

Review Article

Women's empowerment and child nutritional status in South Asia: a synthesis of the literature

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Abstract

Women's disempowerment is hypothesised to contribute to high rates of undernutrition among South Asian children. However, evidence for this relationship has not been systematically reviewed. This review of empirical studies aims to: (1) synthesise the evidence linking women's empowerment and child nutritional status in South Asia and (2) suggest directions for future research. We systematically searched Global Health, Embase (classic and Ovid), MEDLINE, Campbell Collaboration, Popline, Eldis, Web of Science, EconLit and Scopus. We generated 1661 studies for abstract and title screening. We full-text screened 44 of these, plus 10 additional studies the authors were aware of. Only 12 studies fulfilled our inclusion criteria. We included English materials published between 1990 and 2012 that examined the relationship(s) of at least one women's empowerment domain and nutritional status among South Asian children. Data were extracted and synthesised within three domains of empowerment: control of resources and autonomy, workload and time, and social support. The results showed women's empowerment to be generally associated with child anthropometry, but the findings are mixed. Inter-study differences in population characteristics, settings or methods/conceptualisations of women's empowerment, and the specific domains studied, likely contributed to these inconsistencies. This review also highlights that different women's empowerment domains may relate differently to child nutritional status. Future research should aim to harmonise definitions of women's empowerment, which key domains it should include, and how it is measured. Rigorous evaluation work is also needed to establish which policies and programmes facilitate women's empowerment and in turn, foster child nutritional well-being.

Keywords: women's empowerment, child nutrition, South Asia.

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Introduction

More than 3 million preventable child deaths annually can be attributed to child undernutrition. Current estimates indicate that nearly 165 million children under 5 are stunted and 52 million wasted (Black *et al.* 2013). Malnutrition in early life limits mental and physical development, educational achievement and economic productivity later in life,

fuelling intergenerational cycles of poverty and malnutrition (Hoddinott *et al.* 2011).

Over the past several decades, child nutritional status in developing countries has improved. However, South Asia lags behind other regions in achieving improvements in child nutrition. Current estimates indicate that 37% of South Asian children under 5 are stunted and 46% underweight (Gulati 2010; Stevens *et al.* 2012). Efforts to unravel the Asian

Enigma, in which economic gains have not resulted in expected reductions in child malnutrition, have pointed to a number of factors contributing to persistent child undernutrition including poor water, sanitation and hygiene practices (including open defecation), which contribute to high burdens of gastrointestinal diseases and environmental enteropathy in particular (Bhutta 2006; Checkley *et al.* 2008; Dangour *et al.* 2012). Women's low social status was one of the key factors identified early on as a potential key contributor to malnutrition in the region (Ramalingaswami *et al.* 1996). Economic and political structures and socio-cultural norms often allow for inequalities resulting in women's lack of access to (or control over) resources, inability to make household decisions and limited social support. This in turn may result in household decisions that do not provide the necessary resources to support child nutrition and growth. For example, without access to monetary resources, mothers may be unable to purchase appropriate food to meet the special needs of their young children or engage in optimal health-seeking behaviour (Smith *et al.* 2003a,b; Bhutta *et al.* 2004; Bhagowalia *et al.* 2012).

The 1990 UNICEF framework lists care as one of the three major determinants of malnutrition. Later, the analytic framework was expanded to distinguish between *care practices* and *maternal resources for care* as determinants of child nutritional well-being (UNICEF 1990; Engle *et al.* 1997). Care practices, critically important for optimal child nutrition and development, are behaviours such as feeding practices, hygiene practices and stimulation of children. Maternal care resource are characteristics that may affect how mothers are able to care for their children and include: (1) education and knowledge; (2) physi-

cal health; (3) mental health and three domains related to women's empowerment; (4) autonomy and control of household resources; (5) workload and time availability; and (6) social support networks (Fig. 1). This framework is useful for better understanding the relationship between gender and nutrition in South Asia (Sen 2012).

Evidence suggests that women's low status and disempowerment in South Asia may be a strong contributor to the persistent problem of poor child nutrition in this region (Ramalingaswami *et al.* 1996; Haddad 1999; Smith *et al.* 2003a,b). However, the specific aspects of women's empowerment that are important for childcare practices and nutritional status remain poorly understood and the evidence base has not been examined holistically. This review focuses on South Asia and attempts to fill these gaps by bringing together and critically reviewing relevant original studies in order to: (1) synthesise the evidence regarding the association of women's empowerment and child nutritional status in South Asia, and (2) generate recommendations for future research. This review is timely, given the renewed interest in understanding the significance of women's empowerment for child nutrition and the recognised need to refine approaches to measure and document women's empowerment (United States Agency for International Development, International Food Policy Research Institute, Development & Oxford Poverty and Human Development Initiative 2012). A comprehensive assessment of the existing empirical work is a prerequisite to understanding the evidence base and guiding the design of programmes and policies that focus on empowering women and reducing maternal and child undernutrition in South Asia.

Key messages

- Women's empowerment is associated with child nutritional status in South Asia, but this relationship might vary across the different domains of women's empowerment.
- The strength of the association of women's empowerment and child nutritional status may depend on the child's age and contextual factors.
- There is a need for additional research using consistent concepts and indicators for women's empowerment, and rigorous and standardised methods for analysis and evaluation of the relationship of women's empowerment to child nutritional status.

