Review Article

Associations between women's autonomy and child nutritional status: a review of the literature

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Abstract

Around the world, many women continue to experience low levels of autonomy. Recent literature has reported that the health consequences of low maternal autonomy extend beyond mothers and translate into health consequences for their children, and may be an important causal factor in child malnutrition. This review summarises the current knowledge of the relationship between maternal autonomy and children's nutritional status (defined as any measure that reflects the nutritional state of the body, such as birthweight or anthropometric scores) and child-feeding practices. The review also includes both discussion of the limitations found in the literature and directions for future research. A systematic review of the literature was conducted. Results of the studies included in the review strongly suggest that raising maternal autonomy is an important goal for improving children's nutritional status, yet gaps in the current knowledge exist, further confounded by issues with how autonomy is measured and limitations of cross-cultural comparability. A thorough understanding of the consequences of restricting women's autonomy will inform programmes and policy worldwide, and speed progress towards both empowering women and alleviating the global burden of child malnutrition.

Keywords: women's status, female empowerment, decision-making, child health, systematic review, child nutrition.

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Introduction

Women's autonomy is defined in different ways in the literature, but refers to a woman's ability to have control or influence over choices that affect herself and her family within her own particular context. This includes a woman's ability to influence decisions involving family, finances and expenditures, work, social outings, health care, travel, family planning and childcare, along with others. Recently, interest has been growing regarding how social constructs such as women's autonomy may be implicated in child mal-

nutrition. Although largely a preventable condition, child malnutrition is estimated to affect one-third of children in developing countries and is responsible for one-third of under five childhood deaths worldwide (UNICEF & WHO 2011). One underlying factor in child malnutrition is the lack of appropriate care for women and children (UNICEF 1998). Care is important for child nutritional status as it comprises 'measures and behaviours that translate available food and health resources into child growth and development' (UNICEF 1998). It is widely acknowledged that mothers play a vital role in determining

the nutritional status of their children. As primary caregivers, mothers have significant control over factors critical for child well-being, including food preparation and storage, feeding practices, psychosocial care, hygiene and health practices, and newborn care (Engle *et al.* 1999). Women's autonomy has received increased attention in this respect because a mother's degree of autonomy at the household level may impact her ability to make decisions in the best interest of her children or may limit her ability to divert household resources to her children. When mothers have control over income, they tend to divert more towards health- and nutrition-related expenditures than men (e.g. Caldwell 1986; Thomas 1997; Quisumbing & Maluccio 2000; Quisumbing & Maluccio 2003). Furthermore, an increase in women's autonomy is sometimes associated with a decrease in child mortality (Boehmer & Williamson 1996; Hossain *et al.* 2007).

Women's autonomy is also an important aspect of care for women. Women with greater autonomy tend to be more likely to use contraception, have longer birth intervals, are less likely to have unintended pregnancies and have smaller families (e.g. Balk 1994; Morgan & Niraula 1995; Upadhyay & Hindin 2005; DeRose & Ezeh 2009; Abada & Tenkorang 2012; Rahman 2012). Additionally, they are more likely to seek health care and use prenatal care, and have less risk for depression and anxiety disorders (Bloom *et al.* 2001; Patel *et al.* 2006; Hadley *et al.* 2010; Woldemicael & Tenkorang 2010; Qadir *et al.* 2011; Hou & Ma 2013). In many parts of the world, women continue to experience very low levels of autonomy. According to one analysis using data from 2004 to 2009, in 18 out of 30 developing countries from Africa, Asia, Latin America and the

Caribbean more than half of the women reported having no say in everyday household decisions like making large household purchases, purchases for daily needs, visits to family or relatives, or decisions regarding their own health care (UN Women 2011).

Promoting gender equality and women's empowerment is one of the eight established Millennium Development Goals set by the United Nations in the year 2000. Yet substantial progress still remains to be made towards empowering women around the world before the goal date of 2015 (United Nations 2013). While increasing women's autonomy is an important goal in and of itself for ensuring human rights, a growing body of literature recognises that women's autonomy has far-reaching impacts for the health and well-being of the community and the family, and is essential for reducing child malnutrition worldwide.

The aim of this literature review is to summarise the current evidence of the impact of maternal autonomy on child nutritional status, as well as to highlight some of the critical gaps in the literature. Overall, current evidence indicates that higher maternal autonomy is associated with benefits for child nutritional status. However, limitations exist because autonomy is measured differently from one study to the next, its association with child nutritional status differs based on which dimension of autonomy is measured, cultural contexts are not readily comparable, and maternal autonomy is sometimes negatively associated with child nutritional status. Following the review of the literature, important areas of focus for future research will be highlighted. Also included are some discussion on the limitations relating to current autonomy measurements as found in the identified studies, such as the issue of joint

Key messages

- The literature supports that an association exists between increases in maternal autonomy and better measures of child nutritional status.
- The relationship between maternal autonomy and child nutritional status varies with region and context.
- There are differences between studies in how autonomy is measured and issues with the validity of current autonomy measurements.
- Many opportunities exist for future research to enhance the current understanding of the relationship between maternal autonomy and child nutritional status.

decision-making, questions of validity and problems of cross-cultural comparability.

Search strategy employed in literature review

To identify articles relevant to the literature review question ‘how does maternal autonomy affect child nutritional status?’ searches were conducted systematically in Medline and Web of Science. In Medline, both a combination of MeSH terms (personal autonomy, child nutritional status) and free terms were used initially, followed by searches using only free terms. Searches using only free terms were found to be the most fruitful, so this became the focus of the search strategy. Key terms related to both autonomy and child nutritional status were identified (Table 1) and logically connected using Boolean operators in each database along with terms related to mothers (maternal, women, woman, female, mother) and children (child, children, infant). Searches were not limited in any database except in Medline by species (human) and field (title/abstract). No restrictions were made on child age, although child age was typically under 5 years in the identified studies, with a few studies additionally including older children up to 13 years of age. Additional searches were conducted of the grey literature using Google Scholar, and relevant articles were included in the review as these make a substantial contribution to the current understanding of the relationship between maternal autonomy and

child nutritional status. Following the identification of relevant articles using the search strategy, the references of all identified articles were searched by hand to locate additional relevant publications.

Inclusion criteria

Relevant articles were identified using the following two criteria:

1. Maternal autonomy or a closely related construct is a measured predictor of interest.
2. Child nutritional status is a measured outcome of interest.

All predictors related to autonomy, such as women’s status or empowerment, were included in the review for a comprehensive view of this topic. However, only direct measurements of maternal autonomy at the household level were included for review (as opposed to women’s autonomy at the societal level). All child nutritional outcomes were of interest and included in the review (anthropometric scores, birthweight, breastfeeding, and complementary feeding).

Summary of results

Overview of studies included for analysis

Twenty-two studies published from 1990 to 2011 were included for review. All studies were from developing countries, with 10 investigating South Asia (six from India), eight Africa and one Latin America. Additionally, three studies compared multiple countries from different continents. Table 2 provides a summary of all significant results of final regression models found in the literature on the impact of maternal autonomy on child nutritional status. These findings illustrate that maternal autonomy tends to be positively associated with child nutritional status, yet also show that autonomy is measured differently from one study to the next, tends to have inconsistent findings, sometimes is negatively associated with child nutritional status and differs across context. With a few exceptions, most of the studies measuring the relationship between maternal autonomy and child nutritional

Table 1. Predictor and outcome terms used in the search strategy

Objective: How does maternal autonomy affect child nutritional status?

Predictor Terms:	Outcome Terms:
<ul style="list-style-type: none"> • Autonomy • Women’s status • Empowerment • Decision-making • Social power • Women’s position • Women’s rights 	<ul style="list-style-type: none"> • Nutrition • Malnutrition • Feeding • Breastfeeding • Birthweight • Complementary feeding • Stunting • Wasting • Underweight • Weight • Height

Table 2. Significant associations between maternal autonomy on child nutritional status

Author(s) and year of publication	Region	Sample size (after exclusion)	How autonomy is measured	Outcome type	Results/Findings
Doan & Bisharat 1990	Jordan	$n = 736$ children from 0 to 36 months	Mothers that are heads or co-heads of households are considered to have high autonomy, while mothers that are daughter-in-law to heads of households are considered to have low autonomy.	Weight-for-age	Less maternal autonomy associated with lower child weight-for-age z-score (WAZ), whether or not other relatives are present ($F = 6.49^{***}$). R^2 for the whole model = 0.07.
Radebe <i>et al.</i> 1996	Mazowe District of Zimbabwe	$n = 327$ children between 6 months to 5 years of age	Decision-making power measured based on whether mother can make decisions without a male relative on what to sell and grow, when to obtain health care for children and family planning.	Weight-for-age	Mothers on communal lands with less decision-making power have children more likely to be malnourished [odds ratio (OR) = 2.86 ^{**}].
Bégin <i>et al.</i> 1997	Rural Chad	$n = 16$ infants and 98 children 12–71 months	Mothers questioned on whether they influence what foods their children are given.	Height-for-age	1. Maternal influence associated with higher child weight-for-height z-score (HAZ) ($\beta = 1.61^{***}$). 2. Maternal influence results in higher HAZ for younger children but not older children ($\beta = -0.264^*$).
Merchant & Udipti 1997	Bombay	$n = 150$ infants	Decision-making power measured using four categories: household decisions, financial decisions, decisions regarding self and social decisions.	Three categories of child growth (weight and height); positive deviants, median growers and negative deviants	1. Less maternal autonomy for child medical treatment decisions during periods of illness results in greater likelihood children are in negative-deviant growth category ($P \leq 0.05$). Measure of association not reported. 2. Less maternal autonomy for social decisions results in greater likelihood children are in negative-deviant growth category ($P \leq 0.01$). Measure of association not reported.
Bégin <i>et al.</i> 1999	Chad	$n = 98$ children between 12 and 71 months of age	Autonomy measured based on earned money and control of income, involvement in decisions on household food and health expenditures and child feeding and whether other family members participated in these decisions.	Height-for-age	Maternal influence over child-feeding decisions associated with marginally higher height-for-age scores ($\beta = 0.53^*$). R^2 for all caregiver-related variables = 0.36.
Simon <i>et al.</i> 2002	Mali	$n = 402$ children under 5 years of age and 261 mothers	Mother's felt control and passivity/helplessness were measured using a 20-item questionnaire.	Weight-for-height (wasting) and height-for-age (stunting)	1. Higher maternal score for passivity/helplessness marginally associated with greater likelihood that children are wasted ($\beta = 0.216^*$) and stunted ($\beta = 0.175^*$). 2. Higher maternal score for felt control associated with greater likelihood that children are stunted ($\beta = -0.359^*$) while no relationship seen for height-for-age scores.

