

Accepted Manuscript

Associations between quantitative measures of women's empowerment and access to care and health status for mothers and their children: A systematic review of evidence from the developing world

Pierre Pratley



PII: S0277-9536(16)30408-7

DOI: [10.1016/j.socscimed.2016.08.001](https://doi.org/10.1016/j.socscimed.2016.08.001)

Reference: SSM 10775

To appear in: *Social Science & Medicine*

Received Date: 11 July 2015

Revised Date: 13 July 2016

Accepted Date: 1 August 2016

Please cite this article as: Pratley, P., Associations between quantitative measures of women's empowerment and access to care and health status for mothers and their children: A systematic review of evidence from the developing world, *Social Science & Medicine* (2016), doi: 10.1016/j.socscimed.2016.08.001.

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Title Page

Title:

Associations Between Quantitative Measures of Women's Empowerment and Access to Care and Health Status for Mothers and their Children: A Systematic Review of Evidence from the Developing World.

Corresponding author: Pierre Pratley, MS, DrPH

The George Washington University Milken Institute of Public Health

Department of Global Health, Milken Institute of Public Health, George Washington University, 950 New Hampshire Avenue NW, Washington, DC 20052, United States.
Email: ppratley@gwu.edu

1 **Abstract**

2 Research on the association between women's empowerment and maternal and child
3 health has rapidly expanded. However, questions concerning the measurement and
4 aggregation of quantitative indicators of women's empowerment and their associations
5 with measures of maternal and child health status and healthcare utilization remain
6 unanswered. Major challenges include complexity in measuring progress in several
7 dimensions and the situational, context dependent nature of the empowerment process as
8 it relates to improvements in maternal and child health status and maternal care seeking
9 behaviors. This systematic literature review summarizes recent evidence from the
10 developing world regarding the role women's empowerment plays as a social determinant
11 of maternal and child health outcomes. A search of quantitative evidence previously
12 reported in the economic, socio-demographic and public health literature finds 67 eligible
13 studies that report on direct indicators of women's empowerment and their association
14 with indicators capturing maternal and child health outcomes. Statistically significant
15 associations were found between women's empowerment and maternal and child health
16 outcomes such as antenatal care, skilled attendance at birth, contraceptive use, child
17 mortality, full vaccination, nutritional status and exposure to violence. Although
18 associations differ in magnitude and direction, the studies reviewed generally support the
19 hypothesis that women's empowerment is significantly and positively associated with
20 maternal and child health outcomes. While major challenges remain regarding
21 comparability between studies and lack of direct indicators in key dimensions of
22 empowerment, these results suggest that policy makers and practitioners must consider
23 women's empowerment as a viable strategy to improve maternal and child health, but

also as a merit in itself. Recommendations include collection of indicators on psychological, legal and political dimensions of women's empowerment and development of a comprehensive conceptual framework that can guide research and policy making.

Introduction and Objectives

Women's empowerment has long been hypothesized to drive maternal and child health outcomes in the developing world (Dyson & Moore, 1983; Filippi et al., 2006; Murthi, Guio, & Dreze, 1995). Despite a growing literature on the linkages between the promotion of gender equality and improvement of maternal health outcomes and child survival, measurement of women's empowerment remains a major challenge (Mason, 1986a, Kishor, 2005, Carlson, Kordas and Murray-Kolb, 2014).

Key issues in establishing the linkages between women's empowerment and health outcomes are lack of a clear definition of the concept, lack of direct indicators of all dimensions of women's empowerment and lack of data on the individual, household and community levels that reflect all dimensions of women's empowerment (Alkire, 2005; Malhotra and Schuler, 2005; Mason, 1986).

As a result, policy makers, practitioners and researchers have struggled to establish if and when women's empowerment can positively benefit maternal and child health outcomes. A study by Carlson, Kordas and Murray-Kolb (2014) was the first to systematically probe this question. The authors conducted a systematic literature review on the evidence base regarding associations between women's autonomy and child nutritional status. The review finds strong evidence in support of the hypothesis that women's autonomy is positively correlated with child nutritional outcomes but also identifies a number of

limitations in the current literature. These include different operationalizations of women's empowerment leading to studies using different methods of aggregation and different indicators of empowerment. The authors conclude this creates challenges for the comparability of studies (Carlson, Kordas and Murray-Kolb, 2014).

This study aims to advance current knowledge by examining all direct measures of (dis)empowerment including violence against women and their associations with a full range of maternal and child health outcomes. The remainder of this article will have the following structure. The paper will discuss different ways empowerment has been defined and measured in the literature. Then, a brief overview of health outcomes of interest will be discussed. Next, the methods section discusses search, inclusion and quality criteria used to select articles and conduct the review. The results section presents a synthesis of main findings. Lastly, the discussion section will conclude and recommend ways forward to advance research and practice in the field of the empowerment of women as an avenue to improved maternal and child health.

1.2 Conceptual Challenges to Measuring Women's Empowerment and its Associations with Maternal and Health Outcomes

1.2.1 Women's Agency, Autonomy, Empowerment and Status, Different Terms, Related Concepts

Women's empowerment has been defined in a variety of ways throughout the demography, economics and public health literature. These different terms are aptly summarized by an often-cited definition of women's empowerment proposed by Kabeer (2002). She defines women's empowerment as "...the process by which those who have

been denied the ability to make strategic life choices acquire such an ability (Kabeer, 2002).”

Other terms such as women’s status, agency and autonomy are interrelated, but distinct concepts (Alkire, 2005; Malhotra and Schuler, 2005). Women’s status is measured relative to others in society, whereas autonomy is defined as the ability to make decisions free of control from others (Dixon, 1978; Dyson & Moore, 1983; Mason, 1986a; Mason, 1987). Autonomy encompasses the ability to make strategic life choices with regards to economic decision making or health seeking behavior independent of a husband or extended family such as a mother in law. Agency includes control over social and material resources and the ability of individuals and groups to exert power in order to pursue and achieve that which they value (Sen, 1985, p. 203; Sen, 1999; Alkire, 2005). Agency is also described as making strategic life choices by Kabeer (2002). Lastly, empowerment is a unifying term commonly defined as a process in which changes in agency (or autonomy) are tracked over a period of time taking into account the social context, or opportunity structure, determined in part by the status and voice of women (Alsop & Heinsohn, 2005; Ibrahim & Alkire, 2007; Narayan-Parker, 2002; Narayan-Parker, 2005).

1.2.2 Multidimensionality

Feminist social demographers were among the first to propose that the concept of women’s empowerment and women’s status is comprised of different dimensions (Acharya & Bennett, 1981; Mason, 1986).

Broadly the five conceptual dimensions of empowerment commonly found throughout the literature include psychological (Cattaneo & Chapman, 2010; Mason 1986; Zimmerman, 1995; 2000), social (Malhotra & Schuler, 2005), economic (Alkire et al., 2012; Mason 1986; Samman & Santos, 2009), legal (Malhotra & Schuler, 2005; Schuler & Hashemi, 1994; Stromquist, 1995) and political dimensions (Narayan-Parker, 2002; Stromquist, 1995).

Empowerment in the psychological dimension includes an increase in a woman's belief of her ability to achieve goals (Cattaneo & Chapman, 2010), for example perception on her self efficacy (Bandura, 2002 and Bandura & Locke, 2003 cited in Cattaneo & Chapman, 2010). It is distinct from actual power or decision making and reflects a woman's self perception of her ability to achieve meaningful goals (Cattaneo & Chapman, 2010).

The social dimension of women's empowerment is generally described as access to social resources, such as having a large social network, group membership and being able to rely on family members and friends as social support (Malhotra & Schuler, 2005; Simon et al. 2002; Koenig et al. 2003).

The economic dimension of women's empowerment pertains to control over material resources as well as claims to resources. These include monetary contributions to the household through labor as well as having a bank account and a women's say over her own money (Allendorf, 2010; Furuta and Salway 2006; Kabeer, 2002; Lawoko et al. 2007; Malhotra & Schuler, 2005).

The legal dimension of women's empowerment captures the extent that women's rights are reflected and codified in law and include women's ability to vote, obtain a land title or inherit her husband's property or possessions after he passes (Bennett, 2002; Malhotra & Schuler, 2005; Stromquist, 1995). This also includes women's knowledge of the legal system (Schuler & Hashemi, 1994).

The political dimension of women's empowerment comprises inclusion in political processes and the ability of women to organize themselves for change (Narayan-Parker, 2002; Stromquist, 1995). An example is the relative proportion of female to male voters in a region or country or the inclusion of women in the village's water board or the country's bodies of political representation (Malhotra & Schuler, 2005; Stromquist, 1995; Narayan-Parker, 2002).

The multidimensionality of empowerment in itself is problematic as well because indicators are aggregated in many different ways. This complicates comparability between studies and measures of empowerment. Some authors choose to disregard the multidimensional nature of empowerment and aggregate all indicators of empowerment into one index (for example, see Brunson et al. (2009), Do and Kurimoto (2012) or Upadhyay and Hindin (2005)). This approach has been critiqued as it might mask differential contributions of certain dimensions and indicators of empowerment (for a discussion, see Malhotra and Schuler, 2005 citing Ghuman, 2002, pp. 99–100). Conversely, disaggregation into single indicators has also been critiqued as a single indicator is not sufficient to measure a full dimension of empowerment (see Kishor 2000b; Estudillo, Quisumbing, and Otsuka 2001 cited in Malhotra and Schuler, 2005).

Lastly, it should be noted that a health-specific dimension of empowerment is virtually absent in the current literature. Many authors have signaled the importance of health-related decision making (Malhotra and Schuler, 2005; Mason 1987; Mason, 2005). Such a dimension could be seen as a conceptually separate sixth dimension, especially since indicators already exist and suggestions for additional indicators can be made. Examples of indicators that could be included in a health-specific dimension are a woman's decision making regarding her own and her children's health as well as control over decisions of when to visit a doctor or where to give birth.

