health Surveys across 30 Sub-Saharan African countries. Table 5 summarizes the country-wise distribution.

Indicators of Empowerment

The central theme identified in the reviewed articles was partnership indicators, which were categorized into two subthemes: household decision-making and support. Decision-making was further divided into two categories: decisions related to maintaining health and decisions associated with meeting nutritional needs. Within health-related decision-making, 15 studies discussed efforts to provide child care, one study addressed child rearing and education, six studies highlighted pregnancy planning, and two studies focused on maintaining environmental health both inside and outside the home, including access to clean water and sanitation (Aziz et al., 2020; Saadah et al., 2022) The support subtheme comprised spousal support, support from other family members, and community support, particularly from health workers. Spousal support was reflected in the freedom to participate in social and economic activities outside the home, as well as open communication, which fostered freedom of expression, joint decision-making, and mutual respect. Support from other family members included the freedom to communicate and interact with relatives. Community support, particularly from

Table 6. Characteristics of Articles by Country of Origin

Country	Number of studies	Authors
Ethiopia	6	(Mekonnen et al., 2021) (Tesfaye & Egata, 2022); (Abreha et al., 2020b); (Jisso et al., 2022); (Kim et al., 2019); (Tasic et al., 2020)
Afrika	6	(Komakech et al., 2022); (Bliznashka et al., 2021);(Christian, et al., 2023) (Christian, Atiglo, et al., 2023); (Ewerling et al., 2017); (Quisumbing et al., 2021); (Jones et al., 2019)
India	5	(Paul & Saha, 2022); (Athavale et al., 2020); (Sharma & Subramanyam, 2021); (P. & Bansal, 2022); (Imai, Annim, & Kulkarni, 2014)
Ghana	4	(Nsiah-Asamoah et al., 2022); (Azupogo et al, 2020); (Malapit & Quisumbing, 2015); (de Groot et al., 2022)
Burkino Faso	4	(Heckert et al., 2019); (Gelli et al., 2017); (Olney et al., 2015); (Heckert et al., 2023)
Bangladesh	6	(Walters et al., 2019); (Heckert et al., 2019); (Holland & Rammohan, 2019)); (Holland & Rammohan, 2019); (Kim et al., 2019); (Jones et al., 2019)
Pakistan	4	(Khalid & Martin, 2017); (J.-A. B. Baxter et al., 2023); (Aziz et al., 2020); (Matare et al., 2021)
Gambia	2	(Sey-Sawo et al., 2023); (Bonilla et al., 2017)
Malawi	2	(Walters et al., 2019); (Gelli et al., 2018)
Zimbabwe	2	(Tome et al., 2021); (Matare et al., 2021)
Uganda	2	(Terfa et al., 2022); (Ickes et al., 2018)
Nepal	2	(Poudel et al., 2022); (Kulkarni et al., 2021)
Canada	1	(Yaya et al., 2020)
Tanzania	1	(Wood et al., 2021)
Rwanda	1	(Habtu et al., 2023)
Asia Selatan	1	(Onah, 2021)
Senegal	1	(Tasic et al., 2020)
Cameron	1	(Tchakounté Tchuimi, 2023)
Timor Leste	1	(Bonis-profumo et al., 2021)
Indonesia	1	(Saadah et al., 2022)

health professionals, was documented in 10 articles and involved access to healthcare services.

Factor Influencing Empowerment

Three categories of factors influencing maternal empowerment were identified: socioeconomic factors, maternal characteristics, and child characteristics. Socioeconomic factors included income, occupation, and ownership of assets such as housing and land. Maternal characteristics included maternal education (Abreha et al., 2020; Besnier, 2023; Imai, Annim, Kulkarni, et al., 2014), age (Ewerling et al., 2017; Jones et al., 2019; Onah, 2021) and marital status (Wood et al., 2021). Child-related factors included sex and age of the child (Abreha et al., 2020).