Smith <i>et al.</i> 2003	Data from thirty-six countries in South Asia (SA), Sub-Saharan Africa (SSA) and Latin America/Caribbean (LAC)	<i>n</i> = 117 242 children under 3 years old and 105 567 women	Mother's relative power within the household measured by making a single index from four different factors, including whether mother works for cash income, mother's age at first marriage, percent difference in the mother and her partner's age, and the difference in the mother and her partner's years of education.	Height-for-age and stunting, weight-for-height and wasting, and weight-for-age and under-weight	<ol style="list-style-type: none"> 1. Across all 36 countries, higher decision-making power is positively associated with child WAZ ($\beta = 0.012^{***}$) 2. In SA, SSA and LAC, higher maternal power positively associated with child's growth including WAZ ($\beta = 0.0156^{***}$ for SA; $\beta = 0.0046^{***}$ for SSA), HAZ ($\beta = 0.0140^{***}$ for SA; $\beta = 0.0034^{***}$ for SSA) and weight-for-height z score (WHZ) ($\beta = 0.0094^{***}$ SA; $\beta = 0.0039^{***}$ for SSA; $\beta = 0.0143$ for LAC). 3. In SA, women's power decreases likelihood that her child will be underweight (OR = 0.976^{***}), stunted (OR = 0.980^{***}) and wasted (OR = 0.986^{***}). In SSA, increased power decreases likelihood of child being underweight (OR = 0.994^{***}), stunted (OR = 0.994^{***}) and wasted (OR = 0.992^{***}). In LAC, increased power decreases chances of child being stunted (OR = 0.995[*]) and wasted (OR = 0.989[*]). 4. In SA, out of four countries, all but Bangladesh showed associations between power and child WAZ. In SSA, out of 23 countries, six showed associations between women's power and child WAZ, while one country (Ghana) showed a negative association. In LAC, out of nine countries, two showed associations between women's power and child WAZ, while one country (Brazil) showed a negative association between women's power and child WAZ. 8. Increased decision-making power associated with increased breastfeeding initiation, decreased exclusive breastfeeding, decreased breastfeeding duration, increased bottle-feeding, increased chances that a 6–12-month-old child received complementary foods, and increased eating events for children older than 6 months. Results varied in a region-specific manner.
					<ol style="list-style-type: none"> 1. Mother's experience of domestic violence associated with lower HAZ for their daughters ($\beta = 0.138^*$).
Roushdy 2004	Egypt	<i>n</i> = 3286 women with children under 5 years old	Women's decision-making measured using four dimensions: mobility, opinion of domestic violence, control of household cash allocation and childcare decisions. Experience of domestic violence also measured.	Height-for-age	
Basu & Koolwal 2005	India	<i>n</i> = 4408 ever-married women giving birth in the past 5 years	Self-indulgent autonomy measured as age, age difference with partner, reads magazine/ listens to radio, decisions on visits with family/friends, decisions on own health care, ability to use money and opinion of wife-beating. Responsibility measured as input to earnings, permission to go to market, and decisions on food and major purchases.	Whether or not youngest child has anaemia	<ol style="list-style-type: none"> 1. When mother's ability to make decisions about own health care increases from joint decision-making to making decision alone, it increases the odds that her youngest child will not have anaemia (OR = 2.0866[*]). 2. Odds of not having anaemia increase if child's mothers contributes less than half of total family income compared to mothers contributing almost none of family income (OR = 0.2097^{**}). 3. Odds of not having anaemia increase if mother reads newspaper (OR = 4.2934^{**}) and does not think domestic violence ever justifiable (OR = 1.6908^{**}).

Table 2. Continued

Author(s) and year of publication	Region	Sample size (after exclusion)	How autonomy is measured	Outcome type	Results/Findings
Desai & Johnson 2005	Benin, Malawi, Mali, Uganda, Zimbabwe, Egypt, India, Nepal, Haiti, Colombia, Nicaragua and Peru	n = typically between 5000 and 8000 households	Women's decision-making measured as whether women have final say in health care, making large household purchases, household purchases for daily needs and visits to family or relatives.	Height-for-age	Out of 12 countries, women's decision-making was associated with higher children's height-for-age for two countries, India ($\beta = 9.27^{***}$) and Mali ($\beta = 7.64^*$). However, women's decision-making associated with lower children's HAZ in two countries, Haiti ($\beta = -8.06^*$) and Malawi ($\beta = -10.9^{***}$). 1. The empowerment variables positively associated with child WAZ were mother's position in household and involvement in decision-making ($\beta = 0.08^{***}$ for model I, $\beta = 0.09^{**}$ for model II) and mother's mobility ($\beta = 0.10^{***}$ for model II). Maternal employment and income associated with lower child WAZ for model I ($\beta = -0.12^{***}$), but was no longer significant after including an interaction term between maternal employment and food insecurity in final model II. 2. Comparing the upper and lower quartiles of children's WAZ, both maternal income and employment (OR = 2.168 ^{***}) and psychological abuse and sexual coercion (OR = 1.429 ^{**}) increases the risk of children having low WAZ.
Sethuraman <i>et al.</i> 2006	South India	n = 820 mother-child dyads, with children between 6 and 24 months of age	Women's empowerment measured as mobility within village, control over food supply, current employment and income, position in household and involvement in decision-making, previous employment, family type and mobility around the village, women's decisions, experience of psychological abuse and sexual coercion and distance from natal home.	Weight-for-age	1. Increased shared power associated with higher child BMI ($\beta = 0.034^{**}$; $R^2 = 0.128$) 2. Higher bargaining power of mother associated with lower child BMI ($\beta = -0.030^{***}$; $R^2 = 0.1786$). 1. Violence associated with lower child HAZ in Bolivia ($\beta = -23.3$) and Haiti ($\beta = -81.4$). No P -value reported. 2. Higher scores for maternal autonomy was associated with lower child HAZ scores in Haiti ($\beta = -35.0$). No P -value reported.
Patel <i>et al.</i> 2007	Bolivian Amazon	221 households with 659 children between 2 and 13 years of age	Household power was measured by questioning both mothers and fathers one question: 'Who decides what to buy at the market or what food to cook?'	Child body mass index (BMI)	3. Joint decision-making of the parents associated with lower child HAZ in Bolivia ($\beta = -16.2$) but higher child HAZ in Nicaragua ($\beta = 28.5$). No P -value reported.
Heaton & Forste 2008	Latin America (Colombia, Peru, Haiti, Nicaragua and Bolivia)	Sample size not given. Data taken for children ≤ 5 years of age	Decision-making measured using five questions on who makes final decisions regarding health care, large household purchases, everyday household purchases, visits to relatives and food to be cooked daily.	Height-for-age	Lack of maternal autonomy increases the chances of linear growth retardation (stunting) (OR: 1.38; 95% confidence interval: 1.01–1.90).
Mashal <i>et al.</i> 2008	Afghanistan	n = 2474 children under 5 years old from 1327 households	Maternal autonomy measured using questions on whether mother has permission from the head of the household to bring the child to see a doctor, and whether it was required that mothers have an accompanying person to visit a health facility with the child.	Emaciation (wasting), linear growth retardation (stunting) and underweight	
Brunson <i>et al.</i> 2009	Northern Kenya	n = 435 women with 934 children between 0 and 10 years old	Maternal autonomy was measured with a culture-specific questionnaire consisting of 11 questions: three questions on money and food, three on livestock and five on medical care, birth control and schooling.	Weight-for-height	1. Maternal autonomy was associated with higher WHZ for children over 36 months of age ($\beta = 0.23^{**}$) but no relationship was seen for children under 36 months of age. 2. Out of the five regions tested in Kenya, women's autonomy was only a positive predictor of child WHZ for children over 36 months of age in Korr ($P < 0.02$; $R^2 = 0.17$).

Shroff <i>et al.</i> 2009	Andhra Pradesh, India	$n = 821$ mothers and oldest children less than 36 months of age	Maternal autonomy is measured based on decision-making power, freedom of movement, financial autonomy and attitude towards domestic violence.	Stunting	Increased likelihood of child stunting was associated with both whether a woman needed permission to go to market (OR = 0.593**) and whether a woman was allowed to set aside money for personal use (OR = 0.731**).
Dancer & Rammohan 2009	rural Nepal	$n = 4360$ rural children between 6 and 59 months of age	Maternal autonomy was measured through seven questions including whether the mother has the final say on her own health care, on making large household purchases and on making purchases for daily needs, as well as whether getting medical help for herself is a problem due to needing permission to go, a problem because of the distance to the health facility, a problem because of taking transport or a problem because she is unable to go alone.	Stunting and wasting	1. Mothers reporting more problems taking transport to get medical help for themselves was associated with significantly lower child HAZ ($\beta = -0.127^*$). Mothers having the final say on their own health care associated with higher child HAZ ($\beta = 0.139^*$). Mothers having problems going to a medical facility for themselves due to not wanting to go alone had a negative association with their children's WHZ ($\beta = -0.063^{**}$). Mothers who had more problems getting medical help for self (unable to take transport) have children less likely to not be stunted (OR = 0.829**).
					2. Mothers having problems getting to a medical facility due to the distance associated with higher child WHZ ($\beta = 0.090^{**}$).
					5. Mothers having final say on making large household purchases associated with children having lower WHZ ($\beta = -0.088^*$). Mothers having the final say on making purchases for daily needs associated with children having better WHZ ($\beta = 0.087^{**}$).
					8. When analysed separately by gender, all the above results were only significant with male children.
					5. Mothers who have the final say on their own health care have children more likely to not be stunted (OR = 1.284*) and this held for both male children and female children when analysed separately.
Maffioli <i>et al.</i> 2009	India, Bangladesh, Burkina Faso, Ethiopia and Ghana	India- $n = 26\ 309$ Bangladesh- $n = 3565$ Ghana- $n = 1900$ Ethiopia- $n = 2873$ Burkina Faso- $n = 5565$ (All children between 1 and 5 years of age)	Decisional autonomy measured based on mother's participation in decisions on health care, purchases, visits to relatives and food to be cooked. Women categorized as having more, intermediate or less autonomy. Wife's relative status to husband measured as differences between wife and husband's education and difference in prestige of the occupations. Low status assigned if both of mother's variables were lower than husband, higher status if both variables were higher than the husband's or medium status for other situations.	Stunting	1. A mother's decisional autonomy is not correlated with the probability of her children being stunted in any of the five countries. 2. Mothers' low relative status compared with their husband is associated with increased child stunting only in India (OR = 1.367**).
Ross-Sutis 2010	Tanzania	$n = 6101$ women between 15 and 45 years who have children between 0 and 59 months	Decision-making power measured based on final say on own health care, large purchases, visits to family and food to be cooked. Also measured if mothers felt that violence was justified in various circumstances and financial independence	Stunting, wasting and underweight.	A mother's autonomy in choosing her own health care was associated with improved HAZ. All other autonomy variables were insignificant (OR = 0.857**).