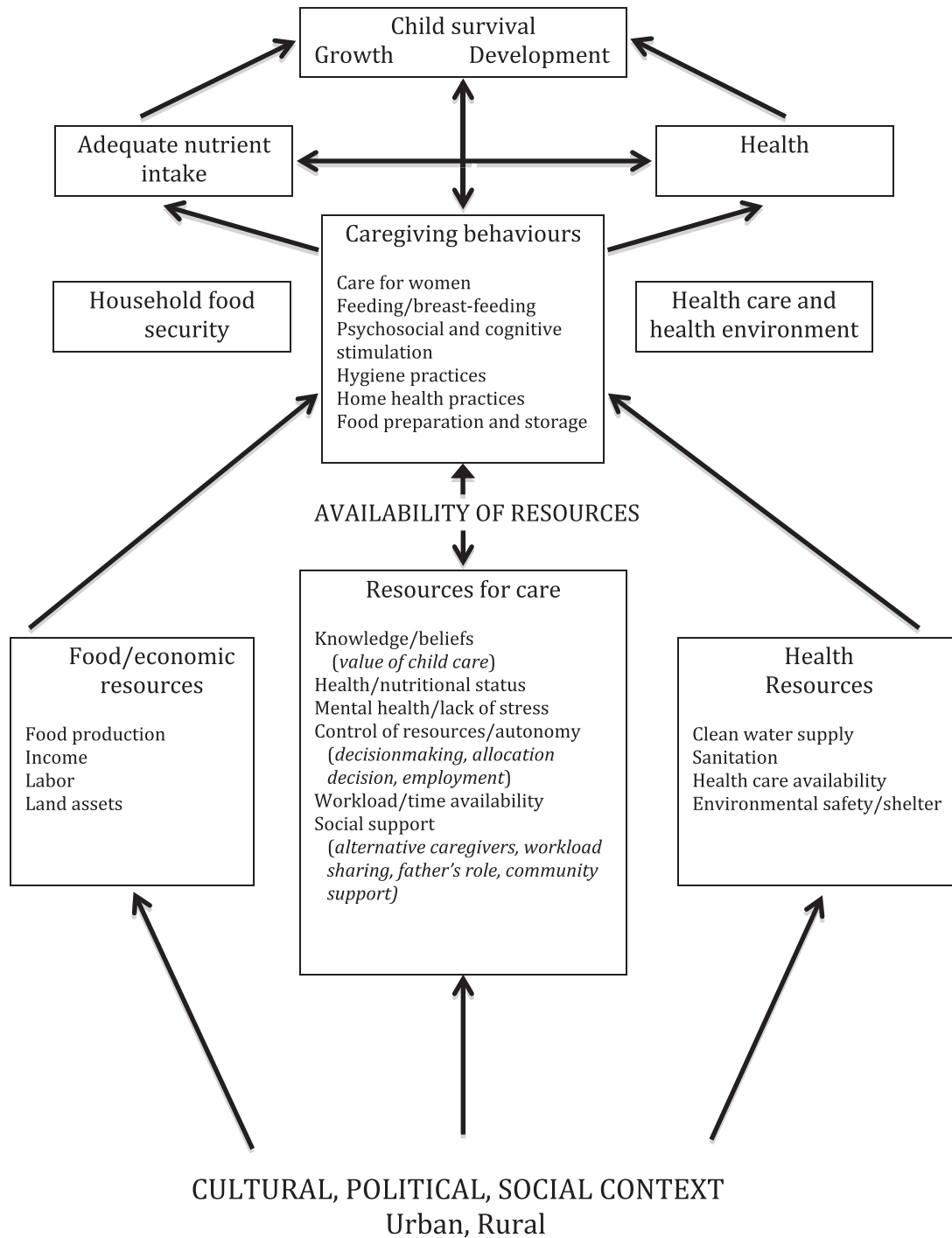


Fig. 1. Determinants of child nutritional status.

Source: Adapted from Engle P., Menon P. & Haddad L. (1997) Care and Nutrition: Concepts and Measurement. Figure, 2. IFPRI Occasional Paper 33. International Food Policy Research Institute: Washington, DC., with permission from the International Food Policy Research Institute (<http://www.ifpri.org/sites/default/files/publications/oc33.pdf>).

Methods

Terms, concepts and indicators

Women's empowerment is a complex construct and there is no universally accepted definition of the term or agreement regarding which domains and sub-domains comprise one's empowerment. The literature on women's empowerment, however, usually refers to notions of power, agency, control and decision making (Kabeer 1999; Malhotra *et al.* 2002; Alsop & Heinsohn 2005; Alsop *et al.* 2006; Samman & Santos 2009). Kabeer (1999, p. 437) defines empowerment as a process, namely, 'the expansion in people's ability to make strategic life choices in a context where this ability was previously denied to them'. Consistent with this definition, our review also uses the term women's empowerment to refer to individual capacity to introduce change to improve one's social and economic status and gain autonomy. However, we focus on characteristics of empowerment that a woman has at a particular time. Specifically, this review uses a conceptual framework (Fig. 1) developed by Engle *et al.* (1997) to focus on three domains of empowerment identified as determinants of nutritional well-being: control of resources and autonomy, workload and time, and social support.

The complexity of defining women's empowerment and its many domains has led to challenges in identifying indicators and methods for measuring women's empowerment. Often, indirect or proxy measures, such as level of education, age at marriage or differential mortality between men and women, have been used because of the complexity of measuring empow-

erment directly. Recognising the limitations of indirect measures, new tools have recently been designed and tested to directly measure empowerment and examine its multidimensionality (Malhotra *et al.* 2002; United States Agency for International Development, International Food Policy Research Institute, Development & Oxford Poverty and Human Development Initiative 2012). With these conceptual issues in mind, and applying the review's inclusion criteria, this study synthesises findings from select studies that used direct measurements of women's empowerment that relate to the three domains of control of resources and autonomy, workload and time, and social support.

Search strategy and study details

We systematically searched the following databases in January 2013: Global Health, Embase (classic and Ovid), MEDLINE, Campbell Collaboration, Popline, Eldis, Web of Science, EconLit and Scopus, using key terms for each conceptual aspect of the research question: women's empowerment, child nutritional status and South Asia (Table 1). References of the included studies were hand searched and additional related articles were screened for inclusion.

All studies were downloaded into EndNote; duplications were eliminated; and title, abstract and full-text screening conducted. Restrictions based on study design or sample size were not used so as to maximise the inclusion of evidence. However, studies that used aggregate data at the community or regional level, as opposed to the household or individual level, were

Table 1. Search terms

Women's		Empowerment		Child		Nutrition		South Asia	
Wom?n	W/5	Empower*	AND	Child*	AND	Nutrition*	AND	South* Asia*	AND
Female		Employ*		Infan*		Anthropomet*		Afghanistan*	
Gender		Authorit*				Micronutrient*		Bangladesh*	
Matern*		Control*				Maln*		Bhutan*	
Mother*		Decision*				Wast*		India*	
		Power*				Stunt*		Maldives*	
		Leadership				Underweight		Nepal*	
		Autonomy*				Grow*		Pakistan*	
								Sri Lanka*	

excluded. Based on an initial preliminary search of the literature and consultations with gender and nutrition experts, we limited our search to exclude studies published before 1990 as these studies focused on indirect proxies of women's status, e.g. maternal education, but not women's empowerment. Our inclusion criteria were: (1) peer-reviewed empirical study published in English between 1 January 1990 and 31 December 2012; (2) included national or sub-national data on at least one South Asian country; (3) assessed the nutritional status of children under 5 years of age using anthropometric measurements; (4) included assessment of at least one women's empowerment domain at the household level identified in the conceptual framework (Fig. 1) as a study aim or study variable; and (5) examined relationship(s) of at least one women's empowerment domain and one indicator of child nutritional status.