Instrument for measuring empowerment

The analysis revealed that 13 articles explicitly described instruments for measuring empowerment, with four main terminologies: "*empowerment," "women's empowerment," "maternal capability/ autonomy,"* and *"mother empowerment."* Three articles employed the term empowerment (Baxter et al., 2023; Komakech et al., 2022; Nsiah-Asamoah et al., 2022), while eight spesifically used women's empowerment (Baxter et al., 2023; Mekonnen et al., 2021; Sey-Sawo et al., 2023; Terfa et al., 2022; Walters et al., 2019; Yaya et al., 2020). Two studies applied maternal capability (Paul & Saha, 2022; Tome et al., 2021) and autonomy (Paul & Saha, 2022c), and one study employed the term mother empowerment (Saadah et al., 2022).

Intervention to improve maternal empowerment

Two studies reported intervention programs designed to enhance maternal empowerment: the Enhanced Homestead Food Production (E-HFP) program from Helen Keller International (Enhanced Homestead Food Production) and a Nutrition Education-Based Intervention (Heckert et al., 2019) and a Nutritional Education-based Intervention (Athavale et al., 2020).

The E-HFP program combined agricultural training and input provision, behavior change communication (BCC), optimal infant and young child feeding (IYCF), health and hygiene practices, nutrition promotion, and community-focused activities. The nutrition education-based intervention applied the Infant and Young Child Feeding (IYCF) guidelines to improve children's nutrition up to the age of two years. The guidelines included early initiation of breastfeeding, continued breastfeeding with calcium-rich complementary foods, and provision of solid, semi-solid, and soft foods according to age-specific requirements, with a minimum of three food groups per day.

Impact of Intervention Based on Empowerment Indicators

The maternal empowerment indicators analyzed in this study were children's knowledge, self-efficacy, competence and nutritional status

Knowledge

Knowledge is one of the key indicators of empowerment. The success of empowering mothers can be assessed based on the level of knowledge they possess. In the context of addressing child stunting, the required knowledge primarily relates to feeding practices (Gelli et al., 2018; Holland & Rammohan, 2019; Kim et al., 2019; Malapit & Quisumbing, 2015; Olney et al., 2015) and age-appropriate dietary diversity (Sraboni & Quisumbing, 2018)

Knowledge of feeding practices includes understanding early initiation of breastfeeding (EIBF) (Olney et al., 2015), exclusive breastfeeding (Holland & Rammohan, 2019; Malapit & Quisumbing, 2015; Olney et al., 2015), nutrition for children aged 0–5 years (Gelli et al., 2018), and the introduction of complementary foods and beverages. It also encompasses awareness of iron-deficiency anemia symptoms and the use of supplements (Holland & Rammohan, 2019; Olney et al., 2015), as well as handwashing practices (Olney et al., 2015). Furthermore, knowledge of dietary diversity across age groups encompasses familiarity with the seven food groups for children aged 6–59 months and 5–10 years, as well as the nine food groups for adults (Sraboni & Quisumbing, 2018).

Self-Efficacy

Self-efficacy is a key indicator of empowerment (Baxter et al., 2023; Heckert et al., 2019). It reflects a mother's confidence in her role as a competent caregiver (Athavale et al., 2020; Baxter et al., 2023; Heckert et al., 2023; Tome et al., 2021). Baxter et al., (2023) assessed maternal self-efficacy among mothers of stunted children using the Generalized Self-Efficacy Scale.

Competence/Skills

Enhancing maternal competence is crucial for empowering women. Competencies required include the ability to identify and make decisions regarding childbirth assistance, immunization, early initiation of breastfeeding, and maintaining hand hygiene through proper handwashing with soap and clean water (Matare et al., 2021). Another critical skill is mothers' ability to practice appropriate child feeding (Heckert et al., 2019; Ickes et al., 2018; Malapit & Quisumbing, 2015; Matare et al., 2021; Nsiah-Asamoah et al., 2022; Olney et al., 2015; Walters et al., 2019).