Table 2. Continued

Author(s) and year of publication	Region	Sample size (after exclusion)	How autonomy is measured	Outcome type	Results/Findings
Bose 2011	India	124 385 women and their children less than 5 years old	Women's autonomy is measured based on decisions about own health care, major household purchases, purchases for daily needs and visiting family or relatives, and whether the woman is allowed to go to the market, the health facility or places outside the community/village alone.	Duration of breastfeeding, whether child had milk in past 24 h, meat, fish or eggs in past 24 h, and if child is malnourished	<ol style="list-style-type: none"> 1. Increase in mother's autonomy is associated with increases in the duration of breastfeeding ($\beta = 0.154^{***}$), and increases in the likelihood that the child received both supplemental milk products ($\beta = 0.030^{***}$) and supplemental meat, fish or eggs ($\beta = 0.057^{***}$). 2. Maternal autonomy and child sex interact significantly to affect child malnutrition, with female children less likely to be malnourished if their mother has higher autonomy ($\beta = 0.029^{**}$).
Shroff <i>et al.</i> 2011	Andhra Pradesh, India	$n = 600$ mother-infant dyads, with infants between 3 and 15 months of age	Maternal autonomy was measured using a 47-item questionnaire covering seven dimensions of autonomy including household decision-making, child-related decision-making, financial independence, permission for mobility, actual mobility, acceptance of domestic violence and experience of domestic violence. With the exception of experience of domestic violence, all items were weighted with some removed to improve fit, and a composite score created for each dimension of autonomy.	Weight-for-age, length-for-age, weight-for-length and exclusive breastfeeding at 3–5 months of age	<ol style="list-style-type: none"> 1. Maternal financial autonomy is significantly associated with exclusive breastfeeding at 3–5 months of age (OR = 1.23**). 2. A high score for maternal mobility autonomy associated with lower WHZ ($\beta = -0.202^{**}$). 3. A high score for maternal household decision-making is associated with significantly higher scores for WAZ and HAZ ($\beta = 0.167^{**}$). 4. High scores for both maternal mobility autonomy ($\beta = 0.141^{**}$) and childcare decisions ($\beta = 0.10^{**}$) is associated with higher HAZ. 5. An interaction between child birthweight and maternal mobility autonomy indicates that for low birthweight infants, maternal mobility autonomy had a positive association with infant's HAZ ($\beta = -0.143^{**}$) while no relationship was seen for infants with higher birthweights.
Chakraborty & Anderson 2011	India	$n = 14\ 407$ mother-child dyads for measured birthweight $n = 33\ 881$ mother-child dyads for maternal perception of birthweight. All children <5 years old	Maternal autonomy was measured based on whether or not the mother had the final say on her own health care, the final say on making large household purchases, the final say on making purchases for daily needs and the final say on visits to family or relatives. Autonomy scores were split into three categories: high, medium and low autonomy.	Low birthweight (<2500 g)	Low maternal autonomy increased the likelihood of low birthweight infant (OR = 1.28***). There was no significant influence for a medium autonomy score.

* $P \leq 0.10$, ** $P \leq 0.05$, *** $P \leq 0.01$.

status can be roughly divided into two groups based on whether different dimensions of autonomy are combined into one composite score, or whether each is analysed as a separate independent variable. For the purpose of this review, the studies that analyse each dimension separately (or only measure one dimension) and the studies that use a composite score for autonomy will be discussed separately. All findings are reported as significant ($P \leq 0.05$), or as marginally significant ($P \leq 0.10$). Because the way autonomy is defined and measured is critical to the study of its impacts on health outcomes, this review first examines the definitions and measurement of autonomy in the identified studies, and also highlights qualitative literature demonstrating the complexity of autonomy measurement.

Definitions of women's autonomy

There has been a fair amount of discussion in the literature on how autonomy should be defined. Autonomy is considered a multidimensional construct, consisting of dimensions such as the ability to make purchases and control resources, the ability to make decisions about health care or childcare, and the experience of domestic violence (Agarwala & Lynch 2006). All of these dimensions of autonomy are related and purported to measure the same underlying construct, yet women can have high autonomy in one dimension and very little autonomy in another. For example, a woman may have some control over daily household expenditures but little say in large household purchases, or a woman may be able to make decisions about her and her children's health care but may be disempowered by her experience of domestic violence. Because no standard definition of autonomy has been accepted, many studies define autonomy operationally in distinct ways. This is true in the literature describing the effect of women's autonomy on various child health outcomes, including children's nutritional status.

Of the studies using child nutritional status as an outcome measure, each uses different dimensions to comprise the autonomy construct. For example, one recent study defined autonomy specifically in relation to decisions made on mobility, finances and health

care (Chakraborty & Anderson 2011). Radebe *et al.* (1996) measured autonomy as a woman's ability to make decisions without permission from a male relative on 'what to grow, what to sell, when to seek health care for her children and choices about family planning.' Shroff *et al.* (2011) defined autonomy as '7 dimensions in which women make decisions and control resources within the family', expanding the definition of autonomy to include more decision-making dimensions like 'household decision-making autonomy, child-related decision-making autonomy, financial control and access (financial autonomy), decisions regarding mobility (mobility autonomy), freedom of movement (mobility), acceptance of domestic violence, and experience of domestic violence'. To select dimensions for study, some researchers rely on qualitative work to choose dimensions that are culturally appropriate, while many others select dimensions based on previous research or what is available in the survey data. In a few recent cases, statistical considerations were used to narrow which dimensions to include in analysis. For example, Chakraborty & Anderson (2011) used principal component analysis to select dimensions most relevant to their outcome of interest. Shroff *et al.* (2011) used predetermined dimensions, and used confirmatory factor analysis to determine which questions should comprise each dimension. The variability in which dimensions are included in analyses limits comparability across studies, as will be discussed further (see 'Composite score for autonomy').

This review uses the term 'autonomy' because it commonly refers to women's agency at the household level. However, similar constructs such as women's empowerment and women's status are frequently used alongside, interchangeably or in the stead of women's autonomy (Basu & Koolwal 2005). The terms status or empowerment are typically defined in broader and more comprehensive ways than is autonomy. Status, for instance, is often defined at multiple levels rather than just the household level. In a cross-country study by Smith *et al.* (2003), status was defined as 'women's power relative to men in the households, communities and nations in which they live'. This study measured women's decision-making power at the household level as well as gender

equality at the societal level. A study by Desai & Johnson (2005) used a definition developed by early researchers (Dixon-Mueller 1978; Mason 1986), who define women's status as women's 'access to and control over material resources [...] and social resources [...] within the family, in the community, and in the society at large', although they contend that this broader construct can be represented by data gathered at the household level. On the other hand, empowerment is sometimes distinguished from autonomy and status as a process rather than a static state (Malhotra *et al.* 2002; Basu & Koolwal 2005; Mullany *et al.* 2005). However, empowerment is also frequently considered a condition (Dixon-Mueller 1978; Basu & Koolwal 2005). Other more comprehensive discussions of the definitions of the terms empowerment, status and autonomy exist in the literature (e.g. Mason & Smith 2000; Malhotra *et al.* 2002; Smith *et al.* 2003; Basu & Koolwal 2005; Brunson *et al.* 2009).

In general, autonomy, status and empowerment are all related constructs sometimes used interchangeably and defined in similar but distinct ways in the literature. The lack of a clear definition for these terms is considered problematic by some (Sethuraman *et al.* 2006; Brunson *et al.* 2009), but not all. For instance, Smith *et al.* (2003) argues that it does not pose a problem as long as researchers clarify what is meant by the terms they are using. In addition to these constructs, other terms were included for this review such as women's social power (Simon *et al.* 2002) or bargaining power (Patel *et al.* 2007). Such terms have distinct meanings but are highly related to autonomy and of interest.

Measuring women's autonomy

Many comprehensive discussions on how to conceptualise and measure autonomy exist (e.g. Kabeer 1999; Agarwala & Lynch 2006). Because a woman's agency or ability to make important decisions reflects her autonomy, one way of operationalising autonomy is to directly measure a women's ability to make common household decisions. The most frequently employed method of measuring autonomy in the identified literature is to use survey data, such as data

from Demographic and Health Surveys (DHS), which question women on who in the household makes decisions on a number of differing dimensions of autonomy such as what to cook, daily household purchases, large household purchases or other common dimensions of household decision-making. Similar to survey data used in many studies of women's autonomy, in DHS, mothers report who has the final say on various household decisions, and can answer that they themselves have the final say, their partners have the final say, the decision is made jointly, or someone else has the final say. Using these answers, women are typically rated as having high (woman has the final say), intermediate (decision is made jointly) or low (woman has no say) autonomy.

However, alternative methods of measuring women's autonomy are also employed in the identified literature. In a society in which women are almost universally subject to men, Doan & Bisharat (1990) used women's position in the household (whether head/co-head or subject to a mother-in-law or other relative) as a measure of autonomy. On the other hand, Simon *et al.* (2002) used a mother's felt control and passivity/helplessness to represent women's social power. Smith *et al.* (2003) measured women's status by whether the mother works for cash income, her age at first marriage, the percent difference in the mother and her partner's age, and the difference in the mother and her partner's years of education. Smith *et al.* (2003) employed these measures because variables giving direct evidence of women's status were not available in all the countries being tested, but validated the variables for the countries in which direct measurements of decision-making power were available and found a strong, positive correlation.

To assign autonomy score to a given woman in the identified studies, researchers either make a composite score that includes various dimensions of autonomy, or they may analyse each question or dimension separately. It is unclear that one method of measurement is preferred over the other by researchers, and there is no indication that one leads to clearer conclusions than the other. This difference in measurement limits comparability among studies and, ultimately, limits this field's ability to make strong conclusions or recommendations for programmes.

Agarwala & Lynch (2006) advocate using a composite score for autonomy as analysing dimensions separately dilutes the available research (due to multicollinearity between dimensions) and undermines the theory that autonomy is comprised of separate dimensions that represent one underlying construct. On the other hand, many dimensions comprise autonomy, and the relationship of some dimensions with child health outcomes may be obscured when combined with others in a single analysis. In a recent study, Shroff *et al.* (2011) separately related each dimension of autonomy to child health outcomes, hypothesising that each may influence child health differently. Among the studies that measure dimensions of autonomy separately, differing associations with child health are found. Of additional importance is the finding that the correlates of women's decision-making autonomy over any one decision differ from the correlates of decision-making autonomy over other decisions (Kishor & Subaiya 2008). Issues of validity resulting from autonomy measurements will be discussed further (see 'Validity').