Data extraction

To synthesise prior primary studies on this topic, we first extracted the following study information into a pro forma: reference; design and methods; data source, research setting and sample size; confounders included in the analysis; type of analysis; women's

empowerment domain(s) and variable(s); nutritional outcome(s) measured; crude and adjusted findings; and direction and statistical significance of results (Tables 2–4).

Results

Search and overview of studies

The initial searches generated a total of 1661 potential studies, but only 12 met all the inclusion criteria. During title screening, at least half of the potential studies were excluded because they did not meet the study location or population criteria. Abstract screening eliminated nearly half of the remaining studies for these same reasons or because child anthropometry was not reported. The remaining potential studies ($n = 44$) and other studies of which the authors were already aware ($n = 10$) were downloaded and full-text screened. At this stage a study was usually eliminated either because it did not directly measure women's empowerment or because it did not present household-level data (Fig. 2). The first author conducted the title, abstract and full-text screening, and any complications were resolved via discussion and joint re-reading of studies with co-authors.

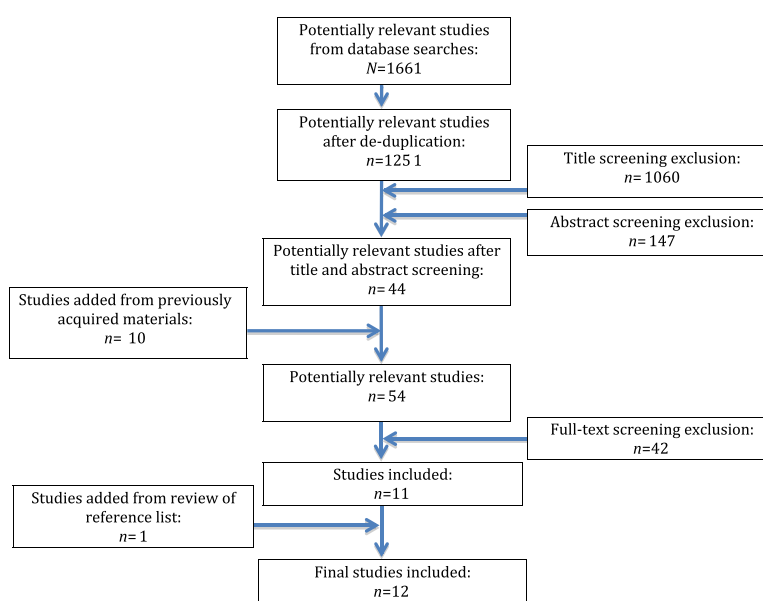


Fig. 2. Study selection process.

Table 2. Studies relating women's empowerment (social support networks) and child nutritional status in South Asia

Reference [†]	Design/methods	Data, source, setting, sample	Confounders	Type of analysis	Women's empowerment	Outcome	Crude results	Adjusted results	Direction/significance of results
(Moestue <i>et al.</i> , 2007) (social networks)	Cross-sectional data and Young Lives dataset, stratified random sampling, used WHO standards for anthropometry, multivariable regression analysis	Young Lives study and this study, India: Andhra Pradesh (urban and rural), about 1 year, 280	Child age and sex; maternal education, age and caste; housing quality, land ownership, number of economic sectors, HH composition, rural/urban and clustering	Linear regression: β (SE)	Network size (number of members) Network literacy (percentage who can read and write)	LAZ	0.18 (0.07)	0.21 (0.07)	Positive, ***
(De Silva & Harpham 2007) (social capital)	Analysis of Young Lives data restricted to biological mothers of 6–18-month-olds with complete data, study examines structured and cognitive social capital, used the SASCAT tool but validated findings via factor analysis and qualitative cognitive interviews, nutritional status calculated using 1977 NCHS reference, multivariate linear regression models with robust standard errors to adjust for clustered sampling	Young Lives study, India: Andhra Pradesh, 6–18 months, 1846	Child age, sex and breastfeeding practice; maternal education level, number of occupations and socio-economic status; HH poverty group, number of school-aged children and number of infants	Linear regression: β (CI)	Community group membership (1 group vs. 0) Community group membership (2+ groups vs. 0) Citizenship activity involvement (talked or joined vs. not involved) Citizenship activity involvement (talked and joined vs. not involved) Support from individuals (1 individual vs. 0) Support from individuals (2+ individuals vs. 0) High cognitive social capital (high vs. low/medium)	LAZ WAZ	0.07 (-0.08, 0.21) 0.06 (-0.05, 0.17)	0.06 (-0.09, 0.21) 0.05 (-0.06, 0.15)	Positive, **
						LAZ WAZ	0.22 (-0.14, 0.59) 0.04 (-0.21, 0.29)	0.19 (-0.23, 0.61) -0.15 (-0.28, 0.25)	Negative, ***
						LAZ WAZ	-0.05 (-0.25, 0.14) -0.02 (-0.17, 0.12)	-0.25 (-0.43, -0.07) -0.05 (-0.18, 0.08)	Negative, **
						LAZ WAZ	0.11 (-0.07, 0.28) 0.02 (-0.11, 0.14)	0.07 (-0.11, 0.24) -0.07 (-0.19, 0.06)	Positive, **
						LAZ WAZ	-0.10 (-0.30, 0.08) -0.04 (-0.18, 0.10)	0.08 (-0.09, 0.24) 0.02 (-0.10, 0.15)	Positive, **
						LAZ WAZ	-0.12 (-0.29, 0.05) -0.04 (-0.17, 0.10)	-0.05 (-0.20, 0.10) -0.01 (-0.12, 0.11)	Positive, **
						LAZ WAZ	0.15 (-0.14, 0.45) 0.13 (-0.08, 0.34)	0.21 (-0.08, 0.49) 0.19 (0.00, 0.39)	Positive, **

CI, confidence interval; HH, household; LAZ, length for age z-score; NCHS, National Center for Health Statistics; SASCAT, Short Social Capital Assessment Tool; SE, standard error; WAZ, weight for age z-score; WHO, World Health Organization. * $P < 0.05$; ** $P < 0.01$; *** $P < 0.001$. † Domains noted in parentheses are those given in the original study as opposed to the domain classifications made by this review.