1.3 Practical Challenges to Measuring Women's Empowerment and its Associations with Maternal and Health Outcomes

1.3.1 Measurement of Women's Empowerment and its Dimensions

Measurement approaches to multidimensionality vary from identification of and proposals to measure all dimensions (Malhotra & Schuler, 2005) to applications that measure only some dimensions of empowerment. Besides what dimension to measure, studies aggregate indicators and dimensions in different ways, ranging from the combination of many dimensions into one index to measurement of multiple dimensions, to single indicators of empowerment. A study's selection of what dimensions to measure and the method of aggregation used matter for measurement, as studies are only comparable when they aggregate their dimensions in a similar way. For example, indices of empowerment that combine many measures cannot easily be compared to studies measuring single indicators of empowerment (Carlson, Kordas and Murray-Kolb, 2014).

As empowerment is multidimensional, many scholars have argued that progress in particular dimensions does not necessarily mean progress in all dimensions (Alkire, 2005; Mason, 2005; Alkire, 2008; Malhotra and Mather 1997; Kishor 1995, 2000b; Hashemi, Schuler, and Riley 1996). For example, a women in Nigeria may not be empowered at the household level in terms of making decisions about her own health, but may be empowered at the national legal or political level because she has the right to vote, or contribute to local political meetings (Alkire, 2008; Samman & Santos, 2009). Conversely, women may be empowered in terms of decision making on market transactions, but lack agency at the household level in interactions with their husbands (Mason, 2005) cited in (Alkire, 2008; Samman & Santos, 2009). Indeed, multidimensionality and domain-specificity of the expansion of agency is supported by empirical evidence and several studies have reported low correlations (<0.35) between different domain-specific measures of empowerment (for a review, see (Samman & Santos, 2009) p.7).

Along with issues of multidimensionality, there currently are major gaps in the empirical measurement of women's empowerment and its association with maternal and health outcomes. The academic literature in this field is largely based on empirical data from Demographic and Health Surveys (DHS). DHS surveys are large nationally representative household surveys that collect demographic and health information. Following international recognition that the status of women in many countries is still compromised resulting in adverse demographic and health outcomes, a push for data on the status of women occurred. DHS surveys started including a women's status questionnaire in most surveys conducted since 1999. Questions included were based on

initial scholarship around autonomy and women's empowerment and covered what were thought to be three dimensions of decision making autonomy: freedom of movement and association, household decision making and freedom from wife beating (Mason, 1986; Mason and Smith, 2005). Over time, these modules were expanded with a number of questions, but these main dimensions remained as central themes.

Currently, DHS surveys often also include questions on women's perceptions on wife beating, exposure to violence and decision making regarding a woman's own healthcare. Many of these are indicators that could well be conceptually distinct from other indicators of empowerment that are commonly grouped into a "household decision making" dimension. Using the example of women's ability to visit family and friends without permission of their husbands, some studies will aggregate this indicator into a household decision making index (Chakraborty and Anderson, 2011; Lepine and Strobl 2013; Sharma and Kader 2013). Other studies will aggregate the same indicator into an index of a woman's mobility (Malhotra, 2011; Ghuman, 2003; Saleem and Bobak, 2005). Other studies will argue based on the conceptual dimensions of empowerment that the indicator reflects some norms in society and belongs in the social or cultural dimension of empowerment, or an overall autonomy index (Koenig et al., 2003).

To further complicate matters, some studies use a combination of any of the above, including for example indicators of mobility in a household decision index, and other indicators in a separate mobility index (for examples, see Mistry and Galal (2009) and Corroon et al. (2014)). These inconsistencies affect comparability between aggregated measures of empowerment. They also reflect conceptual ambiguity due to various definitions (Mason, 1986) and overlap between dimensions of empowerment (Mason,

1986; Malhotra and Schuler, 2005). Ultimately, they complicate comparability between studies. Thus, conclusive claims about the association of women's empowerment with maternal and child health outcomes are hard to make.

Scholars have also pointed out that the implicit focus of measurement of empowerment as household decision making and freedom of mobility is problematic: it may have different meanings in different contexts. Malhotra and Schuler (2005) argue that the most common measures of empowerment used in the DHS assume that daily household decisions somehow reflect women's less commonly occurring "strategic life choices" (Kabeer, 2002). It remains to be seen to what extent the available measures sufficiently cover both the breadth of dimensions in which empowerment can occur and whether these measures actually reflect processes that could affect maternal and child health. As a result, scholars have called for new measures of women's empowerment that go beyond indicators currently collected through DHS and get at other dimensions of empowerment (Alkire, 2008; Kabeer, 1999; Malhotra and Schuler, 2005; Samman & Santos, 2009). For example, the relative autonomy index seeks to measure to what extent women's and men's decisions are coerced, or made autonomously.

Lastly, most measures of empowerment are captured at the individual level (Malhotra and Schuler, 2005). This is increasingly being critiqued, as decision making and motivation to achieve goals do not happen in a vacuum and women's empowerment is context dependent (Batliwala, 1994; Jejeebhoy, 2000; Kabeer, 2001). Some empirical studies find that measurement of women's empowerment at the individual level is subject to substantial measurement error and argue that measurement at the individual level does not fully capture women's empowerment (S. J. Ghuman, Lee, & Smith, 2006; K. O.

Mason & Smith, 2001; Sandberg & Rafail, 2013). Desai and Johnson (2005) examine the difference between individual level and community level measures of women's decision making and find that the measures at the intermediate or community level are better at explaining children's health outcomes than individual measures. In other words, living in communities where women on average have more decision making autonomy is better for child health than being an empowered individual in a community where women are otherwise disempowered (Desai & Johnson, 2005). Despite emerging evidence in the literature that women's empowerment is a process that should also be captured at the community and perhaps also the national level, the majority of empirical studies continue to solely focus on measures of women's empowerment at the individual level (A. Malhotra & Schuler, 2005; Sandberg & Rafail, 2013).

While significant progress has been made, there are still gaps in the current literature on theoretical conceptualizations of how to measure women's empowerment. This has continued to plague research on the measurement of women's empowerment.

1.4 Health outcomes associated with women's empowerment

DHS women's status indicators have been used to assess associations between empowerment and a variety of health outcomes. These include maternal health care utilization (Ahmed, Creanga, Gillespie, & Tsui, 2010; Bloom, Wypij, & Das Gupta, 2001; Furuta & Salway, 2006; Haque, Rahman, Mostofa, & Zahan, 2012; Matthews & Gubhaju, 2004; Stephenson, Baschieri, Clements, Hennink, & Madise, 2006b; Woldemicael & Tenkorang, 2010; Woldemicael, 2010), reproductive behavior (Ahmed et al., 2010; Al Riyami, Afifi, & Mabry, 2004; Hindin, 2000; Lion, Prata, & Stewart, 2009;

Upadhyay & Karasek, 2012; Woldemicael, 2009), women's health outcomes (Hindin, 2005; Koenig, Ahmed, Hossain, & Mozumder, 2003; Kwagala, Wandera, Ndugga, & Kabagenyi, 2013; Mabsout, 2011a; Singh, Bloom, & Brodish, 2013) and child health outcomes (Caruso, Stephenson, & Leon, 2010; Chakraborty & Anderson, 2011; Mashal et al., 2008; Rico, Fenn, Abramsky, & Watts, 2011; Shroff, Griffiths, Adair, Suchindran & Bentley, 2009).

A smaller category of studies probe linkages between maternal and child health outcomes and women's empowerment using original data (for examples, see Bawah (2002), Becker (2006), Brunson et al. (2009) and Mason and Smith (2005)). While many of these studies also include questions that are modeled after or identical to the DHS women's status module, some include novel measures of women's empowerment, such as relationship quality (Gage and Hutchinson, 2006) or discussion of contraception between partners (Bawah, 2002).

2.1 Search strategy

Given the interdisciplinary nature of the two review questions outlined above, databases were searched that include research articles in public health, social demography and development and health economics. The databases searched were MEDLINE, Scopus, Jstor, Econlit, PsycInfo, ProQuest, Web of Science and Cochrane reviews database. Databases were queried using the following search strategy, focused on empowerment-related terms: AB ((women OR female) AND (autonomy OR agency OR status OR empowerment OR (decision AND making OR decision-making) OR (bargaining AND power))) and each of these three maternal and child health outcomes: 1) ((maternal OR

child) AND (health OR mortality)), 2) ((maternal OR child) AND (nutrition AND status)
OR ((health OR obstetric OR perinatal) AND care AND utilization)) and 3)
(contraceptive AND use) OR (exposure AND violence) OR (diarrhea) OR (lower AND
respiratory AND infection*) OR (handwashing OR hand AND washing) OR wash)).

Besides a systematic search of selected electronic databases, a number of experts in the
field of measurement of women's empowerment were contacted, presented with a list of
selected studies and asked for references of unpublished work. These experts were also
queried on whether they know of other relevant studies that were not included in the
selection in order not to miss new or unpublished work.

As many studies in this field are working papers or seminar papers or published on
websites of international organizations, the search strategy was designed to also address
these sources. Websites of prominent organizations in this field were searched for
relevant grey literature. These included the African Development Bank, Asian
Development Bank, Australian Aid Agency, Demographic and Health Surveys,
Department for International Development, International Center for Research on Women,
Inter-American Development Bank, International Food Policy Research Institute,
International Institute for Impact Evaluation, Pan American Health Organization,
Swedish development agency, United Nations agencies, United States Agency for
International Development, World Bank, and the World Health Organization.

2.2 Inclusion criteria

Only studies using data from developing countries were included in the review. The
review follows the World Bank definition of developing countries (which includes all

countries with a Gross National Income per capita GNI of \$4,085 or less by 2012 World Bank data \$1,035 or less by 2012 data) (World Bank, 2013).. Studies published in 1999 or later were included for review. 1999 was chosen as the base year mainly because it is the first year Demographic and Health Surveys started fielding women's questionnaires that contain both key indicators of women's empowerment and health outcomes, which greatly increased the amount of publications on this topic.