According to Ickes et al., (2018) and Matare et al., (2021), feeding practices encompass exclusive breastfeeding, complementary feeding at 6–9 months, and ensuring dietary diversity for infants in this age group. Competence also includes continued breastfeeding beyond 12–18 months, provision of iron-rich foods, appropriate meal frequency, and ensuring adequate diets for children aged 6 months

to 23 months. Additionally, mothers should be aware of the dietary diversity across age groups, which includes seven food groups for children aged 6–59 months and 5–10 years, and nine food groups for older children (Sraboni & Quisumbing, 2018).

Child Nutritional Status

Most of the reviewed studies assessed children's nutritional status using the WHO Child Growth Standards. Nutritional indicators include weight-for-age and height-for-age. Stunting is defined as height-for-age ≤ -2 SD, while undernutrition is defined as weight-for-age ≤ -2 SD (Heckert et al., 2019; Khalid & Martin, 2017; Mekonnen et al., 2021; Nsiah-Asamoah et al., 2022; Paul & Saha, 2022; Poudel et al., 2022; Sey-Sawo et al., 2023; Terfa et al., 2022; Walters et al., 2019; Yaya et al., 2020). For adolescents up to 19 years of age, nutritional status was assessed using the WHO Growth Reference (Baxter et al., 2023). Body Mass Index (BMI) categories were also applied: underweight (<18.5 kg/m²), normal (18.5–24.9 kg/m²), overweight (25–29.9 kg/m²), and obese (≥30 kg/m²). Stunting in older adolescents was additionally identified at a height <145 cm.

Stunting Interventions across Countries

The review identified research conducted across 20 countries, of which 10 provided comprehensive accounts of their national initiatives aimed at reducing stunting. In Rwanda, the Gikuriro Program was highlighted as an integrated effort combining both nutrition-specific and nutrition-sensitive interventions (Habtu et al., 2023). Similarly, Ethiopia (Tasic et al., 2020) and Senegal (Brar et al., 2020) implemented programs that integrated sensitive and specific nutritional strategies. In Burkina Faso, the Helen Keller International Program focused on agricultural training, the provision of inputs, and behavior change communication to address the underlying causes of stunting (Heckert et al., 2019; Olney et al., 2015). Zimbabwe contributed evidence through two studies describing the Sanitation, Hygiene, Infant Nutrition Efficacy (SHINE) Project, which integrated interventions in water, sanitation, and infant feeding (Matare et al., 2021; Tome et al., 2021). Other countries also developed notable multisectoral nutrition programs, such as Nepal with the Suaahara Program (Kulkarni et al., 2021), Tanzania with the Singida Nutrition and Agroecology Project (SNAP-Tz) (Santoso et al., 2021), Malawi with the Nutrition Embedded Evaluation Program Impact Evaluation (NEEP-IE) (Gelli et al., 2018), and Timor Leste with the Community-Driven Nutrition Improvement Project (CDNIP) (Bonis-Profumo et al., 2021). In addition to these integrated approaches, cash transfer initiatives were reported in Ghana (de Groot et al., 2022) and Zambia (Bonilla et al., 2017), illustrating the diversity of strategies employed globally to address stunting.

Discussion

This review sought to examine and synthesize evidence related to parental empowerment, with a particular emphasis on maternal empowerment, in the prevention of child stunting. The findings revealed four central domains: indicators of maternal empowerment, the measurement instruments used to assess empowerment, interventions designed to enhance empowerment and their subsequent impacts, and the implementation of national stunting reduction programs across various countries. Taken together, these dimensions highlight the crucial role of maternal empowerment as both a determinant and a pathway for enhancing child nutritional outcomes.

Maternal empowerment is conceptualised as a multidimensional construct that encompasses a woman's ability to participate in decision-making, exercise autonomy, and mobilise resources to support child well-being (Ashcraft et al., 2019). The findings highlight that key indicators of empowerment in relation to stunting reduction include mothers' decision-making power, economic independence, knowledge, and personal attributes such as educational attainment and health literacy. These factors are pivotal in shaping maternal practices, particularly in relation to child nutrition, care-seeking, and household resource allocation. Commitment and the role of parents, especially mothers, are needed for early detection of stunting which will ultimately prevent stunting from occurring (Nursalam et al., 2021). The evidence confirms that when mothers possess agency, they are better positioned to adopt recommended infant and young child feeding (IYCF) practices, utilize health services, and ensure adequate dietary diversity, thereby reducing the risk of chronic malnutrition (Abreha et al., 2020; Azupogo et al., 2020; Bliznashka et al., 2021; Nsiah-Asamoah et al., 2022; P. & Bansal, 2022).