Table 3. Studies relating women's empowerment (workload and time availability) and child nutritional status in South Asia

Reference [†]	Design/methods	Data, source, setting, sample	Confounders	Type of analysis	Women's empowerment	Outcome	Crude results	Adjusted results	Direction/significance of results
(Sethuraman <i>et al.</i> 2006) (women's empowerment)	Qualitative and quantitative study of rural and tribal subjects including interviews and anthropometric measurements, multivariate and logistic regression, z-scores created using the NCHS reference standards	This study, India: Karnataka (rural), 6–24 months, 820	Maternal weight; maternal and child haemoglobin levels; immunisation status; energy-dense foods; nutrient-dense foods; breastfeeding practices; who feeds child; antenatal care and cost; family type and food purchasing; women's control over food supply, private health care, time, cost and health decisions; water and sanitation; family structure and income	Linear regression: β (<i>t</i> -test) (Note: crude analysis is <i>F</i> not β)	Employment and income Previous employment	WAZ WAZ	22.7 12.1	-0.12 (-3.70)	Negative, ***
(Bose 2011)	Assessing women's status using different measures for getting at this concept; multilevel analysis to examine both macro- and micro-components simultaneously	NFHS 2005–2006, India (urban and rural), 0–5 years, ambiguous	Female child, maternal education, son preference, class, family composition, religion, joint family, mother's age, community, region and urban	Hierarchical linear modelling: β (SE)	Mother's work: working or not (dummy variable)	WAZ	0.14 (0.03)	0.14 (0.04)	Positive, ***

F, Fisher test; NCHS, National Center for Health Statistics; NFHS, National Family Health Survey; SE, standard error; WAZ, weight for age z-score. * $P < 0.10$; ** $P < 0.05$; *** $P < 0.01$. †Domains noted in parentheses are those given in the original study as opposed to the domain classifications made by this review.

Table 4. Studies relating women's empowerment (autonomy and control of household resources) and child nutritional status in South Asia

Reference ^a	Design/methods	Data: source, setting, sample	Confounders	Type of analysis	Women's empowerment	Outcome	Crude results	Adjusted results	Direction/significance of results
(Desai & Johnson 2005) (women's empowerment)	Analysis of DHS survey data re: women's responsibilities in the HH; cross-country analysis; hierarchical linear models to distinguish between individual and community-level influences (Study details above)	DHS, year ambiguous, India, 13–36 months, 15 940 NDHS, year ambiguous, Nepal, 13–36 months, 4876	Inter-clustering, HH wealth, maternal and paternal education, child birth period, and community-level women's decision making	Linear models: coefficient	HH decision making: final decision re: own health care, large HH purchases, daily HH purchases and visits to family or relatives (dummy variable if at least 1 of 4)	HAZ HAZ		0.09 0.06	Positive, * Positive, **
(Sethuraman <i>et al.</i> 2006) (women's empowerment)					HH position and decision-making involvement	WAZ	17.0	0.08 (2.55)	Positive, **
(Shroff <i>et al.</i> 2011)	Cross-sectional baseline data for a longitudinal randomised intervention trial, confirmatory factor analysis for maternal autonomy items and regression analysis with growth variables, WHO 2005 growth standards used	This study, India: Andhra Pradesh (rural), 3–5 months, 600		Random-effects GLS models: β (95% CI)	Women's decisions HH decision making (confirmatory factor analysis)	WAZ LAZ WAZ WLZ	7.1 -0.04 (-0.16, 0.08) 0.11 (-0.01, 0.24) 0.17 (0.04, 0.31)	-0.06 (-0.18, 0.05) 0.17 (0.04, 0.30) 0.26 (0.16, 0.42)	Positive, ** Positive, ** Positive, **

Author(s)	Study Design	Population	Exposure	Outcome	Effect Size	Notes
(Begum & Sen 2009)	Secondary analysis of DHS data	BDHS 2000, Bangladesh (urban and rural), 0-5 years, ambiguous sample size	Maternal age, education, work status, exposure to media, nutritional status, access to health care, child sex, number of children ever born, access to sanitation and income-poverty status	HH decision making re: own health care, child health care, large HH purchases, daily HH purchases, freedom to visit relatives and friends [values of 2 if alone, 1 if jointly or 0 if by someone else to generate aggregated decision-making scores between 0 and 10 used to create a scale of none (0), low (1-5), medium (6-9) and high (10)]	Stunting (severe) 0.03 vs. 0.03 vs. 0.09 vs. -	Percentage comparison: %; linear regression for HAZ; β
(Bose 2011)	(Study details above)		HH decision-making autonomy re: own health care, major HH purchases, daily HH purchases, visiting family or friends, and freedom of movement [scores for decisions or travel alone (2), jointly (1) and decisions by someone else or not allowed to go (0); aggregated using Cronbach's alpha]	WAZ -0.00 (0.01) -0.00 (0.01)		
(Shroff <i>et al.</i> 2009)	Secondary analysis of a nationally representative dataset using multivariate logistic regressions, first South Asian study to measure four theory driven autonomy domains using the same dataset	NFHS 1998-1999, India: Andhra Pradesh (rural and urban), <36 months, 821	Child sex, age and birth order; mat education, age and religion; HH socio-economic status and urban-rural residence	Financial autonomy: to set money aside for use as she wishes (allowed vs. not) HH decision making re: jewellery or other major HH purchases (involved vs. not)	Stunting 0.68 (0.51, 0.91) 0.73 (0.55, 0.98) Positive, **	Logistic regression: OR (95% CI) (Note: if only crude analysis, percentage and <i>P</i> -value shown)