Qualitative research on autonomy

The discussion above illustrates how complex and challenging it is to measure autonomy. Qualitative literature exploring gender relations clearly highlights the social complexity that can surround women's decision-making. For example, levels of autonomy are highly culturally dependent and vary even within a particular region. One qualitative study found that in the Mysore region of Karnataka, India, tribal women had higher rates of autonomy than rural women of the same region due to different cultural norms (Sethuraman *et al.* 2006). Levels of autonomy in a particular context can also vary greatly with time, so that measures that are appropriate at one time may not be appropriate at another (Malhotra *et al.* 2002). Additionally, the availability of resources must be taken into account. Autonomy involves the ability to control resources, yet poverty also limits women's access to resources. Furthermore, mismanagement of money by women or their husbands can also have important implications. For example, one early qualitative study of women in rural Yemen found that

household management of finances made a substantial difference in child health outcomes. One woman had considerable financial autonomy but tended to use it to buy soft drinks, decorations and jewellery and her household was frequently in debt, exemplifying that while women may be more likely to divert resources to children this is not necessarily always the case (Myntti 1993). This study also highlighted the importance of social support and maternal psychological well-being to child health outcomes. Women whose children had better health outcomes tended to have supportive relationships with neighbours and family, accepted assistance when needed, and valued hard work, while women with poor child health outcomes were more likely to be isolated and refuse assistance, tended to have conflict or poor relationships in general with their husbands and families, and tended to be more fatalistic (Myntti 1993). A mother's social support and her personal characteristics and values likely have a large influence on decision-making. To add another level of complexity, feminist literature documents that women can internalise cultural norms and accept low status as inevitable and thus, a woman's own perceptions of her autonomy may not be accurate (Malhotra *et al.* 2002). Overall, qualitative literature highlights many of the nuances in gender relations which are difficult to capture in operationalised measurements of autonomy, and which must be taken into consideration when interpreting results. On the other hand, a qualitative study from India examining the influence of maternal autonomy on child-feeding practices suggested that women with more financial autonomy and autonomy over child-related decisions were more likely to feed their babies colostrum rather than discarding it (Shroff 2007). Thus, there is some support in the qualitative literature for a direct improvement in childcare practices when women's autonomy is increased.

Much of the qualitative research that focuses on women's autonomy or empowerment comes from South Asia (Malhotra *et al.* 2002). Survey questions from DHS that measure women's empowerment were selected to be cross-culturally relevant but were based mainly on knowledge of empowerment in the South Asian context (Schatz & Williams 2011). How these variables reflect empowerment in other

contexts has not yet been thoroughly explored. In fact, there is a surprising dearth of research qualitatively examining dimensions of women's household decision-making autonomy in various cultural contexts. This is important, as certain questions can have different implications in different contexts, or may not be useful indicators of autonomy in some cultures. Some literature on women's empowerment suggests that to accurately measure empowerment, some exploratory, qualitative research must first occur and questions should first be tailored to each specific context (Hashemi *et al.* 1996; Malhotra *et al.* 2002). While practical difficulty may sometimes limit researchers' ability to apply this level of rigour, several of the reviewed studies did make efforts to measure autonomy in culturally relevant ways.

Joint decision-making

An important difference in autonomy measurements among the studies under review is whether they include joint decision-making (when a woman reports that she and her husband make a decision together as opposed to the woman having the final say on the decision) as indicating a woman has lower of autonomy in the household. For example, Brunson *et al.* (2009) emphasised that autonomy should be defined as the ability to make a decision with complete independence from any other person. In this study, women who had the final say on various household decisions were scored as having greatest autonomy, while women who made decisions jointly with their husbands were scored as having less autonomy (Brunson *et al.* 2009). This type of scoring is commonly employed in the identified studies. In contrast, both Heaton & Forste (2008) and Patel *et al.* (2007) measured joint decision-making as a separate variable. The rationale behind this is twofold: (1) the father's involvement may benefit child development and (2) joint decision-making has been associated with reduced rates of domestic violence and lower rates of child mortality (Kishor & Johnson 2004; Heaton & Forste 2008). Issues of validity related to joint decision-making will be discussed further (see 'Validity').

Socio-demographic characteristics of women with low autonomy

Although many of the reviewed studies did not report differences in socio-demographic characteristics based on autonomy status, some characteristics of women with low autonomy can be distinguished from studies which do report these differences. Women with low autonomy consistently tend to be younger (Doan & Bisharat 1990; Sethuraman *et al.* 2006; Chakraborty & Anderson 2011) and have lower socio-economic status (Simon *et al.* 2002; Chakraborty & Anderson 2011). Chakraborty & Anderson (2011) reported that women with less autonomy were more likely to have no education, and similarly, Simon *et al.* (2002) found women with more felt control tended to be more educated. Doan & Bisharat (1990) reported that women with lower autonomy were actually more likely to be highly educated, but this was likely because highly educated women also tended to be younger in this culture, and younger women were more likely to be subjected to their mother-in-law. In other studies, women with lower autonomy tended to have lower weight and body mass index (BMI) (Sethuraman *et al.* 2006; Chakraborty & Anderson 2011). Additionally, Sethuraman *et al.* (2006) found that women with low autonomy were more likely to be from rural rather than tribal communities. Women with more felt control tended to be more likely to have participated in a credit rotation scheme, have a husband in a skilled occupation and have a supportive mother-in-law (Simon *et al.* 2002). Furthermore, Chakraborty & Anderson (2011) reported that women with low autonomy were more likely to be unemployed, followers of Islam, from male-headed households, daughter-in-laws of household head (or other relative other than wife) and from Northeast and Eastern regions of India as compared with Central and Southern regions.

Studies separating the dimensions of autonomy ($n = 11$)

Table 3 summarises the relationship of commonly measured dimensions of women's autonomy with child nutritional status. Dimensions are included in

Table 3. Summary of the effects of different commonly measured domains of women's autonomy on child nutritional status in the literature

	Child feeding/ childcare autonomy	Maternal health care autonomy	Child health care autonomy	Mobility/ social autonomy	Financial autonomy	Maternal disbelief in legitimacy of domestic violence	Less maternal experience of domestic violence	General maternal involvement in household decision-making
Bégin <i>et al.</i> 1997	IMPROVE	-	-	-	-	-	-	-
Merchant and Udipi 1997	NS	-	IMPROVE	IMPROVE	NS	-	-	-
Bégin <i>et al.</i> 1999	IMPROVE	-	-	-	NS	-	-	-
Roushdy 2004	NS	-	-	NS	NS	NS	IMPROVE	-
Basu and Koolwal 2005	-	IMPROVE	-	NS	IMPROVE	IMPROVE	-	-
Sethuraman <i>et al.</i> 2006	-	-	-	IMPROVE	MIXED	-	IMPROVE	IMPROVE
Heaton and Forste 2008	-	-	-	-	-	-	IMPROVE	-
Mashal <i>et al.</i> 2008	-	-	IMPROVE	-	-	-	-	-
Shroff <i>et al.</i> 2009	-	-	-	IMPROVE	IMPROVE	NS	-	NS
Dancer and Rammohan 2009	-	IMPROVE	-	-	MIXED	-	-	-
Ross-suits 2010	-	IMPROVE	-	NS	NS	NS	-	-
Shroff <i>et al.</i> 2011	-	-	IMPROVE	MIXED	IMPROVE	NS	NS	IMPROVE

Boxes are labelled 'IMPROVE' if study found a positive association of the domain with a measure of child nutritional status, 'MIXED' if mixed results were found, 'NS' if no significant results were found, and '-' if domain was not measured.

the table only if they were found to significantly affect child nutritional status in at least one of the identified studies separating the dimensions of autonomy. Table 3 illustrates that different dimensions of autonomy affect child nutritional status inconsistently, with many found to have non-significant associations with child nutritional status approximately equally as often as significant associations. Any apparent trends should be interpreted with caution due to the small number of studies, differences in measurement and limitations in comparability, also keeping in mind that the number of times each dimension is measured impacts the number of times it will be found to be significant. Even so, some general dimensions of autonomy do stand out as being relevant to children's nutritional status more frequently than others. Each will be explained and discussed briefly.

Child feeding/childcare autonomy

'Child feeding/childcare autonomy' is considered as any question measuring whether the mother has autonomy in decisions regarding the care and feeding of children. When mothers have autonomy over child feeding and childcare, they may be more likely to follow recommended feeding practices (Shroff 2007) or provide more appropriate care. Questions used to measure this dimension vary from study to study. Bégin *et al.* 1997 and Bégin *et al.* 1999 (notably, using the same dataset) found that greater maternal influence over child-feeding decisions in rural Chad was associated with improvement in child's height-for-age. This relationship was found in the context of food scarcity and widespread child malnutrition, and thus maternal influence over feeding decisions may have been especially important in this context (Bégin *et al.* 1997, 1999). Other studies have suggested that maternal autonomy may be especially important in situations of resource scarcity (Brunson *et al.* 2009). While two other studies measured some aspect of the relationship of maternal autonomy with child feeding or care on child nutritional status, no other significant associations were found: Merchant & Udipi (1997) examined the association of intra-household food

allocation and decisions regarding breastfeeding and weaning on child growth with no significant results, and Roushdy (2004) measured the association of decision-making related to children on child height-for-age with no significant results. A study by Shroff *et al.* (2011) also measured child-related decision-making and found it to be associated with improved child nutritional status, but the two questions measuring this dimension were whether the mother had autonomy over infant immunisations and what to do if the child falls sick. For this reason, this finding was instead considered part of health care autonomy. Additionally, somewhat related to maternal control over child feeding is maternal control over food decisions in general. Several studies investigated aspects of maternal autonomy over food decisions, with no significant results: Basu & Koolwal (2005) examined the association of who decides what to cook with whether or not the youngest child has anaemia, Sethuraman *et al.* (2006) studied the association of maternal control over food supply with child's weight-for-age, and Ross-Suits (2010) examined the association of maternal autonomy over food to be cooked each day with child stunting, wasting and underweight. The preponderance of non-significant results suggests that maternal influence over childcare and child feeding (or food decisions in general) may be a weak measure of autonomy. Women are often expected to be sole caretakers of children, and in the same vein, food preparation is often considered a woman's responsibility in many cultures. Having control over childcare decisions and food-related decisions would be a poor representation of autonomy if a woman is exercising her expected role in the household. In fact, a question concerning women's control over food to be cooked was included in the DHS questionnaire with the assumption that women's autonomy over this aspect of household decision-making would be the norm, and women not in control of this aspect of decision-making would be unusual (Kishor & Subaiya 2008). More insight is needed as to what maternal control over childcare represents in specific situations and contexts, and likely autonomy over food decisions should not be considered a measure of autonomy.