To minimize bias in study inclusion criteria, this study follows guidelines for the preparation of review protocols by the Campbell Collaboration (2001) as well as PRISMA guidelines for systematic reviews. However, the majority of studies were cross-sectional and non-experimental in nature. To further narrow down selection criteria among observational studies, a Childcare and Early Education Research Connections (CCEERC) quality score for quantitative observational studies was also assigned to each study (CCEERC, 2014). The CCEERC score ranges from -11 to +11, following CCEERC guidelines, all studies that scored 0 or a negative score on the scale were excluded from further review (CCEERC, 2014).

Studies measuring at least one indicator of women's empowerment and its constituent terms, women's (or female) status, autonomy, agency, decision making or bargaining power were eligible for inclusion. This includes any non- quasi- or experimental study that includes measures of women's empowerment and their associations with maternal and child health outcomes.

In terms of outcome measures, all studies were included that use quantitative data in which at least one dependent (outcome) variable concerns maternal and/or child health

outcomes. Maternal and child health outcomes are defined as indicators on health care utilization (obstetric care, ante- and/or perinatal care, delivery in a health facility), reproductive behaviours (utilization of modern contraceptives, birth spacing and ideal family size and/or number of children), women's health outcomes (anaemia, nutritional status and exposure to violence) and child health outcomes (nutritional status, diarrhoea, immunization status and lower respiratory infections).

3.Results

3.1 Overview of included studies and summary statistics

Figure 1 displays the selection of eligible articles for review. Database searches retrieved 14,584 articles. 13,251 of these were discarded through reviewing article titles and abstracts, after which 1,333 articles remained. These articles were further scanned for eligibility and 1145 articles were discarded, resulting in 118 eligible studies. All of these 118 studies were scored for quality using the CCEERC tool which resulted in another 65 articles being discarded after which a total of 53 eligible articles from the electronic database search were retained. Hand searches of grey literature, websites of organizations and journals with over 5 included studies added 14 eligible articles, resulting in a grand total of sixty seven articles that met full inclusion criteria for review. Before final inclusion, studies resulting from hand searches were also submitted to the CCEERC quality assessment criteria.

Figure 1: Selection of eligible articles for review

Table 1 displays summary statistics of the selected articles and reveals that thirty two of the eligible studies investigated Sub-Saharan Africa, twenty eight the Asia Pacific region, three articles Latin America and the Caribbean and one study data from the Middle East and North Africa region. In addition, three studies used data from multiple countries. The most researched country in this review is India, of which fourteen studies used data, whereas the second most researched country is Ethiopia with eight studies.

Table 1 reveals that among eligible studies, years of publication are skewed towards more recent years with 2010 as the median year of publication. This suggests an increase in interest in the field of measurement of women's empowerment and its potential for driving health outcomes. Of the sixty seven reviewed articles, fifty one are observational (non experimental) and use cross sectional data. An additional ten non-experimental studies employ longitudinal or panel data, only five studies employed a quasi experimental design and one study used an experimental study design.

In order to facilitate comparison and synthesis between studies, results are categorized following one of four methods of aggregation (see Table 2 under "types of aggregation"). These are studies in which all indicators of empowerment are 1) not aggregated and associations are measured between individual indicators of empowerment and health outcomes of interest, 2) aggregated into a single index, 3) aggregated into multiple indices or dimensions of empowerment, 4) mixed using both indices or dimensions and individual indicators.

When discussing findings, report of a positive or negative association entails significance at either the $P \leq 0.1$, $P \leq 0.05$ or $P \leq 0.01$ level, any weaker association is described as not associated.

3.3 Synthesis of most commonly used indicators of Women's Empowerment

Throughout all 67 studies reviewed, 121 unique indicators of empowerment were identified, a striking result that illustrates the divergence in measurement approaches in this field of study. Of note, a large number (81%) of indicators were only used in one to three studies (data not shown). A smaller number of indicators (19%) was used to measure women's empowerment in four or more studies reviewed (data not shown). To facilitate analysis and synthesis, all main indicators of empowerment used in four or more of the studies in this review are displayed in Table 2. The most common indicators used in measuring the relationship between women's empowerment and maternal and child health outcomes originate from the DHS women's status module and concern household decision making. The economic and social or cultural dimensions of empowerment are overrepresented while the psychological, political and legal dimensions of empowerment are not represented among the most commonly used indicators. Most indicators belong to a general household decision making or specific mobility or exposure to intimate partner violence (IPV) index. It should also be noted that many of these indicators are health specific, including decision making on own healthcare, where to take children in case of illness, freedom to visit a doctor and exposure to intimate partner violence, further indicating the need for a specific health dimension of women's empowerment in measurement models for this area of study.

Household decision making is composed of different indicators throughout the literature reviewed, and studies vary widely in the ways in which they aggregate indicators of household decision making into an index or treat them as separate indicators. For example, Chakraborty and Anderson (2011) select variables through principle components analysis (PCA) and aggregate four decision making indicators into one household decision making index. However, these indicators are in different domains both conceptually and functionally and include economic, health and mobility decision making. By contrast, Malhotra et al. (2012) report similar loadings for three different indicators using exploratory factor analysis (EFA) and use a summative index to aggregate household decision making indicators on economic, mobility and health decision making while also constructing a separate mobility autonomy index with three separate indicators. While indicators of household decision making are most commonly used to measure women's empowerment and its associations with maternal and child health in recent empirical literature, these results demonstrate there is little agreement on how to aggregate or categorize these indicators as components of women's empowerment.

3.4 Synthesis: Associations of most commonly used indicators of Women's Empowerment and Health outcomes

Table 2 displays the most frequently used indicators of women's empowerment and the number of studies that find positive, negative, non significant and mixed associations with maternal and child health outcomes. The table also displays the percentage of positive, negative, non-significant and mixed associations found among studies that used the indicator, and the total amount of studies that used the indicator as well as percentage of all studies reviewed that used the indicator to measure women's empowerment.

Among indicators used in 10% or more articles (ie. in 7 or more articles reviewed), having employment outside the home was most frequently significantly associated with maternal and child health outcomes: 64% of articles that included this indicator reported a positive significant association. The second most frequently positively significantly associated with health outcomes was lack of any exposure to IPV as 56% of all 67 total articles that included this indicator reported a positive association between this indicator and maternal and child health outcomes. 52% of articles that included an indicator on household decision making regarding major household purchases find a positive association with maternal and child health outcomes. Lastly, 50% of articles that measured women's justification of domestic violence found positive significant associations of that indicator with maternal and child health outcomes and 45% of total articles that measured a woman's decision making regarding her own healthcare found a positive significant association with indicators measuring health outcomes.

However, not all commonly used indicators of women's empowerment are as strongly associated with health outcomes as the ones that were just discussed. Studies measuring economic decision making in the household regarding daily household purchases find more non significant or mixed associations (53%) of the indicator than positive (43%) associations with maternal and child health outcomes. A similar result is observed for decision making on a woman's own money.

Regarding negative associations, studies that looked at a woman's decision making on where to take children in case of illness find more negative (43%) than positive associations with health outcomes for this indicator. Franckel and Lalou (2009) for example point out using primary data from rural Senegal that child caregiving is a

collective process where a mother's decisions are complimentary to decisions made by others in the household. Similarly, Fikre and Demissie (2012) report a negative association between a women's decision making on the place of birth and skilled birth attendance and Woldemicael (2009) reports women's decision making regarding visits to family and friends is associated women reporting a larger ideal family size and justification of domestic violence is associated with report of never having used contraceptives.

Although lack of exposure to any IPV was mostly positively associated with health outcomes, considerable variation is observed among indicators of sub dimensions of IPV. Articles that included an indicator on lack of exposure to sexual or physical IPV find more non-significant (83% and 57% respectively) than positive ((17% and 29%) associations with maternal and child health outcomes. Exposure to psychological IPV was only measures in 4 studies, but mostly positively associated (3 out of 4) with maternal and child health outcomes and only once not associated.

These main results on the most commonly used indicators of women's empowerment suggest that indicators on economic empowerment, health decision making, exposure to IPV and social norms regarding mobility, education, control over one's body and justification of intimate partner violence play an important role in shaping maternal and child health outcomes. Next, dimensions of empowerment and their associations with maternal and child health outcomes will be examined.

3.5 Synthesis: Most commonly used dimensions of Women's Empowerment

Table 3 displays commonly used dimensions of empowerment and their associations with maternal and child health outcomes. Following results from this literature review, measures of empowerment have been categorized into four main categories and one IPV sub-category. Three of these are consistent with common dimensions of women's empowerment: the economic, social and psychological dimensions (Agarwala and Lynch, 2006; Mason and Smith, 2005; Malhotra and Schuler, 2005). Since one of the key findings of this literature review is that health-related measures of empowerment are pervasive throughout this literature, they were coded as a separate health dimension of empowerment. This is consistent with calls in the literature for the importance of health decision making and its inclusion as a potential separate dimension of empowerment (Mason and Smith, 2005). Lastly, since intimate partner violence is an indicator of severe disempowerment, it is analyzed separately (Agarwala and Lynch, 2006) and included as a separate sub-dimension of health empowerment in Table 3.

Table 3 displays associations of indicators per dimension and type of maternal and child health outcome (first three panels), for all maternal and child health outcomes (fourth panel) and for all indicators across all dimensions (last row in bold).

Women's economic empowerment is thought to play a large role in shaping maternal and child health outcomes. Financially autonomous women are hypothesized to invest more resources in their and their children's health compared to their less autonomous counterparts (Carlson, Kordas and Murray-Kolb, 2014; Golla et al., 2011; Malhotra and Schuler, 2005). This hypothesis is validated by these results. Six of the twenty three most commonly used indicators of women's empowerment measure the economic dimension. Among the studies reviewed, forty one percent of indicators measuring women's

economic empowerment across all studies find a positive association with maternal and child health outcomes. A quarter of associations between women's economic empowerment and maternal and child health outcomes are mixed and another quarter is non significant. Only nine percent of associations with maternal and child health outcomes were negative.