Table 4. Continued

Reference ^a	Design/methods	Data: source, setting, sample	Confounders	Type of analysis	Women's empowerment	Outcome	Crude results	Adjusted results	Direction/significance of results
(Shroff <i>et al.</i> 2011)	(Study details above)	NDHS 2006, Nepal (rural), 6–59 months, 4360	Current maternal employment; religion, maternal age, father's occupation, parental education, wealth, child age, child sex, maternal body mass index, gender of siblings, five geographical regions and birth order	Ordinary least squares; β (SE); logit estimation: OR (SE)	Financial autonomy (confirmatory factor analysis) WAZ WLZ HAZ; HH decision making – final say alone or jointly re: large HH purchases (dummy variable)	LAZ WAZ WLZ HAZ; stunting WHZ	0.05 (–0.04, 0.15) 0.02 (–0.07, 0.12) –0.01 (–0.12, 0.09) 0.02 (0.06); 0.99 (0.11) –0.09 (0.05)	0.02 (–0.07, –0.11) –0.01 (–0.10, 0.10) –0.04 (–0.17, 0.07) 0.02 (0.06); 0.99 (0.11)	Negative, ***
(Dancer & Rammohan 2009)	Uses 2006 NDHS data and econometric techniques to look at maternal autonomy as a determinant of child undernutrition in rural Nepal, used WHO Child Growth standards				HH decision making – final say alone or jointly re: daily HH purchases (dummy variable)	HAZ; stunting WHZ	0.09 (0.04)	–0.03 (0.05); 0.98 (0.10)	Positive, **
(Sethuraman <i>et al.</i> 2006) (women's empowerment)	(Study details above)				Mobility within village Family type and village mobility	WAZ WAZ	24.7 9.4	0.09 (2.78)	
(Shroff <i>et al.</i> 2009)	(Study details above)				Permission re: going to market (needs vs. doesn't) HH decision making re: going/staying with parents/siblings (involved vs. not) Permission re: visiting relatives/friends (needs vs. doesn't)	Stunting Stunting Stunting	0.64 (0.41, 1.00) 42% vs. 39% (0.30) 34% vs. 41% (0.18)	0.59 (0.38, 0.93)	Positive, **
(Shroff <i>et al.</i> 2011)	(Study details above)				Mobility autonomy (confirmatory factor analysis) Actual mobility (confirmatory factor analysis)	LAZ WAZ WLZ LAZ WAZ WLZ	0.07 (–0.04, 0.18) –0.04 (–0.14, 0.06) –0.15 (–0.27, –0.03) 0.03 (–0.07, 0.13) –0.05 (–0.17, 0.06) –0.09 (–0.20, 0.02)	0.14 (0.04, 0.24) –0.03 (–0.14, 0.09) –0.20 (–0.34, –0.06) 0.00, (–0.08, 0.09) –0.04 (–0.14, 0.06) –0.06 (–0.18, 0.06)	Positive, ** Negative, ** Negative, **

Author	Study	Population	Variables	Findings	Significance		
(Brennan <i>et al.</i> 2004)	Secondary data analysis to assess IYCF practices and maternal involvement in health decisions, multivariate logit analysis controlling for confounders	NFHS 1998–1999, India: Uttar Pradesh and Karnataka (urban and rural), <3 years, 3244 (2221, 1023)	Child age, sex and birth order; maternal age at child birth, education, BMI, caste or tribe, media exposure, standard of living, and state	HH decision making: alone or jointly vs. by other re: mother's own health care	Stunting (severe)	0.40% (-0.01%)	Positive, **
				HH decision making: alone vs. by other re: mother's own health care	Stunting	0.20%	
(Shroff <i>et al.</i> 2009)	(Study details above)			HH decision making re: obtaining health care for yourself (involved vs. not)	Stunting	40% vs. 41% (0.94)	
(Dancer & Rammohan 2009)	(Study details above)			HH decision-making autonomy – final say alone or jointly re: own health care (dummy variable)	HAZ; stunting WHZ	0.14 (0.05); 1.28 (0.09)	Positive, ***; Positive, ***
				Difficulty seeking medical help for self: getting permission to access care (dummy variable of not a problem or small problem vs. big problem)	HAZ; stunting WHZ	0.03 (0.04)	
				Difficulty seeking medical help for self: getting permission to access care (dummy variable of not a problem or small problem vs. big problem)	HAZ; stunting WHZ	-0.03 (0.06); 0.99 (0.12)	
				Difficulty seeking medical help for self: distance to facility (dummy variable of not a problem or small problem vs. big problem)	HAZ; stunting WHZ	0.06 (0.05); 1.03 (0.09)	Positive, **
				Difficulty seeking medical help for self: taking transport (dummy variable of not a problem or small problem vs. big problem)	HAZ; stunting WHZ	-0.13 (0.05); 0.83 (0.09)	Negative, ***; Positive, **
				Difficulty seeking medical help for self: going alone (dummy variable of not a problem or small problem vs. big problem)	HAZ; stunting WHZ	-0.02 (0.04); 0.99 (0.07)	Negative, **

Table 4. Continued

Reference ^a	Design/methods	Data: source, setting, sample	Confounders	Type of analysis	Women's empowerment	Outcome	Crude results	Adjusted results	Direction/significance of results
(Maashal <i>et al.</i> 2008) (agency)	Multi-stage sampling for children born in the previous 5 years with war-related experiences, WHO standards for anthropometric data collection and generating z-scores, multivariate logistic regression models to evaluate independent associations and adjusted odds ratio calculations (Study details above)	This study, Afghanistan: Kabul Province (rural and urban), <5 years, 2373	Child age and sex; maternal age, education, whether child marriage and preference for female physician; HH socio-economic status, whether running water; lack of basic needs, forced to leave preferred residence, migration inside and migration out of country	Logistic regression: OR (CI)	HH autonomy re: obtaining health care for children without needing permission or to be accompanied (binary variable)	Stunting Wasting Under-weight	1.77 (1.34, 2.32) 1.45 (0.95, 2.21) 1.88 (1.36, 2.61)	1.38 (1.01, 1.90) 1.67 (1.00, 2.81) 1.46 (1.00, 2.14)	Positive Positive Positive
(Shroff <i>et al.</i> 2011)	(Study details above)				Childcare decision making (confirmatory factor analysis)	LAZ WAZ WLZ	0.05 (-0.05, 0.15) -0.00 (-0.11, 0.10) -0.02 (-0.13, 0.09)	0.10 (0.01, 0.19) 0.06 (-0.04, 0.17) -0.00 (-0.13, 0.12)	Positive, **
(Shroff <i>et al.</i> 2009)	(Study details above)				HH decision making re: cooking (involved vs. not)	Stunting	41% vs. 39% (0.54)		
(Sethuraman <i>et al.</i> 2006) (women's empowerment)	(Study details above)				Control over food supply	WAZ	22.7		
(Aslam & Kingdon 2012)	Stratified sampling, anthropometry standardised with WHO multi-country growth reference standards, instrumental variable techniques to examine how treating maternal empowerment as exogenous underestimates its effect on child weight	This study 2006–2007, Pakistan: Punjab and North West Frontier Province (urban and rural), 0–5 years, 1000	Child sex and age; HH size; maternal and paternal height, education, TV watching, scores on health knowledge test; rural or not, location, per capita expenditure; maternal literacy, labour market participation, family member's education; and parental scores on raven's tests	Community fixed-effect estimates; β (<i>t</i> -stat)	HH decision-making influence on number of children to have (dummy variable of 1 if the mother perceived to have her preference on number of children taken into account)	HAZ WAZ	0.12 (0.70) 0.36 (2.26)	0.09 (0.51) 0.32 (2.01)	Positive, **