The interventions identified across the reviewed studies further reinforce the importance of empowerment as a strategy for addressing stunting. Integrated programs such as Helen Keller International's Enhanced Homestead Food Production (E-HFP) initiative, nutrition education, and IYCF-based programs exemplify the combination of nutrition-specific and nutrition-sensitive approaches (Athavale et al., 2020; Heckert et al., 2019). In the Indonesian context, empowerment programs are situated within the national stunting reduction framework, which distinguishes between specific interventions—targeting women of reproductive age, pregnant women, breastfeeding mothers, and children under two—and sensitive interventions that address structural determinants, including sanitation, food security, healthcare accessibility, and parental knowledge (Ministry of Health Republic of Indonesia, 2018b, 2018a). The review highlights that multisectoral and context-specific interventions are most effective in fostering sustainable

empowerment, as they address both proximal and distal factors influencing child nutrition. A transdisciplinary approach must be taken to address the stunting problem from upstream to downstream (Rahayuwati et al., 2023).

Beyond programmatic strategies, empowerment interventions operate through three primary mechanisms: knowledge, self-efficacy, and competence. Knowledge provides mothers with the cognitive foundation to make informed choices about feeding practices, dietary adequacy, and hygiene (Kim et al., 2019; Malapit & Quisumbing, 2015). Self-efficacy enhances mothers' confidence in their caregiving roles, enabling them to translate knowledge into consistent practices despite social or economic constraints (Baxter et al., 2023; Tome et al., 2021). Competence reflects the acquisition of practical skills in child feeding, hygiene, and health-seeking behavior, which serve as tangible expressions of empowerment (Olney et al., 2015; Tesfaye & Egata, 2022; Walters et al., 2019). This tripartite model illustrates that empowerment is not merely a matter of access to information but requires simultaneous reinforcement of confidence and practical ability.

The effectiveness of empowerment interventions is ultimately measured by improvements in child nutritional outcomes, particularly reductions in stunting. Consistent with global practice, most studies assessed child nutritional status using the WHO Child Growth Standards, specifically height-for-age and weight-for-age z-scores (Khalid & Martin, 2017c; Walters et al., 2019). The consistent use of these standardized indicators facilitates cross-country comparisons and strengthens the evidence base linking maternal empowerment to child growth trajectories. Importantly, reductions in stunting prevalence following empowerment-based interventions suggest that maternal agency plays a transformative role in disrupting intergenerational cycles of malnutrition.

Nevertheless, this review also highlights several challenges and research gaps. First, the conceptualization of empowerment remains heterogeneous across studies, with many relying on the broader framework of "*women's empowerment*" rather than maternal-specific empowerment (Mekonnen et al., 2021; Yaya et al., 2020). This lack of conceptual clarity complicates cross-study synthesis and underscores the need for more standardized and contextually validated instruments. Second, most interventions focus on short- to medium-term outcomes, with limited evidence on long-term sustainability and intergenerational effects. Finally, while many programs emphasize the mother's role, fewer studies account for the influence of broader family and community dynamics, such as paternal involvement, extended kinship structures, and sociocultural norms that may either enable or constrain maternal decision-making.

In the Indonesian context, these findings underscore the need to move beyond simply incorporating maternal empowerment into stunting reduction programs to explicitly operationalizing it as a core strategy. Maternal empowerment should be systematically integrated into national policies and primary health care services, particularly through community health centers (Puskesmas) and integrated health posts (Posyandu), by strengthening mothers' decision-making capacity, self-efficacy, and practical parenting skills. Family- and community-based interventions that actively engage fathers and other caregivers are also crucial for creating a supportive environment for sustainable stunting prevention.