Health care autonomy

Among the studies included for review, women's autonomy over health care, either for herself or for her children, is the dimension most consistently associated with children's nutritional status. When women control their own health care, they may have more access to important services such as prenatal care. Additionally, when women have control over decisions regarding health care, they may be quicker to seek health care during periods of illness both for themselves and their children, despite potential cost. Of the three studies measuring female autonomy over child health care, all found significant associations with child nutritional status. Merchant & Udipi (1997) found that mothers with less autonomy over their children's medical treatment during an illness were significantly more likely to have children in the negative-deviant growth category. Mashal *et al.* (2008) defined women's autonomy as whether the mother could bring her children to see a doctor without her partner's permission and whether she needed to be accompanied while bringing children to a health facility, and found maternal health care autonomy to be significantly associated with decreased incidence of child stunting. Shroff *et al.* (2011), as mentioned previously, combined two questions in measuring childcare decision-making: whether a mother decided on whether to immunise the infant and on what to do when an infant became sick. Childcare decision-making was associated with better child length-for-age scores (Shroff *et al.* 2011).

Three studies also evaluated whether female control over their own health care had a significant association with child nutritional status, and all found significant results. Ross-Suits (2010) found maternal autonomy in choosing her own health care to be significantly associated with better child's height-for-age scores, and Dancer & Rammohan (2009) similarly found that maternal control over health care was significantly associated with improved child's height-for-age scores, although only marginally. Conversely, Dancer & Rammohan (2009) measured the relationship of various problems mothers may encounter in getting to a medical facility with child nutritional

status and found contradictory results. Mothers reporting that it was 'a small problem' or that it was 'not a problem' to get to a medical facility for themselves because of available transport had children with marginally better height-for-age scores, yet children were more likely to be stunted. Similarly, mothers with no problems or only small problems getting to a medical facility for themselves due to their willingness to go alone had children with better weight-for-height scores. However, mothers having 'a big problem' getting to a medical facility for themselves because of the distance had children with better weight-for-height scores. All of these results were only significant for male children when genders were analysed separately. The reason for these contradictory findings is unclear. However, using the degree of problems women experience in getting to a medical facility to define autonomy is unusual, with no other identified study using such measures. Based on the information provided, it is uncertain how women would interpret whether they were experiencing 'big problems' or 'small problems,' and also uncertain what other resources women may be able to access if they are experiencing problems in any of the areas (such as distance to health facility). Finally, Basu & Koolwal (2005) found that a mother's ability to make decisions about her own health care marginally increased the odds that her youngest child would not have anaemia.

In general, all studies measuring maternal autonomy over health care-related decisions find significant associations (although not necessarily for every outcome measure), with the exception of the study by Dancer & Rammohan (2009), which used an unusual measure of health care autonomy. Taken together, the consistency with which maternal autonomy over health care decisions is found to be positively associated with child nutritional status is suggestive that this may be an especially important factor in determining child nutrition outcomes. While speculative, it is possible that when women are able to independently bring children to medical facilities and have autonomy over health care-related decisions, their children have better health and can avoid the known cyclic relationship between disease and compromised nutritional status.

Mobility/social autonomy

The mobility/social autonomy dimension considered any question or group of questions which measured a mother's freedom of movement through her ability to independently travel to various places, attend social events or visit family and friends. Restrictions of a woman's freedom of movement may limit her ability to obtain resources, such as from the market, and can limit her ability to receive advice or support from friends and family. Seven of the 11 studies measured mobility autonomy, and of these, four found significant relationships. Merchant & Udipi (1997) found that in Bombay mothers with less autonomy over social decisions such as outings and attendance at different social functions were more likely to have children in the negative-deviant growth category. Sethuraman *et al.* (2006) found that women's mobility within the village had a positive association with her child's weight-for-age. Similarly, Shroff *et al.* (2009) found that not needing permission to go to the market decreased the likelihood that a child would be stunted. Shroff *et al.* (2011) found mixed results for mobility autonomy. While high mobility autonomy was associated with lower weight-for-age scores, it was associated with higher length-for-age scores. In this study, mobility autonomy interacted with child birthweight, with mobility autonomy being more important for improving length-for-age scores in children with lower birthweights (Shroff *et al.* 2011). No significant associations for mobility autonomy were found in three studies: Roushdy 2004, Basu & Koolwal 2005, and Ross-suits 2010. Overall, while some studies report that mobility autonomy positively influences children's growth and nutrition, this finding is not consistent in the literature. Mobility autonomy appears to have important implications for child nutrition, but its effect likely varies by situation and context, or based on how the variable is defined.

Financial autonomy

Financial autonomy was considered to be any question or group of questions giving evidence of women's control over financial resources. This type of control can allow women to divert resources to children, thus

improving child growth and nutrition. A fairly wide range of questions regarding income, finances and purchases was included in this category. Five of the identified studies (out of the nine that analysed some aspect of financial autonomy) found significant associations of financial autonomy with child nutritional status, but with mixed results. Basu & Koolwal (2005) found that increasing the amount of maternal contribution to the family income from almost none to less than half significantly decreased the odds that her child would have anaemia. However, no significant association was seen for mothers being able to use money as they wished, or if mothers were able to make decisions about major household purchases (Basu & Koolwal 2005). Shroff *et al.* (2009) found that women able to set aside money for personal use had children who were significantly less likely to be stunted. In another study testing several different dimensions of autonomy, only maternal financial autonomy (whether mothers were able to independently make various household financial decisions) was significantly associated with increasing the likelihood of exclusive breastfeeding at 3–5 months of age (Shroff *et al.* 2011). However, in this study, financial independence was not associated with any other child nutritional outcome, including weight-for-age, length-for-age and weight-for-length. On the other hand, comparing the upper and lower quartiles of children's weight-for-age, Sethuraman *et al.* (2006) found that maternal income and employment had a negative association with child nutritional status, increasing the risk of children having low weight-for-age scores. However, this main effect was not significant in a model that included an interaction term for maternal employment and food insecurity. Sethuraman *et al.* (2006) explained this interaction by speculating that mothers from poorer households with greater food insecurity may be more likely to be employed, which would explain the negative relationship sometimes seen with maternal employment (Abbi *et al.* 1991; Kishor & Parasuraman 1998). Other mixed results for financial autonomy were reported by Dancer & Rammohan (2009), who found a marginally significant negative association with children's weight-for-height when mothers had the final say on large household purchases, but a positive association when

mothers had the final say on making purchases for daily needs, and both of these findings were only significant for male children. Additionally, four studies found no association of financial autonomy with child nutritional status. According to Bégin *et al.* (1999), whether mothers earned and controlled their own income or were involved in household health and food expenditures had no association with child's height-for-age. Roushdy (2004) found no association of a mother's control over household cash allocation with children's height-for-age scores. Merchant & Udiipi (1997), measuring financial independence as whether the mother had control over income, found no association with child growth. Finally, in a study by Ross-Suits (2010), there was no association between mothers having the final say on large household purchases or financial independence (including control over income) and child stunting, wasting and underweight. Overall, maternal financial autonomy does appear to influence child nutritional status in the literature frequently enough to be of interest, yet consistent results are not seen. The reason for inconsistencies in findings is not clear and may be due to differences in measurement or context, or the broad range of questions on financial decisions which was included under this dimension. The mixed findings underscore the need for a more thorough understanding of the different factors at play influencing women's autonomy measures.

Maternal disbelief in legitimacy of domestic violence

Women's opinion of the legitimacy of domestic violence is typically measured by questioning women on whether they feel domestic violence is justified in various circumstances (such as if a woman neglected children or cheated on her husband). Women who believe domestic violence is at times legitimate may have accepted such cultural norms or violence as inevitable. Thus, they are considered inherently disempowered, although they may not realise this fact themselves. Five studies measured the association of women's opinion of the legitimacy of domestic violence with child nutritional status, and of these, one found a relationship. Basu & Koolwal (2005) found

that when mothers did not view domestic violence as ever justifiable, their youngest child was significantly more likely to be non-anaemic. In contrast, Roushdy (2004) measured women's opinion of domestic violence and found no association with child's height-for-age. Similarly, Shroff *et al.* (2009) measured women's attitude towards domestic violence and found no association with child stunting. In another study, Shroff *et al.* (2011) reported no association between women's acceptance of domestic violence and any measure of child nutritional status, including weight-for-age, length-for-age, weight-for-length and exclusive breastfeeding at 3–5 months of age. Ross-Suits (2010) similarly asked whether mothers felt domestic violence was ever justifiable and found no significant association with child stunting, wasting or underweight. Women's opinion of domestic violence stands out as a dimension of autonomy that frequently has non-significant associations with child nutritional status. Agarwala & Lynch (2006) examined the relatedness of autonomy dimensions using survey data from India and Pakistan and found that while most commonly measured dimensions of autonomy were moderately correlated, perceived legitimacy of domestic violence did not correlate well with other dimensions of autonomy. For this reason, they argued that women's opinion of the legitimacy of domestic violence should not be included in autonomy measurements as it may reflect education, or some social factor other than autonomy (Agarwala & Lynch 2006).

Maternal experience of domestic violence

Women's experience of domestic violence is commonly included as a dimension of autonomy because violence can severely restrict women's freedom and choices, but it is also studied as a separate construct. Four of the identified studies examined the relationship of women's experience of domestic violence with child nutrition. Of these, two measured domestic violence as a dimension of women's autonomy, and two measured domestic violence as a separate construct alongside autonomy. Of the four studies, three reported significant associations. Sethuraman *et al.* (2006) found that mothers who had experienced

psychological abuse or sexual coercion were significantly more likely to have children in the lower quartile of weight-for-age. Heaton & Forste (2008) found that across five Latin American countries, women's experience of domestic violence had a significant negative association with child's height-for-age in Bolivia and Haiti, but not in Colombia, Peru or Nicaragua. Roushdy (2004) found that maternal experience of domestic violence was significantly associated with higher likelihood that daughters would be stunted, but did not affect male children. However, Shroff *et al.* (2011) measured women's experience of domestic violence and found no significant association with any aspect of child nutritional status, including weight-for-age, length-for-age, weight-for-length and exclusive breastfeeding at 3–5 months. Studies that exclusively focused on domestic violence in the home but that did not consider it a dimension of women's autonomy were not included in this review. However, a growing body of literature recognises the negative impact of domestic violence on child nutritional status (e.g. Yount *et al.* 2011; Sobkoviak *et al.* 2012). Pulling in results from this body of literature, it seems clear that domestic violence has important negative effects on child nutrition, both indirectly through maternal stress, mental health, behavioural risks, physical health and malnutrition as well as through stress experienced by the child, possible impairment of mother's ability to breastfeed and in general compromising the mother's ability to care for the child (Yount *et al.* 2011). What may be less clear is how the experience of domestic violence relates to female autonomy. The reasons for inconsistent findings among the reviewed literature are unclear, although again, context and issues related to measurement are probably important factors.