BDHS, Bangladesh DHS; BMI, body mass index; CI, confidence interval; DHS, Demographic and Health Surveys; GLS, generalized least squares; HAZ, height for age z-score; HH, household; IYCF, infant and young child feeding; LAZ, length for age z-score; NDHS, Nepal DHS; NFHS, National Family Health Survey; OR, odds ratio; SE, standard error; TV, television; WAZ, weight for age z-score; WHO, World Health Organization; WHZ, weight for height z-score; WLZ, weight for length z-score. * $P < 0.10$; ** $P < 0.05$; *** $P < 0.01$. Domains noted in parentheses are those given in the original study as opposed to the domain classifications made by this review.

Several publications included in this review used secondary data analysis of large household datasets, such as the Demographic and Health Surveys, but some used data from context-specific cross-sectional surveys. Because none of the studies included interventions, a hierarchy of study designs could not be done. Many of the studies were conducted in India, but studies in Nepal, Pakistan, Bangladesh and Afghanistan were also included. Studies in Bhutan, Maldives and Sri Lanka were not found. About half of the studies were of children under 5 and the others used a subset of this age range, usually children under 3. Some studies used prevalence of stunting, wasting and underweight, but the most common measures of child nutritional status were mean anthropometric *z*-scores of height/length for age (HAZ/LAZ), weight for age (WAZ) and/or weight for height/length (WHZ/WLZ). Only two studies presented results disaggregated by child sex, and therefore, the review did not examine sex-disaggregated results (Brennan *et al.* 2004; Dancer & Rammohan 2009). Although some studies included additional statistical models, we only reviewed crude and final results. Despite searching for studies from 1990 onwards, the studies that met the eligibility criteria were published from 2004 to 2012, highlighting the increased use of direct measurements of women's empowerment and linking women's empowerment and child nutrition in the last decade.

Given great differences in the included studies' definitions and ways of measuring women's empowerment, location, age range of sampled children and anthropometric outcomes measured, the grouping of the studies and synthesis of key messages was challenging. We therefore opted for grouping studies based on the domains of women's empowerment specified in the conceptual framework: control of resources and autonomy, workload and time, and social support (Tables 2–4).

Social support

Maternal social support (e.g. childcare assistance, providing information or emotional support) may influence childcare practices and in turn child nutrition (Engle *et al.* 1997). Two studies assessed the associa-

tion of social support with child anthropometry and the results were mixed (Table 2). Using Young Lives study data, one study found larger and more literate social networks to be associated with better LAZ of 1-year-old children in Andhra Pradesh, but social networks with a larger proportion of non-family members were negatively associated with child LAZ (Moestue *et al.* 2007). The authors did not comment extensively on this negative finding but it may be that those with more non-family members in their social networks have less assistance at home and that this help within the home is more important for child nutrition than the non-family member support. Another study, using the same data, showed a negative association between maternal involvement in social groups and LAZ in 6–18-month-old children. The authors hypothesised that this was due to additional stressors generated from community engagement. Other measured sub-domains of social support including membership in community groups, individual support and cognitive social capital (i.e. perceptions and feelings of trust or belonging to a community) were not associated with LAZ; of these four social support indicators, high maternal cognitive social capital was associated with higher WAZ (De Silva & Harpham 2007).

Workload and time

The relationship between maternal employment and child nutritional status is complex: employment can increase income (and control over income), but may also decrease maternal time for childcare (Engle *et al.* 1997). Only two studies examined the relationship between women's workload and child nutritional status in South Asia (Table 3). Both studies found that maternal employment was associated with poorer WAZ in young children. The first study, conducted in rural Karnataka, India, showed a negative association between maternal employment and WAZ in children 6–24 months of age (Sethuraman *et al.* 2006), whereas the second study documented that mothers who worked for pay in India were more likely to have a child under 5 with poor WAZ, compared with mothers who were not working (Bose 2011). Note that this finding may reflect reverse causality: mothers

who have to work for pay may be poorer and more resource constrained and therefore more likely to have a malnourished child than non-working mothers.

Control of resources and autonomy

This domain relates to women's status in the household compared with other members in aspects such as control over income, access to resources and decision-making power (Engle *et al.* 1997). Most studies ($n = 10$) on women's empowerment and child nutrition in South Asia covered this domain; some examined overall control, autonomy and decision making whereas others looked at specific sub-domains such as control of resources, mobility autonomy, financial autonomy and decision making, women's own health care, childcare including health seeking, and food purchasing and preparation (Table 4).

Five studies used composite indices or other data reduction methods to combine various indicators on household decision making into one variable. Desai & Johnson (2005) noted that children whose mothers had final decision-making power in at least one of the sub-domains examined (maternal own health care, large household purchases, daily household purchases and freedom to visit relatives and friends) had children with higher HAZ in India, but not in Nepal. Similarly, Sethuraman *et al.* (2006) found maternal position within the household and involvement in decision making to be protective for child WAZ in India. In Andhra Pradesh, Shroff *et al.* (2011) found that the ability to make household decisions was positively associated with child WAZ and WLZ but not LAZ. On the other hand, Begum & Sen's (2009) analysis of Bangladesh Demographic and Health Survey data did not reveal any statistically significant associations between an aggregated decision-making autonomy score (which combined autonomy regarding her own health care, child health care, large household purchases, daily household purchases and her freedom to visit relatives and friends) with stunting, wasting or underweight. These findings are consistent with Bose's (2011) results; this recent Indian study used an aggregate autonomy index including decision making on a similar set of aspects (own health care,

major household purchases, daily household purchases, visiting family or friends and freedom of movement to market, health facility and outside of village) and found no association with the likelihood of children being underweight (low WAZ).