In summary, this review confirms that maternal empowerment is a cornerstone of stunting prevention strategies worldwide. Empowerment enhances maternal knowledge, strengthens confidence, and builds competencies that collectively translate into improved child feeding practices and health outcomes. The integration of empowerment-based interventions into national and multisectoral programs represents a promising pathway to accelerate progress toward global nutrition targets. Future research should prioritise the development of standardised measures, the assessment of long-term program impacts, and the inclusion of broader sociocultural dimensions to capture the complex ecosystem within which maternal empowerment and child nutrition are embedded.

The primary ai of this systematic review is to examine the empowerment of mother in the context of stunting prevention: however the quantity of scholarly artices that explicity reference stunting is notably limited, thereby broadening the scope to encompass children experiencing nutritional status issues, including stunting. An increase in search activities via various search engines is anticipated to enchane the results, particulary in relation to the empowerment of mothers with children affected by stunting. Stunting is one of the nutritional problems faced by children, health workers, especially nurses, must understand that efforts to increase maternal empowerment are not only for preventing stunting but can be applied to other nutritional problems that have the potential to occur in children, especially in the first 1000 days of life.

Conclusions

This integrative review highlights maternal empowerment as a fundamental determinant in the prevention of child stunting. The evidence demonstrates that a combination of household decision-making, family and community support, and broader socioeconomic and maternal characteristics shapes empowerment. Empowered mothers are better equipped to make informed decisions regarding healthcare and nutrition, supported by access to resources, spousal involvement, and professional guidance. Measurement approaches, though diverse, consistently underscore the centrality of autonomy, capability, and decision-

making power in defining empowerment.

Interventions such as the Enhanced Homestead Food Production (E-HFP) program and nutrition education based on Infant and Young Child Feeding (IYCF) guidelines illustrate the effectiveness of integrating nutrition-specific and nutrition-sensitive strategies. These interventions strengthen mothers' knowledge, self-efficacy, and practical competencies, thereby enhancing their caregiving capacity. The positive impact of empowerment is evident in improved child nutritional outcomes, as measured by standardized indicators such as height-for-age and weight-for-age.

National and multisectoral programs implemented across countries further confirm that empowerment-based strategies are most effective when integrated within broader health, sanitation, and food security systems. However, the heterogeneity in conceptualizing and measuring empowerment, coupled with the limited evidence on long-term and intergenerational effects, indicates a critical gap in the current literature.

The concept of maternal empowerment must be implemented in an integrated and systematic manner within maternal and child health (KIA) services at community health centers (Puskesmas). Empowerment, which previously focused on passive services, should now actively involve mothers in decision-making on health issues, particularly stunting prevention.Several strategies can be implemented through integrated maternal empowerment policies, including self-monitoring using the KIA handbook, which enables early detection of stunting risks and other potential health problems. Strengthening mother and toddler classes as a space for sharing experiences to increase mothers' confidence and self-efficacy in implementing parenting practices, particularly nutritional patterns, to prevent stunting. Efforts should be made to enhance the role of cadres and other health workers, including nurses, midwives, nutritionists, doctors, and other health professionals, as empowerment facilitators through home visits to provide personal support and ensure mothers are able to make informed decisions regarding nutrition, care, and sanitation at the household level.

Stunting is a chronic nutritional problem that requires participation and cross-sectoral cooperation, so it is necessary to have a mother support group to overcome socio-cultural barriers that hinder access to health care for mothers and toddlers, increase economic empowerment and support from husbands and families, especially the active involvement of husbands in care and create an environment that supports mothers in decision-making related to stunting prevention.

In conclusion, maternal empowerment emerges not only as a key pathway but also as a sustainable strategy for reducing child stunting. Strengthening empowerment through knowledge transfer, confidence-building, and skill development should remain a priority in global nutrition agendas. Future research must advance the standardization of empowerment measures, evaluate the durability of program outcomes, and integrate sociocultural dimensions to ensure more comprehensive and contextually relevant interventions.

Declaration of Interest

The Authors declare that there is no conflict of interest

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Data Availability

All data underlying the results are availavle as part of article and no additional source data are required

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