Among specific categories of health outcomes, indicators of women's economic empowerment were most often positively associated with health service uptake outcomes (45%). A slightly smaller percentage, thirty nine percent of indicators of women's economic empowerment were positively associated with both family planning and health status outcomes. Only a small proportion of indicators of women's economic empowerment were negatively associated with health outcomes and about half of the indicators of women's economic empowerment were either not-significantly associated with all three health outcomes, or had mixed associations (showing both positive as well as non significant or negative health outcomes).

A longstanding hypothesis in the literature on measuring women's empowerment asserts that social norms, freedom of movement and a woman's access to social resources may have influences on fertility and other maternal and child health outcomes (Mason, 1986; Mason and Smith, 2003; Malhotra and Schuler, 2005). This hypothesis is corroborated by the findings of this systematic literature review. Among all articles reviewed here, decision making on visiting one's family and friends is the most commonly measured indicator of women's empowerment. Thirty nine percent of indicators in the social dimension of women's empowerment were found to be positively associated with

maternal and child health outcomes, while nine percent of associations were negative and half of associations was either non significant or mixed.

Fifty one percent of indicators were positively associated with health service uptake outcomes. A large number of positive associations is also found between indicators of women's empowerment in the social dimension and family planning (forty two percent). But a smaller number of positive associations is reported between indicators of empowerment in the social dimension and health status outcomes: only thirty one percent of indicators are positively associated with health status outcomes.

While these results in part corroborate previous hypotheses regarding positive associations between social indicators of women's empowerment and maternal and health outcomes, many gaps remain regarding measurement. A main challenge is that the meaning of social indicators of women's empowerment are highly context dependent (Mason, 1986) and it remains to be seen whether freedom of movement is as important in an African setting as it is in Asian or Middle Eastern contexts. The challenges of context dependency to indicators of women's empowerment will be revisited in the discussion.

Thirty seven studies included in this literature review contained measures of health-related empowerment. As can be seen in Table 9, this review finds positive associations for indicators of women's health empowerment among forty four percent of indicators measured, while sixteen percent is negatively associated with maternal and child health outcomes, eleven percent was not associated and twenty eight percent had a mixed association.

However, once specific health outcomes are considered, half of health empowerment indicators were positively associated with family planning outcomes and over half (57%) of health empowerment indicators were positively associated with health service uptake indicators. Interestingly, health status outcomes including nutritional outcomes were only positively associated with health empowerment indicators for thirty one percent of indicators measured, a result that is different from a recent review on measures of empowerment and nutrition outcomes, that finds health empowerment indicators are most commonly associated with nutritional outcomes (Carlson, Cordas and Murray-Kolb, 2014). This could well be explained by the expanded number of health status outcomes examined in this study compared to the review by Carlson, Cordas and Murray-Kolb (2014) that only focused on nutritional health status outcomes.

Intimate partner violence is highly prevalent in the developing world and continues to threaten the health of women and children (Jewkes, 2002; Ellsberg et al., 2008; Garcia-Moreno et al., 2006). Among all reviewed articles, twenty eight articles measured associations between IPV as a dimension of empowerment and maternal and child health outcomes. Thirty nine percent of these associations were positive, fourteen percent negative and fort six percent not significant. Only a small number of studies measured associations between IPV as a dimension of empowerment and family planning or health service uptake health outcomes and no positive associations were found for these categories of health outcomes. However, of the twenty one measures of IPV as a dimension of empowerment in relation to health status outcomes, over half (fifty two percent) were positively associated with health status outcomes (see Ackerson and Subramanian, 2012; Deyessa et al., 2010; Ellsberg et al., 2008; Emenike et al., 2008;

Hossain et al., 2014; Imai et al., 2013; Singh et al., 2008). These results illustrate a gap in research on the effect of IPV on health outcomes other than health status.

Perceived control, access to social capital and self-esteem are at the core of a woman's ability to speak up for herself and make decisions. Despite a well developed theoretical literature on the psychological dimension of empowerment, concrete measures are largely lacking in practice. Among all 67 articles reviewed, only seven indicators belonging to the psychological dimension of women's empowerment were measured in two articles (Deyessa et al., 2010; Simon et al., 2002). Both articles examined associations between psychological indicators and health status outcomes. Of this small amount of indicators, the majority was significantly associated with health status outcomes (five out of seven, or seventy one percent), one was negatively associated with health status outcomes, and one indicator of psychological empowerment was not significantly associated with health status outcomes. The virtual absence of measures in the psychological dimension of women's empowerment is another large gap in the measurement of women's empowerment and its associations with maternal and child health outcomes that should be addressed in future research.

4. Conclusion and Discussion

This systematic literature review summarizes the existing literature regarding the relationship between quantitative indicators of women's empowerment and maternal and child health outcomes including indicators on self-reported health service uptake. It highlights the main gaps and areas of consensus in current theory and practice regarding the measurement of women's empowerment and its associations with maternal and child

health outcomes. The main findings are that measurement of women's empowerment continues to vary widely between individual studies and comparison between studies remains problematic. Results however generally support the hypothesis that women's empowerment is associated with maternal and child health outcomes. The most commonly used indicators in the reviewed literature measure women's economic empowerment, women's health empowerment, exposure to violence and women's social empowerment and overall, almost half of the associations measured are positive.

When further honing in on this complex web of associations by specific indicators, dimensions and health outcomes, a more patchy evidence base appears. While negative associations are generally rare except for one indicator in the social and health dimension of women's empowerment (an indicator on decision making regarding where to take a child in case of illness), about half of the associations measured are not significant or mixed. The negative associations found in this review also highlight the situational and process aspects of women's empowerment, and how the process of empowerment may have differential effects on health service uptake as compared to health status indicators. First of all, decision making is not solely an individual process, and decision making in relation to making a visit to health services may be a collective process. As a result, individual increases in ability for decision making may not result into increases in health seeking behavior as reported in Franckel and Lalou (2009) who examine health seeking behavior in relation decision women's ability to make decisions in Senegal. Patterns of association also vary widely between indicators and dimensions. Three main gaps in evidence as well as two directions for future studies to address these gaps are proposed

for a more focused research agenda in the field of measurement of women's empowerment and its relationship to maternal and child health outcomes.

First, aggregation of indicators remains problematic and no consistent dimensional structure can be found among reviewed articles. This issue has previously been discussed in the literature (Agarwala and Lynch, 2006; Carlson, Cordas and Murray-Kolb, 2014; Mason, 1986; Mason, 2005; Malhotra and Schuler, 2005) and continues to hamper comparability between studies. However, this systematic literature review has been able to synthesize the evidence in current empirical literature around a long hypothesized health-related dimension of empowerment (Mason, 2005) adding empirical evidence to the literature on dimensions of empowerment. Future research should further try to operationalize this dimension and efforts to measure its properties empirically would be a valuable undertaking to advance this field. This review also reinforces the evidence base around the importance of women's economic empowerment, protection from intimate partner violence and social indicators of women's empowerment. Empirical evidence to date suggests that progress in all these areas is related to improving maternal and child health.

Authors continue to struggle with aggregation of individual indicators of household decision making as they are problematic and can belong to several overlapping dimensions of empowerment (Mason, 1986; Malhotra and Schuler, 2005). For example, an indicator on decision making regarding large household purchases pertains to household decision making as much as the economic dimension of empowerment (Malhotra and Schuler, 2005). Likewise, decision making on a woman's own, or her children's health in some studies is included as part of the household decision making

dimension of empowerment (Agha and Carton, 2011; Becker et al. 2006; Brunson et al. 2009) while in others it is used as a separate indicator of empowerment in terms of decision making on own health (Lawoko et al. 2007) or decision making related to child health (Kravdal, 2001; Story and Burgard, 2000). These problems are indicative of a larger underlying conceptual issue: this field of study still lacks a coherent conceptual framework for measurement that can guide researchers in how to operationalize empowerment by aggregating indicators into meaningful dimensions. Although frameworks and guidelines exist for the economic dimensions of women's empowerment (Golla et al., 2011) and some suggestions have been made for overall frameworks (Malhotra and Schuler, 2005; Alsop and Heinsohn, 2005) the debate on the multidimensionality of women's empowerment should not be overlooked and efforts to contribute to a framework could help guide future research and promote comparability between studies that measure women's empowerment.

This systematic literature review also confirms the importance of context dependency for empowerment measures. Two key issues are identified. The first involves whether specific indicators actually measure the empowerment process in a certain context (Carlson, Kordas, & Murray-Kolb, 2014; K. O. Mason & Smith, 2001). Good examples are indicators of mobility and freedom of association in the Sub Saharan or Latin American setting, where women are more likely to be able to leave the house without needing permission from their husbands compared to women in the South Asian setting. Second, the issue of joint or individual decision making complicates measurement and interpretation. Some studies reason that women are empowered only when they are the sole decision maker (Brunson et al. 2009; Desai and Johnson, 2005), others when

decisions are made jointly (Fapohunda & Orobato, 2013). The importance of context dependency, for example, is well illustrated by results from Senegal that show prompt visits to a health facility are more likely when the husband himself makes the decisions on his child's health (Franckel & Lalou, 2009). Another study in Ethiopia finds higher rates of acute child malnutrition in couples where individual decision making regarding a child's health takes place as opposed to joint decision making (Egata, Berhane, & Worku, 2014).

This systematic literature review has also uncovered a dearth of measures regarding the psychological dimension of women's empowerment and exposure to intimate partner violence. Although it is encouraging that a few studies have conducted such analyses, future research should focus on development and validation of new measures that can be used to track progress in these dimensions. This would be a promising expansion of the literature, since the few indicators on psychological empowerment and intimate partner violence in this review were often positively associated with maternal and child health outcomes.