General maternal involvement in household decision-making

The final dimension of autonomy commonly found in the identified studies is general household decision-making, which was measured through various questions about who makes decisions at the household level. Three studies included general household decision-making as a dimension of autonomy, and two

of these found significant results. Sethuraman *et al.* (2006) examined whether women were 'involved in major household decisions' and found that higher maternal decision-making and position in the household was significantly associated with improved child's weight-for-age scores. Shroff *et al.* (2011) used questions such as who makes decisions on 'what gifts to give when relatives marry', 'whether or not you should work outside the home' and 'obtaining healthcare for yourself', along with others, and found that higher maternal household decision-making autonomy was associated with significantly higher weight-for-age and weight-for-length scores in children. However, Shroff *et al.* (2009) found no significant association for general household decision-making with child stunting. The fact that this dimension is used by a small number of studies and is subsumed in other dimensions (such as decisions on obtaining health care for self) again exemplifies the difficulty in comparison that can arise from the various definitions and measurements of autonomy seen in the literature.

Composite score for autonomy (n = 11)

Eleven of the identified studies used a composite score to represent autonomy. While results of these studies generally lend support to autonomy having a positive influence on child nutritional status, some mixed results are still seen. Using a composite score for autonomy, clear significant associations were found by Radebe *et al.* (1996) on children's weight-for-age, and also by Chakraborty & Anderson (2011) on children's birthweight. Brunson *et al.* (2009) similarly found a strong significant association of women's autonomy on children's weight-for-height, but only for children over 36 months of age, and when tested individually in five different regions of Northern Kenya, only remained significant for one region, Korr, which of the five regions studied, had especially poor conditions and the highest rates of child wasting. Bose (2011) found significant positive associations of women's autonomy with three different child-feeding practices; higher maternal autonomy was related to longer duration of breastfeeding, a higher likelihood that the child received supplemental milk products,

and a higher likelihood of receiving supplemental meat, fish or eggs. Additionally, maternal autonomy was associated with lower likelihood that female children would be malnourished (Bose 2011). On the other hand, Patel *et al.* (2007) reported a negative finding for increased maternal power. Shared power, mother power and father power were measured separately, and Patel *et al.* (2007) found that shared power was associated with higher child BMI, and when measured separately, this was true for both male and female children. However, mother power had a negative association with child BMI. Patel *et al.* (2007) thus suggest that increasing the bargaining power of mothers does not always improve child nutritional status, and that encouraging cooperation and communication between partners within the household may be preferable.

Three of the studies using composite autonomy scores compared results across different countries and all reported mixed findings. Desai & Johnson (2005) found significant positive associations of women's autonomy with child's height-for-age in India and marginally in Mali, but had a significant negative association in Malawi and marginally in Haiti, while no association was reported for Benin, Uganda, Zimbabwe, Egypt, Nepal, Colombia, Nicaragua or Peru. Heaton & Forste (2008) similarly reported a significant negative association of women's autonomy with child's height-for-age in Haiti (with no significant associations in Colombia, Peru, Nicaragua and Bolivia). Similar to Patel *et al.* (2007), in this study, autonomy was calculated by separating women's autonomy from joint decision-making. Along with autonomy, joint decision-making had independent, mixed associations with child nutritional status; increased joint decision-making had a negative association with child's height-for-age scores in Bolivia, but a positive association in Nicaragua (Heaton & Forste 2008). Smith *et al.* (2003) is by far the most comprehensive study carried out on the relationship of autonomy and child nutritional status, examining various child nutritional outcomes in 36 countries in Asia, Africa and Latin America. Measuring autonomy across all countries, a significant positive association was found overall on child's weight-for-age. Briefly, women's autonomy was found

to have a positive association with child's weight-for-age in three out of four countries in Asia, six out of 23 countries in Africa, and two out of nine countries in Latin America/Caribbean. Significant negative associations were also found in one country in Africa and one country in Latin America. In general, increases in women's autonomy tended to be negatively associated with breastfeeding measures (particularly duration) but increased the likelihood that a child 6–12 months old had received complementary foods, increased the times per day the child was offered foods and increased the quality of foods the child did receive (Smith *et al.* 2003). One other study, Maffioli *et al.* (2009), compared a composite score of women's autonomy across five countries in South Asia and Africa on child stunting, and found no significant associations, although women's status (measured using the differences between a mother and her partner's education and occupation) had a marginally significant association with child stunting in India. Potential trends in findings based on context will be discussed later (see 'Regional Differences').

Two studies used unique measures of women's autonomy. In an early study by Doan & Bisharat (1990) carried out in Amman, Jordan, autonomy was measured based on whether mothers were the heads of household or whether they were subject to other relatives, such as their mother-in-law. In this culture, women, rarely if ever, have final say in household decisions and are almost universally subject to men. Thus, typical survey questions would have little meaning in this context. However, women may have relatively more or less autonomy based on their position in the household (specifically, whether or not they are subject to their mother-in-law). Increasing maternal autonomy by not being subject to other relatives in the household is associated with significant benefits for children's weight-for-age scores (Doan & Bisharat 1990). However, it is difficult to separate whether the benefit to children is due to the mother's increase in autonomy or the diminished influence of the mother-in-law, a factor which may be independently associated with children's nutritional status (Reid *et al.* 2010; Aubel 2012). On the other hand, Simon *et al.* (2002) scored women's social power based on survey data measuring felt

control and passivity/helplessness. Women who were more passive were marginally more likely to have children who were wasted and stunted while women who had higher felt control were marginally more likely to have children in the normal range for weight-for-height.

Overall, studies using a composite score of women's autonomy support the hypothesis that increasing women's autonomy has a positive effect on children's nutritional status. However, there are inconsistencies among findings that warrant further attention. It is difficult to pinpoint causes of these inconsistencies, partly due to differences in autonomy measurement. For example, each study includes different dimensions in calculating an overall autonomy score. It is possible that some studies find no significant results or fewer significant results based on which autonomy dimensions are included in the score. Chakraborty & Anderson (2011) used principal component analysis to select the dimensions for inclusion in the composite score, which may have contributed to the strong significant association they reported. Interestingly, the dimensions finally selected into the study were whether the mother had the final say on her own health care, daily household purchases, large household purchases and visits to relatives, which covers many of the dimensions that tended to most often have significant results when analysed separately. Additionally, regional differences in women's autonomy likely play an important role in the mixed results seen in this group, as will be discussed further (see 'Regional differences').

Outcome measures

The most typical outcome measures used in the studies included in this review were the World Health Organization growth scores weight-for-height (wasting), height-for-age (stunting) and weight-for-age (underweight). Weight-for-height is considered to represent current malnutrition, height-for-age a measure of long-term malnutrition and weight-for-age a combination of the two. Another limit to comparability among the identified studies is that frequently only one of these measures is used in analyses. Only four of the identified studies assessed all

three growth outcomes (Smith *et al.* 2003; Mashal *et al.* 2008; Ross-Suits 2010; Shroff *et al.* 2011), and two others included both weight-for-height and height-for-age (Simon *et al.* 2002; Dancer *et al.* 2008). Among studies evaluating all three nutritional outcomes, significant results were often found for one, but not others. This suggests the possibility that studies could have found additional significant results if more measures had been included. In addition, no patterns can be discerned in the results based on the outcomes used. However, height-for-age scores (as well as stunting) do stand out as most often reflecting significant results for the health care-related dimension of autonomy. Mashal *et al.* (2008) included wasting, stunting and underweight and found that lack of maternal autonomy (as measured by whether the mother would bring the child to see a doctor alone and without permission) was significantly associated with increased likelihood of child stunting. Dancer & Rammohan (2009), Ross-Suits (2010), and Shroff *et al.* (2011) all found positive associations of increases in women's health care autonomy using specifically child's height-for-age scores as outcome measures. One possible explanation is that stunting is most likely to occur during the rapid period of growth in the first 2 years of childhood, and young children are also especially vulnerable to disease. These first few years are a sensitive time period when access to health care is important in preventing malnutrition, and children's health care may be improved when mothers have the autonomy to make health care-related decisions. However, as Brunson *et al.* (2009) point out, one limitation in these measurements is that stunting is a long-term measure of nutritional status, and autonomy measurements taken at the time of the survey may not accurately reflect the mother's autonomy during the period of time in which the stunting occurred. Some studies have noted that in many cultures, women's autonomy tends to increase with age and with the birth of children, especially sons (Hindin 2000; Acharya *et al.* 2010). However, in a more comprehensive study of changes in women's autonomy over their life course in India, Lee-Rife (2010) found that many of the women actually experienced decreased autonomy with age, although autonomy levels immediately following marriage

were highly correlated with autonomy levels many years later.

A few studies also examined the association of women's autonomy on child-feeding practices. Shroff *et al.* (2011) measured the association of dimensions of Indian women's autonomy on exclusive breastfeeding (EBF) at 3–5 months of age, and found that increased financial autonomy was positively associated with EBF. Similarly, Bose (2011) found that higher maternal autonomy was associated with longer breastfeeding duration in Bolivia. However, Smith *et al.* (2003) found a clearly negative association of maternal autonomy with breastfeeding measures across Asia, Africa and Latin America. While maternal decision-making was associated with increased likelihood of initiating breastfeeding in South Asia, it was associated with decreased likelihood of EBF at 0–4 months of age in South Asia, increased chances the child received something from a bottle in the past 24 h in both South Asia and Sub-Saharan Africa, and shorter breastfeeding duration in South Asia, Sub-Saharan Africa and Latin America. The reason for these differences is unclear.

Complementary feeding was a measured outcome in two studies. Bose (2011) found that higher maternal autonomy was associated with higher likelihood that in the last 24 h children received supplemental milk products, and supplemental meat, fish or eggs. Smith *et al.* (2003) also found a positive association of maternal autonomy and child complementary feeding, with increases in a woman's decision-making power increasing the chances that a 6–12-month-old child would have received complementary food in South Asia and Sub-Saharan Africa, increasing the chances that a child older than 6 months would have received high-quality complementary food in the past 24 h in South Asia, and increasing the number of times a child older than 6 months eats per day in South Asia, Sub-Saharan Africa and Latin America/Caribbean. Based on these two studies, it appears that higher women's autonomy generally has a positive association with complementary feeding practices.

Due to the possible differences in maternal autonomy's impact on breastfeeding and complementary feeding, there may be a differential impact of maternal autonomy on children of different ages. However,

only one of the identified studies looked at outcomes of different age groups separately to compare children receiving mainly breast milk to children receiving complementary foods. Brunson *et al.* (2009) found that higher maternal autonomy was related to better child weight-for-height for children over 36 months of age but made no difference for younger children. Brunson *et al.* (2009) noted that in this culture, children up to 36 months of age tend to meet most of their caloric needs through breast milk. Thus, there is some support in the literature for a differential effect of women's autonomy based on child age.