Control over resources is another important aspect of women's empowerment, which has thus far been examined in only three studies from South Asia. In Andhra Pradesh, Shroff *et al.* (2009) found that mothers with financial autonomy, defined as the ability to set money aside for use as they wish, had lower odds of their child under 3 being stunted. By contrast, maternal involvement in decision making regarding the purchase of jewellery or other large household items was not associated with stunting. In a later study, the same group found no association between a woman's financial autonomy and child LAZ, WAZ or WLZ (Shroff *et al.* 2011). By contrast, a study in Nepal documented two associations between WHZ and maternal decision making: a positive association for daily household purchases and a negative association for large household purchases. No associations were found with child HAZ (Dancer & Rammohan 2009). These findings suggest that additional underlying issues related to maternal control of resources that may not have been captured by the analyses affect the association between women's empowerment and child nutrition outcomes.

The mobility autonomy sub-domain was examined in three studies, all in India. In a first study, Shroff *et al.* (2009) found that mothers in Andhra Pradesh who had decision-making power regarding their ability to go to the market had lower odds of having a stunted child under 3, but no association was found for the other mobility variables studied (needing permission to visit friends and relatives or decision making on going to visit relatives). In a more recent study, Shroff *et al.* (2011) reported that mothers who were able to go to places without asking permission had children 3–5 months of age with better LAZ, but no associations were found with actual mobility, defined as being able to go to the same places alone. Furthermore, this study did not find mobility autonomy or actual mobility to be associated with child WAZ, but a high score on mobility autonomy was associated with lower child WLZ. This negative

finding may reflect that more mobile mothers spend less time with the child and/or have non-optimal alternative childcare providers. By contrast, a study in Karnataka, India, showed that mobility freedom within the village was associated with better child WAZ (Sethuraman *et al.* 2006).

Three studies assessed whether a woman's ability to control her own health care was related to child nutritional status. In Uttar Pradesh and Karnataka, Brennan *et al.* (2004) found that a woman's sole or joint decision making for her own health care, compared with someone else making the decisions, increased the risk of her children under 3 being stunted. The authors do not comment on these counter-intuitive findings, but it may be that more empowered mothers have less time for childcare or are outside the home more frequently and without adequate substitute childcare. A similar study among children of this same age in Andhra Pradesh found no association between a woman's ability to control her own health care and child stunting (Shroff *et al.* 2009). Dancer & Rammohan (2009), using nationally representative Nepal data, found that women's ability to make decisions regarding their own care decreased the odds of their child being stunted, but was not associated with child WHZ. They also found that among four different factors potentially limiting maternal ability to seek medical care (getting permission, going alone, distance, transport), only transport increased the odds of child stunting. For child WHZ, they found a negative association among women who were constrained in their ability to receive medical care alone, and a positive association among women who reported distance to a health facility was a barrier. These findings may be less about women's decision-making power or autonomy, but rather, they may reflect constraints that women face in accessing health care due to mobility restrictions or lack of roads and transportation. They did not find an association with decision-making autonomy regarding her own health care or whether she was required to get permission to access care (2009).

Five South Asian studies assessed the relationship of maternal decision making on childcare, food supply and other household matters and child nutritional status. Mashal *et al.* (2008) found that a lack of mater-

nal decision-making autonomy regarding obtaining health care for her children aged less than 5 was positively associated with child stunting, wasting and underweight in Afghanistan. Furthermore, the latter study by Shroff *et al.* (2011) showed a woman's decision-making power regarding the care of her children, including food allocation and health seeking, to be positively associated with LAZ of infants 3–5 months of age in Andhra Pradesh. Two studies in India looked at a woman's control over food supply and cooking decisions and neither found any important relationship with child nutritional status (Sethuraman *et al.* 2006; Shroff *et al.* 2009). Aslam & Kingdon's (2012) study in Pakistan found maternal perception of her influence on the number of children she births to be positively associated with WAZ among children under 5, but not associated with HAZ.

Discussion

Our review finds evidence that women's empowerment in the household is generally associated with child nutritional status, in spite of the wide disparity (and imperfection) in the methods and indicators used to measure women's empowerment in the existing literature on South Asia. The review also shows that different domains of women's empowerment may relate differently to child nutritional well-being and that the strength and direction of associations may vary by child age, household wealth and a series of other contextual factors. The bulk of the studies that have looked at the association between women's empowerment and child nutrition focus on women's autonomy, control and decision-making power. Overall, maternal involvement in decision making (measured using different scales and composite indices and looking at a variety of sub-domains of decision making) is generally associated with child nutritional status, although some studies show a lack of association. Studies of specific aspects of maternal decision making, control and autonomy have mixed results and are so few per sub-domain that conclusions are difficult to draw. Several studies have shown that maternal autonomy and decision making within the household measured with composite indicators

are important for child nutritional status, especially in India. Mobility autonomy and financial autonomy results suggest that the relationship with child nutrition may be context specific. Decision making regarding a woman's health care-seeking behaviour for herself or for her children is inconclusive, and this may be due to the small number of studies exploring these sub-domains.

Social support studies are even more limited. Evidence indicates that social support networks may influence the nutritional status of young children, at least in India, but that the relationship may be complex. Although involvement in social support networks, community activities or groups may create an enabling environment for child nutrition and growth by providing an opportunity for women to gain knowledge and skills, some studies show that social network obligations may be negatively associated with child nutritional status, possibly due to trade-offs in workload and time for childcare, and/or the poor quality of childcare substitutes. Similarly, the direction of effect of maternal employment outside the home on child nutrition may be affected by trade-offs between increased income (and control over income) and time for childcare, and by the quality of alternate childcare providers. The studies reviewed suggest a positive association with child WAZ, but the net impact on child nutrition needs further exploration, particularly in contexts other than India.