Two main dimensions of empowerment from the theoretical literature are completely absent in the current literature on the measurement of associations between women's empowerment and maternal and child health outcomes. Indicators regarding the political and legal dimensions of empowerment were not present in the reviewed literature. Further research is needed to develop and incorporate measures of empowerment that capture these dimensions, for example measures at the individual, community and national level that track participation of women in governmental bodies such as parliament, but also water and municipal councils at the regional and local levels. Such

measures are either already present, for example in the Gender Empowerment Index, or proposed as an extension to current measures (Charmes and Wieringa, 2003; Schuler, 2006). For the legal dimension of empowerment, national level indicators could be implemented that track whether certain legal provisions biased against women are present, such as skewed inheritance laws that benefit the husband's family, or the ability of a woman to get gain a land title (Kabeer, 1999; Malhotra and Schuler, 2005; Alsop and Heinsohn, 2005).

The vast majority of studies in this review are based on cross sectional data. However, some promising new studies recognize this limitation and have drawn on either longitudinal or pooled cross sectional data to track the empowerment process over time (Bandiera et al. 2014, Bawah, 2002; Chowdhary and Patel, 2008; Deyessa et al. 2010; Egata and Berhane, 2014; Imai, et al., 2013; Lawoko et al., 2007; Salazar et al., 2012; Sharma and Kader, 2013; Ueyama, 2006; Upadhyay and Hindin, 2005). Among these studies, the majority of associations were positive, providing evidence for empowerment as a process that can benefit maternal and child health outcomes. More studies in this field should aim to collect and analyze longitudinal datasets to get at the heart of the empowerment process and its linkages with maternal and child health outcomes. Just under two thirds (63%) of studies were based on analysis of secondary quantitative datasets. Further research should be fielded with primary data that incorporates indicators that capture novel or infrequently measured dimensions of empowerment such as the health, freedom from violence, legal and political dimensions of empowerment discussed in this review.

One study based on data from Uganda conducted a randomized controlled trial of both a behavioral intervention (vocational training) while also providing information through adolescent peer education groups regarding sex, reproduction and marriage in treatment communities. Bandiera et al. (2014) found that compared to their counterparts in control communities in which no program were delivered through adolescent development groups, girls in the treatment group scored higher on the empowerment index. But more importantly, girls in the treatment group that were empowered also reported less sex against their will and higher condom use when they engaged in sexual activities (Bandiera et al., 2014). This experimental study sheds light on the direction and functioning of the empowerment process in raising health outcomes for women and girls through critical reflection and engagement in peer group processes and education. More experimental studies should follow to show in what contexts, and for what interventions both empowerment and health outcomes of women and girls can be improved.

While calls have been made to measure women's empowerment beyond the individual level, especially since it is a process that is largely dependent on perceptions in the community, very few studies have taken up this challenge. Following recommendations by Mason (1977; 2003), Malhotra and Schuler (2005) and Sandberg and Rafail (2013), future research should aim to further measure women's empowerment beyond the individual.

Results from this review regarding positive associations of quantitative measures of women's empowerment and indicators for child health outcomes are strong, but should be interpreted with caution. Indicators regarding mother's exposure to violence and child mortality are most commonly reported in the studies reviewed. Other child health

outcomes such as vaccination status are also commonly found to be positively associated with indicators of women's economic empowerment. While this review has attempted to provide some evidence to strengthen these hypothesized linkages, further research is needed to elucidate the relationship between a mother's level of empowerment and differential outcomes for children, especially by inequity dimensions such as gender, ethnicity, education and socio-economic status.

Some of the limitations of this study are similar to other systematic reviews as its search terms and eligibility criteria might limit the scope of review. Articles published before 1999 are excluded and although several measures have been taken to include working papers and articles, some may have been missed. Only articles of which the abstracts are searchable are included, which might have limited the scope of results obtained. However, bibliographies of selected articles were hand searched in order to verify the search strategy and minimize omission of relevant articles.

Concluding, this review has found a large number of studies are in support of the hypothesis that women's empowerment is strongly associated with maternal and child health outcomes. Remaining gaps in knowledge relate to the aggregation of indicators of empowerment into meaningful dimensions, the lack of a health dimension of empowerment, context dependency of indicators and lack of clarity of what indicators are measuring. Furthermore the current empirical research demonstrates a dearth of indicators that measure psychological empowerment, and an absence of any indicators measuring the legal and political empowerment of women. There is also lack of indicators that go beyond measurement of empowerment at the individual level. Lastly, most analyses are limited to cross sectional data. Recommendations on the way forward

include development of a comprehensive conceptual framework for women's empowerment that can guide measurement, data collection, data analysis and policy formulation, increased data collection regarding the psychological, legal and political dimensions of women's empowerment and expansion of research to longitudinal datasets and analyses that also include levels of analysis that go beyond individual women and include measures of women's empowerment in the community.

References

Bibliography

- Ackerson, L. K., & Subramanian, S. V. (2009). Intimate partner violence and death among infants and children in India. *Pediatrics*, 124(5), e878-89.
- Agarwala, R., & Lynch, S. M. (2006). Refining the measurement of women's autonomy: An international application of a multi-dimensional construct. *Social Forces*, 84(4), 2077-2098.
- Agha, S., & Carton, T. W. (2011). Determinants of institutional delivery in rural Jhang, Pakistan. *International Journal for Equity in Health*, 10, 31-31.
- Ahmed, M. (2006). Intra-household bargaining and investment in child health. Unpublished, Carleton College (November 2006).
- Ahmed, S., Creanga, A. A., Gillespie, D. G., & Tsui, A. O. (2010). Economic status, education and empowerment: Implications for maternal health service utilization in developing countries. *PloS One*, 5(6), e11190.
- Al Riyami, A., Afifi, M., & Mabry, R. M. (2004). Women's autonomy, education and employment in Oman and their influence on contraceptive use. *Reproductive Health Matters*, 12(23), 144-154.
- Alkire, S. (2005). Subjective quantitative studies of human agency. *Social Indicators Research*, 74(1), 217-260.

- 735 Alkire, S. (2008). Concepts and Measures of Agency, OPHI working paper.
- 736 Allendorf, K. (2010). The quality of family relationships and use of maternal healthcare
737 services in India. *Studies in Family Planning*, 41(4), 263-276.
- 738 Alsop, R., Bertelsen, M. F., & Holland, J. (2006). Empowerment in practice: From
739 analysis to implementation. World Bank Publications.
- 740 Alsop, R., & Heinsohn, N. (2005). Measuring empowerment in practice: Structuring
741 analysis and framing indicators. World Bank Policy Research Working Paper, (3510).
- 742 Anderson, S., & Eswaran, M. (2009). What determines female autonomy? Evidence from
743 Bangladesh. *Journal of Development Economics*, 90(2), 179-191.
- 744 Antai, D. (2012). Gender inequities, relationship power, and childhood immunization
745 uptake in Nigeria: A population-based cross-sectional study. *International Journal of*
746 *Infectious Diseases: IJID: Official Publication of the International Society for Infectious*
747 *Diseases*, 16(2), e136-e145.
- 748 Bandiera, O., Buehren, N., Burgess, R., Goldstein, M., Gulesci, S., Rasul, I., & Sulaiman,
749 M. (2012). Empowering adolescent girls: Evidence from a randomized control trial in
750 Uganda. *London: London School of Economics*.
- 751 Bawah, A. A. (2002). Spousal communication and family planning behavior in
752 Navrongo: A longitudinal assessment. *Studies in Family Planning*, 33(2), 185-194.
- 753 Becker, S., Fonseca-Becker, F., & Schenck-Yglesias, C. (2006). Husbands' and wives'
754 reports of women's decision-making power in western Guatemala and their effects on
755 preventive health behaviors. *Social Science & Medicine* (1982), 62(9), 2313-2326.
- 756 Bloom, S. S., Wypij, D., & Das Gupta, M. (2001). Dimensions of women's autonomy
757 and the influence on maternal health care utilization in a North Indian city. *Demography*,
758 38(1), 67-78.

- 759 Brunson, E. K., Shell - Duncan, B., & Steele, M. (2009). Women's autonomy and its
760 relationship to children's nutrition among the Rendille of northern Kenya. *American*
761 *Journal of Human Biology*, 21(1), 55-64.
- 762 Campbell Collaboration. (2001). Guidelines for preparation of review protocols.
763 Retrieved from the Campbell Collaboration web site on March, 13th, 2014.
- 764 Carlson, G. J., Kordas, K., & Murray-Kolb, L. (2014). Associations between women's
765 autonomy and child nutritional status: A review of the literature. *Maternal & Child*
766 *Nutrition*.
- 767 Caruso, B., Stephenson, R., & Leon, J. S. (2010). Maternal behavior and experience, care
768 access, and agency as determinants of child diarrhea in Bolivia. *Revista Panamericana De*
769 *Salud Pública*, 28(6), 429-439.
- 770 Cattaneo, L. B., & Chapman, A. R. (2010). The process of empowerment: A model for
771 use in research and practice. *American Psychologist*, 65(7), 646.
- 772 Chakraborty, P., & Anderson, A. K. (2011). Maternal autonomy and low birth weight in
773 India. *Journal of Women's Health*, 20(9), 1373-1382.
- 774 Charmes, J., & Wieringa, S. (2003). Measuring women's empowerment: An assessment
775 of the gender-related development index and the gender empowerment measure. *Journal*
776 *of Human Development*, 4(3), 419-435.
- 777 Chowdhary, N., & Patel, V. (2008). The effect of spousal violence on women's health:
778 Findings from the Stree Arogya Shodh in Goa, India. *Journal of Postgraduate Medicine*,
779 54(4), 306-312.
- 780 Corroon, M., Speizer, I. S., Fotso, J., Akiode, A., Saad, A., Calhoun, L., & Irani, L.
781 (2014). The role of gender empowerment on reproductive health outcomes in urban
782 Nigeria. *Maternal and Child Health Journal*, 18(1), 307-315.
- 783 Cox, C. M., Hindin, M. J., Otupiri, E., & Larsen-Reindorf, R. (2013). Understanding
784 couples' relationship quality and contraceptive use in Kumasi, Ghana. *International*
785 *Perspectives on Sexual and Reproductive Health*, 39(4).