Regional differences

As mentioned previously, of the studies included in this review, 10 were based in South Asia (with six from India), seven from Africa and one from Latin America. Additionally, four studies compared results across countries. Women's autonomy may vary greatly across cultural contexts because women may be empowered in certain dimensions but oppressed in others, and this may be especially true across countries and even regions (and likely even varies from household to household). For this reason, measurements of autonomy across different cultural contexts may pose problems. Little research has been done to determine whether typical autonomy measurements are valid across different cultural contexts, and studies which do compare contexts suggest that in fact, autonomy measurements do not appear to be valid across different communities (see 'Validity' below). Thus, comparing results across countries is questionable at best. To measure autonomy in different countries and regions, the studies identified for review took varying approaches. Some researchers created culturally specific autonomy indexes after carrying out qualitative research, while other studies used standard survey data to measure autonomy, often from DHS, which was designed to make cross-country comparison possible. There are advantages and disadvantages to each approach. In creating a culturally specific survey, the autonomy measurement may be more valid, but less easily comparable to other studies. Using DHS data, the measurements are readily comparable, but this may be misleading as the

survey questions may have different implications for autonomy in different countries. All four studies comparing the relationship of women's autonomy and child nutrition across countries made use of DHS data as a way to standardise the autonomy measurement (Smith *et al.* 2003; Desai & Johnson 2005; Heaton & Forste 2008; Maffioli *et al.* 2009) and there appears to be some clear regional trends in the findings.

South Asia

Women's autonomy has been a topic of particular interest in South Asia. Child malnutrition rates are higher in India and South Asia than Africa, a fact which cannot be explained by economic or political conditions (Ramalingaswami *et al.* 1996). Recent estimates show that prevalence of child underweight is much higher in South Asia compared with Sub-Saharan Africa (31% of children are underweight in South Asia, 21% in Sub-Saharan Africa) as well as child wasting (15% of children are wasted in South Asia, 9% in Sub-Saharan Africa) (UNICEF & WHO 2011). Furthermore, based on estimates from 1998 to 2004, the highest rates of low birthweight are found in South Asia, with recent estimates of 31% of infants born with low birthweight in South Asia, while 14% of infants in Sub-Saharan Africa are born with low birthweight (UNICEF 2006). Notably, 40% of all low birthweight babies in the developing world come from India (UNICEF 2006). High prevalence of low birthweight infants is highly suggestive of poor conditions of the mother. The Asian enigma hypothesis ignited interest in women's autonomy by theorising that the reason for the high rates of child malnutrition in South Asia are the high rates of inequality between men and women (Ramalingaswami *et al.* 1996). Thus, many of the studies exploring the association of women's autonomy with child nutrition focus on South Asia and India in particular.

While in recent years India has continued to make progress both in improving conditions for women and decreasing rates of child malnutrition, substantial progress remains to be made on both fronts. The clearest significant findings of the relationship between women's autonomy and child nutritional status are invariably centred in Asia, and typically in

India, which is particularly clear in cross-country analyses. Out of the 12 developing countries assessed by Desai & Johnson (2005), only in India did women's decision-making have a strong significant association with child's height-for-age, although no significant results were seen for Nepal. Smith *et al.* (2003) measured the association of women's status with a number of child nutritional outcomes in 36 countries across Asia, Latin America and Sub-Saharan Africa and invariably found the most strongly significant results in South Asia. The association of women's decision-making power with child's weight-for-age was strongly significant in India, Nepal and Pakistan, but not Bangladesh. The other study comparing women's autonomy across five countries in Asia and Africa (Maffioli *et al.* 2009) found no significant relation of mothers' decisional autonomy with child nutritional status in any country, while mothers' relative status was a marginally significant predictor of child stunting only in India, although Maffioli *et al.* (2009) noted that this could be due to the larger sample size for this country.

Overall, the most consistently positive associations between women's autonomy and child nutritional status are focused in South Asia. This may be due to lower rates of women's autonomy in this region compared to other regions. However, as mentioned previously, most of the qualitative literature exploring women's empowerment was carried out in South Asia. It is possible that consistent results are found in this region because the autonomy measurements often used are most culturally relevant for South Asia.

Africa

Somewhat less significant findings and more mixed results are reported for Africa. Smith *et al.* (2003) found significant positive associations of women's autonomy with child's weight-for-age in six African countries: strong associations for Chad, Mozambique, Nigeria and Namibia, and marginal associations for Cameroon and Niger. No significant associations were reported for 16 other African countries. Smith *et al.* (2003) also found a negative association of maternal autonomy on child nutritional status in Ghana. In

Mali, women's autonomy was significantly associated with improved child nutritional status as investigated by Desai & Johnson (2005), but did not reach significance in a study by Smith *et al.* (2003). Desai & Johnson (2005) also found a negative association of women's autonomy with child's height-for-age in Malawi.

The degree of inequality between men and women varies across African countries, which could account for some of the mixed results. On the other hand, among the identified studies focusing on individual African countries and not doing cross-country comparisons, autonomy measurements are more likely to be culturally specific and a more consistent positive association with child nutritional status is generally found. Among these studies, increases in maternal autonomy were positively associated with improvements in children's nutritional status in Zimbabwe (Radebe *et al.* 1996), Chad (Bégin *et al.* 1997, 1999), Mali (Simon *et al.* 2002), Egypt (Roushdy 2004), Kenya (Brunson *et al.* 2009) and Tanzania (Ross-Suits 2010). The significant findings among studies using more culturally specific autonomy measurements suggest that culturally specific questionnaires may be more appropriate to derive measures of women's autonomy in Africa. Overall, the literature suggests that increasing women's autonomy in Africa would benefit child nutritional status, a conclusion that is especially apparent when culturally specific measurements are utilised. Mixed findings in cross-country comparisons suggest that more research is needed to clarify how autonomy functions in the African context.

Latin America/Caribbean

The most mixed and least significant results were reported for Latin America/Caribbean. Smith *et al.* (2003) measured women's status in nine countries from Latin America/Caribbean and found significant positive associations with child's weight-for-age in Peru, and a marginally positive association in the Dominican Republic, as well a marginally negative association with child's weight-for-age in Brazil. No association was reported for Paraguay, Bolivia, Guatemala, Haiti, Colombia or Nicaragua. Desai &

Johnson (2005) measured women's autonomy in four Latin American countries and only found a marginal negative association with child's height-for-age in Haiti (with no association found for Colombia, Nicaragua and Peru). Heaton & Forste (2008) measured women's decision-making across five Latin American countries and found again, only a negative association with child's height-for-age in Haiti but no association reported for Colombia, Peru, Nicaragua or Bolivia. On the other hand, joint decision-making was measured separately and had a negative association with child's height-for-age in Bolivia but a positive association in Nicaragua (Heaton & Forste 2008). Patel *et al.* (2007) also separately measured the relationship of mother bargaining power, father bargaining power and shared bargaining power with child BMI in Bolivia and found that increased shared power was associated with higher child BMI, while higher mother power was associated with lower child BMI. Latin America generally has higher levels of women's autonomy than developing countries in South Asia and Sub-Saharan Africa, and also a lower prevalence of child malnutrition. It is possible that increasing maternal autonomy when autonomy is already high does not improve child nutrition, or could even have a negative effect. Women with high autonomy may be less likely to breastfeed (Smith *et al.* 2003), or it is possible increases in autonomy could mean more time spent away from children, such as may occur if women seek employment. Smith *et al.* (2003) found that in Latin America, child wasting decreased with increasing maternal autonomy when maternal autonomy was low, but it increased with increases in maternal autonomy when mothers already reported a high level of autonomy. Another possible explanation for the negative relationship sometimes seen in Latin America is that higher autonomy could result in more domestic violence and thus have a negative effect on child nutrition (Koenig *et al.* 2003; D'Oliveira *et al.* 2009). On the other hand, no Latin American study was identified that used a questionnaire based on qualitative research to measure the relationship of women's autonomy and child nutritional status. It is likely that many of the standard questions used to measure women's autonomy have different meanings or effects in this context. More research is needed to

further clarify the relationship between women's autonomy and child nutritional status in Latin America (see 'Future research').

Validity of autonomy measurements

An important consideration is whether or not survey measurements of autonomy at the household level are valid. From the identified studies, four major questions concern the validity of autonomy measurements:

1. If we understand autonomy to represent true freedom or agency on the part of the woman to make important decisions for herself as well as her children, are the dimensions frequently used to measure autonomy a valid representation of this construct?

Autonomy may not be accurately represented by some of the frequently used dimensions. For example, as previously mentioned, opinion of domestic violence has been found to poorly correlate with experience of domestic violence and other dimensions of autonomy (Agarwala & Lynch 2006). In the identified studies, few found significant associations between opinion of domestic violence and child nutritional status. Furthermore, conceptual problems may exist with the dimensions used to represent autonomy. Consider for example one commonly used question: whether a woman has the final say on decisions regarding daily household purchases. It is possible that in some cases, a woman's control over this aspect of household decision-making may not represent autonomy on the part of the woman but rather a responsibility that she is obligated to fulfil. Rather than representing freedom or agency on her part, these purchases could represent a responsibility that she would not have willingly taken control over and a lack of social support, or yet another aspect of her daily life she needs to take care of in her limited time or with limited resources. This distinction was also explored by Basu & Koolwal (2005), who separated leisure from responsibility in their measurement of autonomy. Along with typical dimensions of autonomy directly related to childcare and household tasks, they measured leisure variables, such as whether a woman reads the newspaper or spends time

listening to the radio, and they found that newspaper reading by mothers is significantly associated with children not having anaemia. It is questionable whether the time a woman spends in leisure activities represents an improved measure of autonomy over the typically used questions, but leisure variables may have other important implications in terms of care for mothers, possibly reflecting that the mother has time to rest and is not overburdened with responsibility, which may result in improved care for children. However, it is clear that more care needs to be taken to understand what is being measured by each dimension of autonomy. Literature may show that mothers' control over various household dimensions improves child nutrition, but it remains questionable whether this control is a true reflection of autonomy. Several studies have shown that when women are heads of households with males absent, this results in nutritional benefits for children (Kennedy & Peters 1992; Johnson & Rogers 1993; Pryer *et al.* 2004) although the opposite has also been found (Haidar & Kogi-Makau 2009). This suggests that women having control of household decisions results in benefits for children, yet female-headed households also tend to be more impoverished (Kennedy & Peters 1992; Haidar & Kogi-Makau 2009) and it is likely that many women do not freely choose to lack the support of a male partner unless an abusive or conflict-ridden relationship is a concern. If children benefit when women have increased responsibility for childcare and household decisions this is certainly of interest, but perhaps should not be labelled 'autonomy'.

2. When assigning women a score for their level of autonomy, is it appropriate to consider joint decision-making as representative of lower autonomy?