When considering all studies across domains together, some patterns emerge. The social support studies taken together suggest that characteristics of maternal social networks may be more associated with child nutritional well-being than maternal citizenship activities; however, there are only two studies and they are both specific to children less than 2 years of age residing in Andhra Pradesh. The two studies on maternal employment have opposite findings regarding the relationship of maternal employment to child nutritional status; however, one study is nationally representative and the other among households residing rurally in one state. Therefore, it is difficult to draw a conclusion. However, it is the study of younger children that shows a positive association and this may highlight that their need for childcare is greater than that of older children. Studies measuring maternal

decision making using aggregate indices also hint at the same overall conclusion: those limited to younger children show positive associations with various indicators of child nutritional status, whereas both studies using data on children 0–5 years of age do not find statistically significant associations. Once again, perhaps children of younger ages have a more immediate need for care provided by the mother. For the remaining sub-domains of autonomy – control of resources, mobility autonomy and control of one's own health care – patterns have yet to emerge

Our review adds to the existing literature highlighting the potential importance of women's empowerment for nutrition in South Asia. Researchers identified the feminisation of poverty and the overall poor status of women in South Asia as a barrier to social development and human capital formation, several decades ago (Ramalingaswami *et al.* 1996; Bhutta *et al.* 2004). A study by Haddad (1999) found that women's status in Asia was particularly low compared with other regions, and that this might contribute to poor child health and nutrition, including intrauterine growth retardation and low birthweight. In a multi-country analysis, Smith *et al.* (2003a,b) combined several proxy indicators for women's status into a composite index and found stronger associations for women's status and child nutritional status in South Asia than in any other part of the world. Several additional studies of women's empowerment and child nutritional status in South Asia have used indirect measurements as proxies of women's (dis)/empowerment, such as media exposure, domestic violence and local exogamy. Thus far, evidence is inconclusive regarding the importance of these indirect measures, although two studies that used nationally representative data confirmed the widely documented positive association between maternal education and child undernutrition in South Asia as well as globally (Begum & Sen 2009; Bose 2011; Ruel & Alderman 2013).

A recent global review by Van den Bold *et al.* (2013) summarised existing evidence of the impact of development programmes such as cash transfer programmes, agriculture interventions and microfinance programmes on women's empowerment and nutrition. The review found evidence from relatively few

studies that cash transfers and agriculture programmes can improve women's empowerment, but none of the evaluations specifically looked at whether or not the positive impacts on women's empowerment, in turn, translated into improved child nutrition outcomes. Little is known about the impact of microcredit programmes on women's empowerment or nutrition, due to the scarcity of studies that have looked at these outcomes.

Our findings concur with those previous reviews and global analyses and contribute at least two additions: (1) an exclusive focus on direct measurements of women's empowerment following a conceptual framework intended to identify key determinants of child nutritional status, and (2) a systematic review of all empirical evidence in South Asia linking women's empowerment and child nutrition.

A mixed picture emerges regarding whether and how women's empowerment is linked to child nutritional outcomes in South Asia. Some of the inconsistencies in findings between individual studies may be due to population or context-specific factors; for instance, a broader location and larger age range may mask population heterogeneity and prevent identifying some associations that other, more focused studies find. Similarly, studies that cover a wide age range of children and/or do not disaggregate the data by child age may fail to identify the potentially significant associations between women's empowerment and nutrition among younger children. Given that younger children are more dependent on their mothers, they may be more likely to benefit from a mother who is empowered and able to take the right decisions regarding child feeding, care and health care seeking, which is consistent with the well-documented window of opportunity for improving nutrition, i.e. during pregnancy and the first 2 years of a child's life (Ruel 2010).

Differences in indicators may also make comparisons between studies difficult to interpret. Although many studies use multiple indicators to represent different aspects of women's empowerment, others use composite indices. For example, in an early study Shroff *et al.* (2009) constructed binary autonomy variables and used individual logistic regression models to look at the association between individual

women's empowerment domains and child nutrition. In their latter study (Shroff *et al.* 2011), they used confirmatory factor analysis to reduce eight mobility autonomy and eight actual mobility questions into two variables. Differences in indicators, measurement and analytical approaches may, at least partly, explain some of the inconsistencies in findings.

Our review highlights several methodological weaknesses in the body of literature, which prevent firm conclusions. First, all publications available used cross-sectional data, which makes it difficult to specify the direction of the relationships identified and prevent statements of causality. Second, although most of the studies controlled for important confounding factors and provided adjusted regression results, some key variables such as socio-economic factors or geographic location were sometimes omitted from the models, which could bias the findings. Finally, as mentioned earlier the absence of a standard definition of women's empowerment, the use of different sets of indicators measuring different sub-domains of women's empowerment and the wide variety of analytical methods used makes comparisons between studies difficult. Also, given that different domains have different implications for child nutritional status, exploring the consequences of each particular domain may provide complementary insight to looking at standard consequences of all the different domains of empowerment, as done in this review.

This review shows that several research gaps need to be filled. First, certain domains of women's empowerment are under-studied and in need of urgent attention. Women's workload and time available, control over food and lack of freedom of movement are examples of aspects of empowerment which may relate to a mother's ability to ensure optimal health of her children, but for which the evidence is scant. Second, there is an urgent need to harmonise definitions, key sub-domains of empowerment, indicators and measurement approaches. Third, studies should use rigorous analytical approaches; for instance, association studies should appropriately control for all relevant confounders using appropriate multiple regression analyses and rigorous evaluation work should be conducted to establish the causal relation-

ships between development programmes, women's empowerment and child nutrition. Finally, more studies analysing women's empowerment in various domains, i.e. workload and time and decision making and control, are needed to further our understanding of how individual women's empowerment domains relate to one another and which domains may be most important for particular outcomes of interest (Bhagowalia *et al.* 2012; Sraboni *et al.* 2012).

This review suggests that women's empowerment in the household may be an important determinant of child nutritional well-being in South Asia, and that its influence may differ by context, child age and other household and maternal characteristics. Based on the current evidence, a programmatic and policy focus on mothers of younger children (under 2 years of age) is warranted; specifically, improvements in their decision-making autonomy, more balanced workloads and stronger social support networks may be more likely to result in improvements in child nutritional status than for older children. The review highlights several research gaps that urgently need to be filled. This observation, however, should not prevent immediate investments in empowering women in South Asia, given the multiple benefits that such investments may generate. Empowerment of women is an important goal in its own right and may also be a key mechanism for ensuring healthier and better nourished South Asian children. Programmes and policies aiming to reduce child undernutrition in South Asia should not be narrowly focused on specific nutrition interventions and on improving diets, but should consider the ways in which household dynamics, including empowerment of women, could influence whether and for whom the interventions will succeed.

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Conflicts of interest

The authors declare that they have no conflicts of interest.

Contributions

KC conducted the review and drafted the paper with guidance and feedback from co-authors throughout. All authors participated in selection of the review topic, joint re-reading of key studies and reviewing of drafts, and all have read and approved of the final version of the paper and its submission.

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