- 786 D'Souza, R., & Bryant, J. (1999). Determinants of childhood mortality in slums of
787 Karachi, Pakistan. *Journal of Health Population in Developing Countries*, 2(1), 33-44.
- 788 Dancer, D., & Rammohan, A. (2009). Maternal autonomy and child nutrition: Evidence
789 from rural Nepal. *Indian Growth and Development Review*, 2(1), 18-38.
- 790 Desai, S., & Johnson, K. (2005). Women's decision making and child health: Familial
791 and social hierarchies. *A Focus on Gender: Collected Papers on Gender using DHS Data*,
792 55-68.
- 793 Deyessa, N., Berhane, Y., Emmelin, M., Ellsberg, M. C., Kullgren, G., & Högberg, U.
794 (2010). Joint effect of maternal depression and intimate partner violence on increased risk
795 of child death in rural Ethiopia. *Archives of Disease in Childhood*, 95(10), 771-775.
- 796 Diop-Sidibé, N., Campbell, J. C., & Becker, S. (2006). Domestic violence against women
797 in Egypt--wife beating and health outcomes. *Social Science & Medicine*, 62(5), 1260-
798 1277.
- 799 Do, M., & Kurimoto, N. (2012). Women's empowerment and choice of contraceptive
800 methods in selected African countries. *International Perspectives on Sexual and*
801 *Reproductive Health*, 38(1), 23-33.
- 802 Dyson, T., & Moore, M. (1983). On kinship structure, female autonomy, and
803 demographic behavior in India. *Population and Development Review*, 35-60.
- 804 Egata, G., Berhane, Y., & Worku, A. (2014). Predictors of acute undernutrition among
805 children aged 6 to 36 months in East rural Ethiopia: A community based nested case-
806 control study. *BMC Pediatrics*, 14(1), 91.
- 807 Ellsberg, M., Jansen, H. A., Heise, L., Watts, C. H., & Garcia-Moreno, C. (2008).
808 Intimate partner violence and women's physical and mental health in the WHO multi-
809 country study on women's health and domestic violence: An observational study. *The*
810 *Lancet*, 371(9619), 1165-1172.
- 811 Emenike, E., Lawoko, S., & Dalal, K. (2008). Intimate partner violence and reproductive
812 health of women in Kenya. *International Nursing Review*, 55(1), 97-102.

- 813 Fapohunda, B. M., & Orobato, N. G. (2013). When women deliver with no one present
814 in Nigeria: Who, what, where and so what?. *PLoS ONE*, 8(7), e69569.
- 815 Fikre, A. A., & Demissie, M. (2012). Prevalence of institutional delivery and associated
816 factors in Dodota Woreda (district), Oromia regional state, Ethiopia. *Reproductive Health*,
817 9, 33.
- 818 Franckel, A., & Lalou, R. (2009). Health-seeking behaviour for childhood malaria:
819 Household dynamics in rural Senegal. *Journal of Biosocial Science*, 41(1), 1-19.
- 820 Furuta, M., & Salway, S. (2006). Women's position within the household as a
821 determinant of maternal health care use in Nepal. *International Family Planning*
822 *Perspectives*, 17-27.
- 823 Gage, A. J., & Hutchinson, P. L. (2006). Power, control, and intimate partner sexual
824 violence in Haiti. *Archives of Sexual Behavior*, 35(1), 11-24.
- 825 Gayen, K., & Raeside, R. (2010). Communicative actions, women's degree of social
826 connectedness and child mortality in rural Bangladesh. *Child: Care, Health and*
827 *Development*, 36(6), 827-834.
- 828 Ghuman, S. J. (2003). Women's autonomy and child survival: A comparison of Muslims
829 and non-Muslims in four Asian countries. *Demography*, 40(3), 419-436.
- 830 Ghuman, S. J., Lee, H. J., & Smith, H. L. (2006). Measurement of women's autonomy
831 according to women and their husbands: Results from five Asian countries. *Social*
832 *Science Research*, 35(1), 1-28.
- 833 Golla, A. M., Malhotra, A., Nanda, P., & Mehra, R. (2011). Understanding and
834 measuring women's economic empowerment. Definition, Framework and Indicators.
835 Washington, DC: International Center for Research on Women (ICRW).
- 836 Goo, L., & Harlow, S. D. (2012). Intimate partner violence affects skilled attendance at
837 most recent delivery among women in Kenya. *Maternal and Child Health Journal*, 16(5),
838 1131-1137.

- 839 Grabowski, R., & Self, S. (2013). Mother's autonomy: Impact on the quality of children's
840 healthcare in India. *Applied Economics*, 45(13-15), 1903-1913.
- 841 Haile, Z. T., Chertok, I. R. A., & Teweldeberhan, A. K. (2013). Determinants of
842 utilization of sufficient tetanus toxoid immunization during pregnancy: Evidence from
843 the Kenya demographic and health survey, 2008–2009. *Journal of Community Health:*
844 *The Publication for Health Promotion and Disease Prevention*, 38(3), 492-499.
- 845 Hailu, D., & Berhe, H. (2014). Determinants of institutional delivery service utilisation
846 among women of childbearing age in urban and rural areas of Tsegedie district, Ethiopia.
847 *Midwifery*.
- 848 Haque, S. E., Rahman, M., Mostofa, M. G., & Zahan, M. S. (2012). Reproductive health
849 care utilization among young mothers in Bangladesh: Does autonomy matter? *Women's*
850 *Health Issues*, 22(2), e171-e180.
- 851 Hindin, M. J. (2000). Women's autonomy, women's status and fertility-related behavior
852 in Zimbabwe. *Population Research and Policy Review*, 19(3), 255-282.
- 853 Hindin, M. J. (2005). Women's autonomy, status, and nutrition in Zimbabwe, Zambia,
854 and Malawi. *A Focus on Gender: Collected Papers on Gender using DHS Data*, 93-115.
- 855 Hossain, M. A., Sumi, N. S., Haque, M. E., & Bari, W. (2014). Consequences of intimate
856 partner violence against women on under-five child mortality in Bangladesh. *Journal of*
857 *Interpersonal Violence*, 29(8), 1402-1417.
- 858 Hou, X., & Ma, N. (2011). Empowering women: the effect of women's decision-making
859 power on reproductive health services uptake--evidence from Pakistan. *World Bank*
860 *Policy Research Working Paper Series*. No. 5543.
- 861 Imai Katsushi, S., Annim, S. K., Kulkarni, V. S., & Gaiha, R. (2013). Does Women's
862 Empowerment Reduce Prevalence of Stunted and Underweight Children in Rural India?
863 *Discussion Paper Series*, 2013.

- 864 Kabakyenga, J. K., Östergren, P., Turyakira, E., & Pettersson, K. O. (2012). Influence of
865 birth preparedness, decision-making on location of birth and assistance by skilled birth
866 attendants among women in south-western Uganda. *Plos One*, 7(4), e35747-e35747.
- 867 Kabeer, N. (2002). Resources, agency, achievements: Reflections on the measurement of
868 women's empowerment. *Development and Change*, 30(3), 435-464.
- 869 Kant, I., Gregor, M., Reath, A. (1997) Kant: Critique of Practical Reason. Cambridge.
870 Cambridge University Press.
- 871 Kishor, S. (2000). Empowerment of women in Egypt and links to the survival and health
872 of their infants.
- 873 Kishor, S. (2005). A focus on gender: Collected papers on gender using DHS data ORC
874 Macro.
- 875 Kishor, S., & Subaiya, L. (2008). Understanding women's empowerment: A comparative
876 analysis of demographic and health surveys (DHS) data. Macro International.
- 877 Koenig, M. A., Ahmed, S., Hossain, M. B., & Mozumder, A. K. A. (2003). Women's
878 status and domestic violence in rural Bangladesh: Individual-and community-level effects.
879 *Demography*, 40(2), 269-288.
- 880 Koenig, M. A., Zablotska, I., Lutalo, T., Nalugoda, F., Wagman, J., & Ron Gray. (2004).
881 Coerced first intercourse and reproductive health among adolescent women in Rakai,
882 Uganda. *International Family Planning Perspectives*, 30, 156-163.
- 883 Kravdal, Ø. (2001). Main and interaction effects of women's education and status on
884 fertility: The case of Tanzania. *European Journal of Population*, 17(2), 107-136.
- 885 Kwagala, B., Wandera, S. O., Ndugga, P., & Kabagenyi, A. (2013). Empowerment,
886 partner's behaviours and intimate partner physical violence among married women in
887 Uganda. *BMC Public Health*, 13(1), 1112.
- 888 Laverack, G. (2007) Health Promotion Practice: building empowered communities.
889 London. Open University Press.