Another problem may exist in the extent to which measurements of autonomy should emphasise a woman's complete independence from others. Most studies to date regard women who have the final say on decisions as having the highest level of autonomy, and women who share decisions with their husbands as having less autonomy. As discussed previously, Heaton & Forste (2008) found support that both female autonomy and joint decision-making have independent associations with children's nutritional status. Similarly, Patel *et al.* (2007) separately meas-

ured mother power, father power and shared power and found that shared decision-making had a positive association with children's nutritional status. Other recent studies suggest that joint decision-making is preferable to male- or female-dominated decision-making. For example, higher rates of women's autonomy were associated with lower likelihood of her partner accompanying her to antenatal care, while joint decision-making led to higher involvement of the husband in antenatal care, and increased planning and discussion between women and their partners regarding health (Mullany *et al.* 2005). Also, couples that make joint decisions regarding reproductive issues are more likely to use contraception (Feyisetan 2000). A comprehensive study by Kishor & Subaiya (2008) measuring the correlates of different dimensions of women's empowerment concluded that joint decision-making and female-dominated decision-making were unique variables, with correlates varying depending on the specific decision being made. This study clearly demonstrates that combining joint decision-making and independent decision-making as one undifferentiated variable is not appropriate (Kishor & Subaiya 2008). Results from these studies make a compelling case for measuring joint decision as a separate variable, and bring into question the validity of autonomy measurements as they have been conceived to date.

3. Is autonomy differentiated from social support in measured constructs?

Social support is frequently found to result in improved child health outcomes (Crnic *et al.* 1983; Kana'iaupuni 2005; Elsenbruch *et al.* 2007). It is difficult to discern from survey data when the involvement of partners or others in important decision-making processes could be considered social support, or when it is oppressive and leads to loss of desired individual autonomy. In fact, women are enmeshed in social networks and rarely make decisions in complete isolation from other persons. Theoretically, different scenarios are possible which could result in a woman having more decisional power: a woman may be more authoritarian than her husband and as a result take control of decisions, she may have a respectful relationship with her partner which results in her having more say over decisions, or she may

have a partner unwilling to support the family or one who delegates responsibilities to her that she would prefer not to have. Clearly, a number of explanations are possible, and the likelihood of different scenarios may be culturally dependent. When women have the final say on a decision because a partner is uninvolved, this could represent a lack of social support yet would be rated as greater autonomy. But, if a woman makes decisions jointly, this could represent greater social support yet would be rated as lower autonomy in many studies.

4. Is the typical mode of measuring women's autonomy valid across different cultural contexts?

There is evidence that certain types of survey questions for measuring autonomy, used in many of the studies included for review, are not valid cross-culturally. Comparing results from 23 communities across five countries, Ghuman *et al.* (2006) demonstrated that women and their partners respond markedly differently to survey questions measuring the wives' autonomy. Importantly, the difference between the answers of husbands and wives varied unpredictably from one community to the next, and a considerable amount of random error existed in answers to the survey questions that also appeared to differ based on context. Furthermore, men and women appeared to understand the survey questions differently based on context (Ghuman *et al.* 2006). Another interesting finding of this study is that in four out of the five countries, while higher levels of women's autonomy as reported by women were associated with lower child mortality, higher levels of women's autonomy as reported by men were associated with higher child mortality. Ghuman *et al.* (2006) concluded that the husbands' and wives' reports of women's autonomy may differ based on their past experiences of child mortality. In other words, after the death of a child, women may be more likely to claim to have low autonomy to pass blame on to the husband, while husbands may be more likely to claim their wives have greater autonomy to pass the blame for previous child deaths onto their wives [although Ghuman *et al.* (2006) concluded that women's responses were more reliable as they fit better with theory and previous research].

Comparing responses to DHS survey data across 23 different developing countries, Kishor & Subaiya (2008) found that several of the typically measured decisions used to represent women's autonomy had different correlates based on context. Another comparative study found that, using data from Pakistan and India, even a small change in context resulted in large changes in measurement error and variances among the commonly employed dimensions of autonomy (Agarwala & Lynch 2006). These authors contend that weighting each dimension of autonomy and accounting for measurement error will result in more accurate measurements of autonomy, but acknowledge that more work needs to be done to understand how larger shifts in context affect autonomy measurements. On the other hand, Ghuman *et al.* (2006) conclude that in order to validly measure autonomy, qualitative research should be done to ensure that survey questions are more culturally specific, while also acknowledging the need to generalise findings across different contexts (which is important to establish policy and inform public health initiatives). Similarly, Kishor & Subaiya (2008) emphasise that 'theory and context' must determine which autonomy measures will be used for each setting, and that 'there is a need to be very specific' about what is being measured.

Future research

Based on this review, the following areas are recommended as the focus for future research:

1. The effect of women's autonomy on child nutritional status should be compared across age groups. Brunson *et al.* (2009) found a significant association of women's autonomy on child nutrition only for children over 36 months of age, and represents the only identified study which compares the differential relationship of women's autonomy with children in different age groups. This difference could be regional, due to variations in autonomy measurements, or it is possible that a child's transition from breastfeeding to complementary feeding and eventual dependence on solid foods could mediate the effect of women's autonomy on child nutrition. As discussed previously,

Smith *et al.* (2003) found that women with greater status were less likely to breastfeed in Asia, Africa and Latin America, with the strongest negative associations seen in India. This finding could explain why increasing women's autonomy could have a differing impact on the nutritional status of younger children. More studies are needed to investigate how women's autonomy impacts children at varying age groups.

2. In light of research demonstrating that women's autonomy can change over time or with reproductive events such as abortion or pregnancy (Lee-Rife 2010), longitudinal research should be conducted to understand how changes in autonomy over the life course can affect children's nutritional status. Future research could begin to explore how varying levels of women's autonomy impact children at different developmental stages, and how autonomy relates to women's perceived self-efficacy in their role as mothers.

3. This review suggests that some dimensions of autonomy may be more salient to child nutritional status than others. Specifically, health care autonomy seems to most often result in significant benefits for child nutrition, while opinion of domestic violence is the least frequently significant. However, more research is needed to clarify whether different dimensions do have differing impacts on child nutrition. Currently, the number of studies measuring separate dimensions of autonomy is fairly limited making any trend tenuous. In addition, dimensions are measured differently, and some dimensions are simply measured more than others. However, a clearer understanding of which dimensions of autonomy are most important for improving child nutritional status could be useful for public policy. While maternal autonomy is highly important as a matter of women's rights rather than just a matter of child outcomes, increasing our understanding of which dimensions of autonomy are important for child nutritional status could allow programmes to focus on these crucial areas while continuing to work to improve female autonomy in general.

4. Future research should improve our understanding of how autonomy impacts different child outcomes. An increased understanding of all three World Health Organization child growth outcomes (weight-

for-age, weight-for-height, and height-for-age) would be helpful, especially as studies which measure all three outcomes often find significant results for some measurements of child malnutrition but not others. This review has suggested that health care autonomy seems to frequently be related to child's height-for-age in the identified studies. Measuring all three nutritional outcomes would improve comparability among studies and ensure that important associations of autonomy on child nutritional status are not missed, although sometimes practical considerations make including all of these measures difficult. Other child nutritional outcomes should be explored further as well, specifically breastfeeding in light of the current mixed findings, as well as birthweight, complementary feeding and obesity.

5. The literature supports that the impact of women's autonomy on child nutrition may differ across regions, as has been discussed previously. Research is needed to clarify how autonomy functions differently in different cultural contexts, and to increase our understanding on how to allow comparison of specific findings with other contexts (or to determine to what extent such comparisons are possible). Specifically, in-depth qualitative research would aid our understanding of how autonomy varies with situation and context.

6. More research is needed to determine whether autonomy measures are valid (as discussed previously) and resolve the problems with validity or possibly suggest alternative ways to directly measure autonomy. Along this line, more studies are needed looking at the differences between joint decision-making and male or female-dominant decision-making and their differing impacts on child nutrition.

7. Although generally the literature supports that increases in women's autonomy have a positive impact on child nutritional status, there is still considerable variation around these findings, with many studies reporting non-significant and sometimes negative associations. In order to clarify the reason for inconsistent findings, more studies are needed to clarify the mechanisms by which autonomy can positively impact child nutrition to inform programmes and policy and to aid in the design of interventions (see Future research #8). Mechanisms by which

women's autonomy can negatively impact child nutrition should also be investigated in light of some of the reported findings, like the fact that autonomy can negatively affect breastfeeding (Smith *et al.* 2003).

8. Future research should expand beyond cross-sectional studies to show causality, possibly by employing intervention studies to find practical ways to improve women's autonomy and how such an improvement can affect child health and nutrition outcomes.

Conclusion

In general, women's autonomy tends to be associated with improvement in children's nutritional status. However, this relationship is also obscured by differences in how researchers measure autonomy and uncertainty in the validity of the definition and measurement of autonomy. Additionally, different dimensions of autonomy may have differing impacts on children's nutritional status. While improving women's overall status in developing countries is an important long-term goal, understanding which dimensions of autonomy result in the most health benefits for women and children could help focus public health interventions on improving the most important aspects of women's autonomy as immediate goals. This could be especially helpful given that improvements in women's autonomy have been found to sometimes result in increased rates of domestic violence (Koenig *et al.* 2003; D'Oliveira *et al.* 2009) although the opposite is also true (Sabarwal *et al.* 2012). Similarly, increasing women's decision-making autonomy has been associated with increased blood pressure and depression, possibly due to disagreement and increased conflict between partners (Hadley *et al.* 2010). Rather than trying to increase women's autonomy in all dimensions, focusing on particular aspects of women's autonomy such as increasing women's ability to make health care decisions for themselves and their children might help avoid some of the negative impacts resulting from shifting power within households (although to date, there is no data showing that increasing autonomy in only one dimension would not result in any negative effects). Joint decision-making has also been found to

decrease rates of domestic violence (Kishor & Johnson 2004; Heaton & Forste 2008), thus increasing true (partner-supported) joint decision-making is another possible focus for public health interventions because this type of decision-making could empower women while avoiding domestic violence (Hindin *et al.* 2008). Involving and educating men in health-related decisions may benefit women's autonomy and health while possibly minimising disagreement and conflict between spouses (Feyisetan 2000; Mullany *et al.* 2005). Regional differences in women's autonomy are also apparent, and understanding how autonomy has differing impacts across regions will lend additional focus and insight to public health interventions.

This review has sought to summarise the current extent of knowledge on the relationship between women's autonomy and children's nutritional status, as well as to focus future research. When women are disempowered in society, negative health consequences extend beyond women to children, thus affecting all of society. Increasing our knowledge of how women's autonomy impacts child nutritional status will hopefully add impetus and insight to public health interventions in developing nations, speeding progress towards accomplishing many of the Millennium Development Goals for both women and children.

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Conflicts of interest

The authors declare that they have no conflicts of interest.

Contributions

KK and GJC together conceptualised the review, GJC conducted searches, compiled articles, created

tables and wrote review, KK provided significant direction, and both KK and LEMK gave advice and critically reviewed content.

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