- 890
 891 Laverack, G. (2015) A to Z of Public Health. Basingstoke. Palgrave Macmillan.
 892
 893 Lawoko, S., Dalal, K., Jiayou, L., & Jansson, B. (2007). Social inequalities in intimate
 894 partner violence: A study of women in Kenya. *Violence and Victims*, 22(6), 773-784.
- 895 Lépine, A., & Strobl, E. (2013). The effect of women's bargaining power on child
 896 nutrition in rural Senegal. *World Development*, 45, 17-30.
- 897 Lion, K. C., Prata, N., & Stewart, C. (2009). Adolescent childbearing in Nicaragua: A
 898 quantitative assessment of associated factors. *International Perspectives on Sexual and*
 899 *Reproductive Health*, 91-96.
- 900 Mabsout, R. (2011). Capability and health functioning in Ethiopian households. *Social*
 901 *Indicators Research*, 101(3), 359-389.
- 902 Malhotra, A., & Schuler, S. R. (2005). Women's empowerment as a variable in
 903 international development. *Measuring Empowerment: Cross-Disciplinary Perspectives*,
 904 71-88.
- 905 Malhotra, C., Malhotra, R., Ostbye, T., & Subramanian, S. V. (2012). Maternal autonomy
 906 and child health care utilization in India: Results from the national family health survey.
 907 *Asia-Pacific Journal of Public Health*.
- 908 Mashal, T., Takano, T., Nakamura, K., Kizuki, M., Hemat, S., Watanabe, M., & Seino, K.
 909 (2008). Factors associated with the health and nutritional status of children under 5 years
 910 of age in Afghanistan: Family behaviour related to women and past experience of war-
 911 related hardships. *BMC Public Health*, 8(1), 301.
- 912 Mason, K. O., & Smith, H. L. (2001). Thinking about, measuring, and analyzing
 913 women's empowerment/autonomy: Lessons from a cross-country comparative studies.
 914 Paper presented at the *Presentation at the Annual Meeting of the Population Association*
 915 *of America, Washington, DC*, 29-31.

- 916 Mason, K. O. (2005). Measuring women's empowerment: Learning from cross-national
917 research. *Measuring Empowerment: Cross-Disciplinary Perspectives*. Deepa Narayan,
918 89-103.
- 919 Matthews, S. A., & Gubhaju, B. (2004). Contextual influences on the use of antenatal
920 care in Nepal. MEASURE DHS, ORC Macro. Calverton, Maryland.
- 921 Measham, D. M. (2004). Gender-based power and susceptibility to sexually transmitted
922 infections among women in Karnataka state, India. Available from ProQuest
923 Dissertations & Theses Full Text. (305212911).
- 924 Mistry, R., Galal, O., & Lu, M. (2009). Women's autonomy and pregnancy care in rural
925 India: A contextual analysis". *Social Science & Medicine*, 69(6), 926-933.
- 926 Moher D., Liberati A., Tetzlaff J., Altman D. G., and the PRISMA Group. (2009).
927 Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA
928 Statement. *Ann Intern Med.* ; 151:264-269.
- 929 Narayan-Parker, D. (2002). Empowerment and poverty reduction: A sourcebook World
930 Bank Publications. Washington, DC.
- 931 Narayan-Parker, D. (2005). Measuring empowerment: Cross-disciplinary perspectives.
932 World Bank Publications. Washington, DC.
- 933 ORC Macro. (2004). Demographic and Health Survey. ORC Macro. [http://www.](http://www.measuredhs.com)
934 [measuredhs.com](http://www.measuredhs.com)
- 935 Quisumbing, A. R., & Otsuka, K. (2001). Land inheritance and schooling in matrilineal
936 societies: evidence from Sumatra. *World Development*, 29(12), 2093-2110.
- 937 Rico, E., Fenn, B., Abramsky, T., & Watts, C. (2011). Associations between maternal
938 experiences of intimate partner violence and child nutrition and mortality: Findings from
939 demographic and health surveys in Egypt, Honduras, Kenya, Malawi and Rwanda.
940 *Journal of Epidemiology and Community Health*, 65(4), 360-367.

- 941 Sabarwal, S., McCormick, M. C., Silverman, J. G., & Subramanian, S. V. (2012).
 942 Association between maternal intimate partner violence victimization and childhood
 943 immunization in India. *Journal of Tropical Pediatrics*, 58(2), 107-113.
- 944 Salazar, M., Högberg, U., Valladares, E., & Persson, L. (2012). Intimate partner violence
 945 and early child growth: A community-based cohort study in Nicaragua. *BMC Pediatrics*,
 946 12, 82-82.
- 947 Saleem, S., & Bobak, M. (2005). Women's autonomy, education and contraception use in
 948 Pakistan: A national study. *Reproductive Health*, 2, 8-8.
- 949 Samman, E., & Santos, M. E. (2009). Agency and empowerment: A review of concepts,
 950 indicators and empirical evidence. Oxford Poverty & Human Development Initiative.
- 951 Sandberg, J., & Rafail, P. (2013). Measurement models of women's autonomy using the
 952 1998/1999 India DHS. *Journal of Population Research*, 30(4), 367-381.
- 953 Schuler, S. R., & Hashemi, S. M. (1994). Credit programs, women's empowerment, and
 954 contraceptive use in rural Bangladesh. *Studies in family planning*, 65-76.
- 955 Self, S., & Grabowski, R. (2012). Son preference, autonomy and maternal health in rural
 956 India. *Oxford Development Studies*, 40(3), 305-323.
- 957 Sharma, A., & Kader, M. (2013). Effect of women's decision-making autonomy on
 958 infant's birth weight in rural Bangladesh. *ISRN Pediatrics*, 2013, 159542-159542.
- 959 Shroff, M. R., Griffiths, P. L., Suchindran, C., Nagalla, B., Vazir, S., & Bentley, M. E.
 960 (2011). Does maternal autonomy influence feeding practices and infant growth in rural
 961 India? *Social Science & Medicine*, 73(3), 447-455.
- 962 Simon, D., Adams, A. M., & Madhavan, S. (2002). Women's social power, child
 963 nutrition and poverty in Mali. *Journal of Biosocial Science*, 34(2), 193-214.
- 964 Singh, A., Mahapatra, B., & Dutta, S. (2008). Spousal abuse and infant and child
 965 mortality in India. *Asia-Pacific Population Journal*, 23(2)

- 966 Singh, K., Bloom, S., & Brodish, P. (2015). Gender equality as a means to improve
967 maternal and child health in Africa. *Health care for women international*, 36(1), 57-69.
- 968 Singh, P. K., & Singh, L. (2014). Examining inter-generational differentials in maternal
969 health care service utilization: Insights from the Indian demographic and health survey.
970 *Journal of Biosocial Science*, 46(3), 366-385.
- 971 Sipsma, H., Callands, T. A., Bradley, E., Harris, B., Johnson, B., & Hansen, N. B. (2013).
972 Healthcare utilization and empowerment among women in Liberia. *Journal of*
973 *Epidemiology and Community Health*, 67(11), 953-959.
- 974 Stephenson, R., Baschieri, A., Clements, S., Hennink, M., & Madise, N. (2006).
975 Contextual influences on the use of health facilities for childbirth in Africa. *American*
976 *Journal of Public Health*, 96(1).
- 977 Story, W. T., & Burgard, S. A. (2012). Couples' reports of household decision-making
978 and the utilization of maternal health services in Bangladesh. *Social Science & Medicine*,
979 75(12), 2403-2411.
- 980 Sutherland, E. G. (2006). Contraceptive behavior in the western Chitwan valley of Nepal:
981 Effects of season, natural resource responsibility, women's status, and accessibility of
982 family planning services. PhD thesis available from ProQuest Dissertations & Theses
983 Full Text. (3219084).
- 984 Trapp, E. M. (2006). How social factors and maternal empowerment affect sex-equality
985 and child well-being in Bangladesh. PhD thesis available from ProQuest Dissertations &
986 Theses Full Text. (305340817).
- 987 Ueyama, M. (2006). Effects of Women's agriculture on child health in rural Malawi:
988 food security effect and bargaining effect. *Japan Society for the Promotion of Science*,
989 *Hitotsuashi University*.
- 990 Upadhyay, U. D., & Hindin, M. J. (2005). Do higher status and more autonomous women
991 have longer birth intervals? Results from Cebu, Philippines. *Social Science & Medicine*
992 (1982), 60(11), 2641-2655.

- Upadhyay, U. D., & Karasek, D. (2012). Women's empowerment and ideal family size: An examination of DHS empowerment measures in Sub-Saharan Africa. *International Perspectives on Sexual and Reproductive Health*, 78-89.
- Vaz, A., Pratley, P., & Alkire, S. (2015). Measuring Women's Autonomy in Chad Using the Relative Autonomy Index. *Feminist Economics*, 1-31.
- Wado, Y. D., Afework, M. F., & Hindin, M. J. (2014). Childhood vaccination in rural southwestern Ethiopia: The nexus with demographic factors and women's autonomy. *The Pan African Medical Journal*, 17 Suppl 1, 9-9.
- Woldemicael, G. (2009). Women's autonomy and reproductive preferences in Eritrea. *Journal of Biosocial Science*, 41(02), 161-181.
- Woldemicael, G. (2010). Do women with higher autonomy seek more maternal health care? Evidence from Eritrea and Ethiopia. *Health Care for Women International*, 31(7), 599-620.
- Woldemicael, G., & Tenkorang, E. Y. (2010). Women's autonomy and maternal health-seeking behavior in Ethiopia. *Maternal and Child Health Journal*, 14(6), 988-998.
- Tables and Figures (at end of manuscript and without footnotes as suggested by Editor)**

Table 1: Summary statistics of reviewed articles					
Study characteristics			Study characteristics		
	n	%		n	%
Study countries			Year of publication		
Bangladesh	6	9.09	1999	1	1.52
Egypt	1	1.52	2000	3	4.55
Eritrea	1	1.52	2001	1	1.52
Ethiopia	8	12.12	2002	2	3.03
Ghana	3	4.55	2003	2	3.03
Guatemala	1	1.52	2004	2	3.03
Guinea	1	1.52	2005	3	4.55
Haiti	1	1.52	2006	7	10.61
India	14	21.21	2007	1	1.52
Kenya	5	7.58	2008	4	6.06
Liberia	1	1.52	2009	6	9.09
Malawi	1	1.52	2010	5	7.58
Mali	1	1.52	2011	6	9.09
Multicountry	3	4.55	2012	10	15.15

Nepal	3	4.55	2013	7	10.61
Nicaragua	1	1.52	2014	7	9.09
Nigeria	3	4.55			
Pakistan	4	6.06			
Philippines	1	1.52	Aggregated measures or not?		
Senegal	2	3.03	Aggregated	45	60.61
Tanzania	1	1.52	Not aggregated	22	39.39
Uganda	2	3.03			
Zimbabwe	2	3.03	Method of aggregation		
Region			Summative index	36	77.5
Sub Saharan Africa	32	46.97	Exploratory factor analysis	3	7.5
Asia Pacific	28	42.42	Confirmatory factor analysis	1	2.5
Latin America and the Caribbean	3	4.55	Principal component analysis	4	10
Middle East and North Africa	1	1.52	Latent class analysis	1	2.5
Multicountry	3	4.55	Type of aggregation		
Type of study design			No aggregation	22	32.84
Observational Cross Sectional	51	67.11	Single index	17	24.24
Observational Longitudinal	10	14.93	Multiple indices / dimensions	10	15.15
Quasi Experimental	5	7.46	Mixed aggregated and separate indicators	14	21.21
Experimental	1	1.5	Type of data		
Total articles	67	100	Primary data	25	37
			Secondary data	42	63
			Total articles	67	100

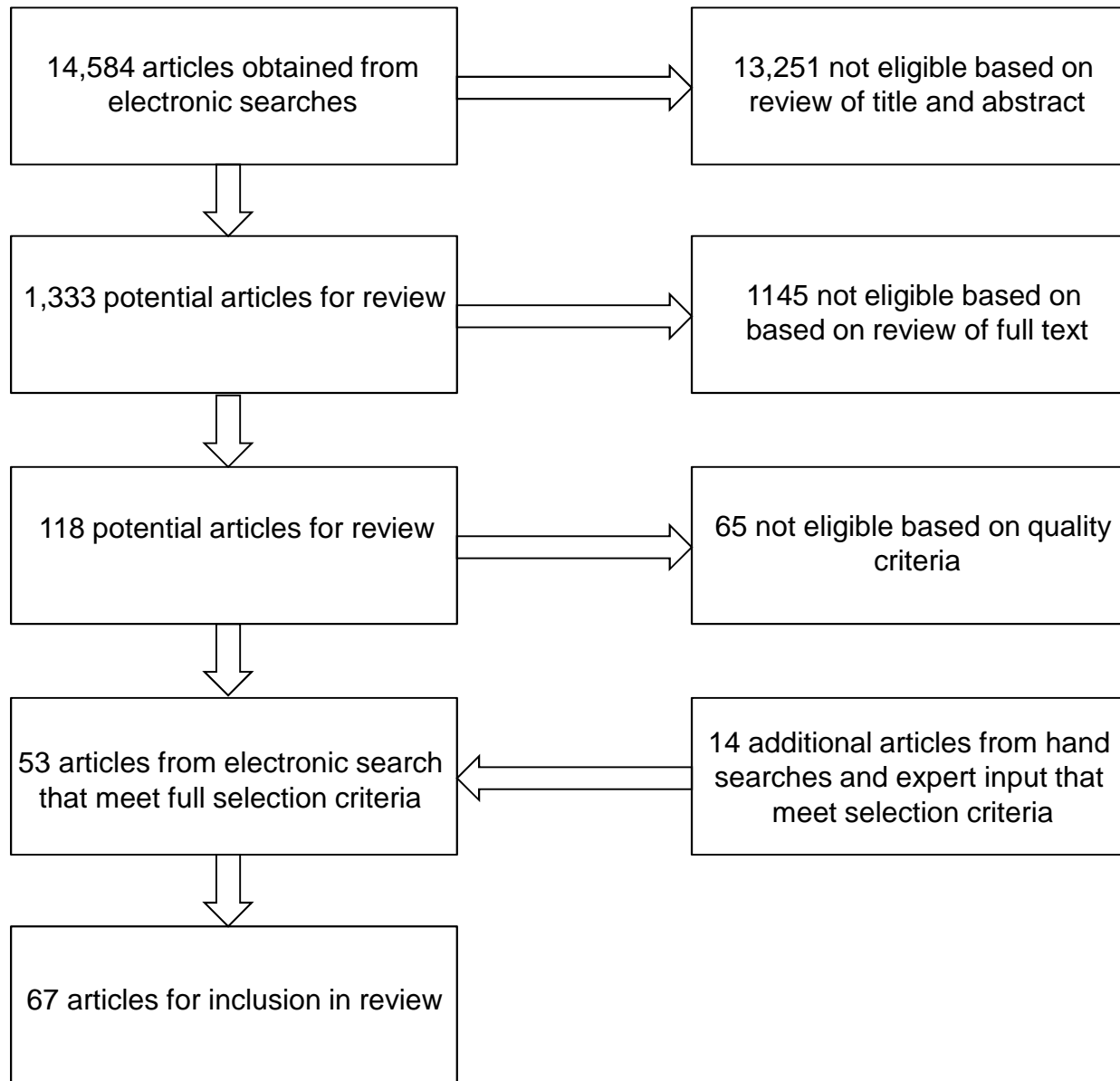
Table 2: Associations with maternal and health outcomes of most common indicators of women's empowerment among reviewed articles (n=67)

Name of Indicator	Positive associations		Negative associations		Non-significant associations		Mixed association	
	n	%	n	%	n	%	n	%
Woman's sole or joint decision making regarding visits to family and friends	13	45%	1	3%	9	31%	6	21%
Woman's sole or joint decision making regarding making major household purchases	13	52%	1	4%	5	20%	6	24%
Woman's sole or joint decision making regarding her own healthcare	10	45%	2	9%	3	14%	7	32%
Woman's sole or joint decision making regarding making daily household purchases	7	41%	1	6%	5	29%	4	24%
Woman's sole or joint decision making regarding having employment outside the home	7	64%	0	0%	2	18%	2	18%
Woman's justification of domestic violence	5	50%	2	20%	3	30%	0	0%
Woman's sole or joint decision making regarding her own money	3	33%	1	11%	3	33%	2	22%
Women's report of exposure to any Intimate Partner Violence (IPV)	5	56%	2	22%	2	22%	0	0%
Woman's sole or joint decision making regarding where to take children in case of illness	2	29%	3	43%	1	14%	1	14%
Women's report of exposure to physical Intimate Partner Violence (IPV)	2	29%	1	14%	4	57%	0	0%
Woman's sole or joint decision making regarding expenditures on clothes and jewelry	3	50%	1	17%	0	0%	2	33%
Sexual IPV	1	17%	0	0%	5	83%	0	0%
Woman's sole or joint decision making regarding household issues (household autonomy)	2	40%	0	0%	3	60%	0	0%
Woman ownership of a bank / savings account	0	0%	0	0%	1	20%	4	80%
Woman's sole or joint decision making regarding use of contraception	3	75%	0	0%	0	0%	1	25%
Woman's sole or joint decision making regarding what food to cook	3	75%	0	0%	0	0%	1	25%
Woman's report of freedom to visit doctor without permission of husband	2	50%	0	0%	1	25%	1	25%
Psychological IPV	3	75%	0	0%	1	25%	0	0%
Relative education between wife and husband	3	75%	0	0%	1	25%	0	0%
Discussion of family planning between wife and husband	4	100%	0	0%	0	0%	0	0%
Woman can refuse sex	2	50%	0	0%	0	0%	2	50%
Woman's education level	3	75%	0	0%	0	0%	1	25%
Woman's report of freedom to go to the local market without permission of husband	1	25%	0	0%	0	0%	3	75%

Table 3: Associations between dimensions of women's empowerment among reviewed articles by category of maternal and child health outcome (n=67)

	Positive associations		Negative associations		Non-significant associations		Mixed associations		Total
	n	%	n	%	n	%	n	%	n
Family planning utilization									
Economic	7	39%	2	11%	5	28%	4	22%	18
Social	10	42%	2	8%	8	33%	4	17%	24
Health	6	50%	3	25%	1	8%	2	17%	12
IPV	0	0%	2	50%	2	50%	0	0%	4
Psychological	0	0%	0	0%	0	0%	0	0%	0
Health service uptake (including Skilled Birth Attendance (SBA), Antenatal Care (ANC), Institutional Delivery and Vaccination coverage)									
	n	%	n	%	n	%	n	%	n
Economic	19	45%	1	2%	6	14%	16	38%	42
Social	19	51%	3	8%	5	14%	10	27%	37
Health	13	57%	2	9%	2	9%	6	26%	23
IPV	0	0%	1	33%	2	67%	0	0%	3
Psychological	0	0%	0	0%	0	0%	0	0%	0
Health status (including anthropometric measures such as Weight for Age Z-score (WHZ), Weight for Height Z-score (WHZ), Height for Age Z-score (HAZ), Body Mass Index (BMI), anemia and child mortality)									
	n	%	n	%	n	%	n	%	n
Economic	19	39%	0	0%	11	22%	19	39%	49
Social	21	32%	7	11%	23	35%	15	23%	66
Health	8	31%	5	19%	4	15%	9	35%	26
IPV	11	52%	1	5%	9	43%	0	0%	21
Psychological	5	71%	1	14%	1	14%	0	0%	7
All Maternal and Health outcomes									
	n	%	n	%	n	%	n	%	n
Economic	45	41%	3	3%	22	20%	39	36%	109
Social	50	39%	12	9%	36	28%	29	23%	127
Health	27	44%	10	16%	7	11%	17	28%	61
IPV	11	39%	4	14%	13	46%	0	0%	28
Psychological	5	71%	1	14%	1	14%	0	0%	7

Total		n		%		n		%		n		%		n	
1010	All dimensions of empowerment	138	42%	30	9%	79	24%	85	26%	332					
1011	Appendices available in separate file submitted to editor														



Highlights for manuscript

- Women's empowerment is generally positively associated with maternal and child health outcomes
- Approaches to measure women's empowerment vary widely
- Most studies do not aggregate indicators into meaningful dimensions