

# Women's bargaining power and child feeding in Nepal: Linkages through nutrition information

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## Abstract

Women's intra-household bargaining power is an important determinant of child nutritional status, but there is limited evidence on how it relates to infant and young child feeding (IYCF) practices. We conducted a cross-sectional analysis using 2012 baseline data from the impact evaluation of *Suaahara*, a multisectoral programme in Nepal, focusing on households with children 0–23 months ( $n = 1787$ ). We examined if women's bargaining power was related to exposure to IYCF information and if exposure to IYCF information was in turn associated with improved IYCF practices: early initiation of breastfeeding, exclusive breastfeeding, minimum meal frequency and dietary diversity. Bargaining power consisted of four domains: (i) ownership and control of assets; (ii) social participation; (iii) workload; and (iv) household decision-making control and were primarily measured using additive scales. We used generalized structural equation modelling to examine if exposure to IYCF information mediated the relationship between the bargaining domains and the four IYCF practices, separately. Social participation was positively associated with exposure to IYCF information ( $\beta = 0.266$ ,  $P < .001$ ), which in turn was related to early initiation ( $\beta = 0.241$ ,  $P = .001$ ). We obtained similar results for the relationship between social participation and dietary diversity. Decision-making control was directly associated with exclusive breastfeeding ( $\beta = 0.350$ ,  $P = .036$ ). No domains were associated with minimum meal frequency. Different domains of women's bargaining power may relate to exposure to nutrition information and IYCF behaviours. Understanding specific domains of bargaining power is critical to developing interventions that can effectively address gender-related issues that underlie child nutrition outcomes.

## KEYWORDS

bargaining power, IYCF practices, nutrition information

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## 1 | INTRODUCTION

Promotion of appropriate infant and young child feeding (IYCF) practices is important for the reduction of child undernutrition (A. D. Jones et al., 2013; Menon, Bamezai, Subandoro, Ayoya, & Aguayo, 2015). Nepal has seen some of the fastest rates of reduction globally in the past few years, but continues to bear a high burden of child undernutrition that is coupled with poor IYCF practices (Cunningham, Headey, Singh, Karmacharya, & Pandey Rana, 2017; Headey & Hoddinott, 2015; Ministry of Health Nepal, New ERA Nepal, & ICF International, 2017). The prevalence of exclusive breastfeeding for the first 6 months of life is 66%, and early initiation of breastfeeding is 55%; minimum dietary diversity among children aged 6–23 months is only 47% (Ministry of Health Nepal et al., 2017). Improving IYCF practices is an important priority for nutrition programmes and policies to ensure proper health and nutrition in the first 1000 days of life to prevent short- and long-term adverse human and economic consequences (Black et al., 2013; Bhutta et al., 2008; Hoddinott, Maluccio, Behrman, Flores, & Martorell, 2008; Victora et al., 2008).

Women's household status is an important determinant of child nutritional status (Cunningham, Ruel, Ferguson, & Uauy, 2014). Women's intra-household bargaining power refers to the relative social and economic position of a woman in a household for accessing and controlling resources and her decision-making control (Agarwal, 1997; Doss, 2013; Haddad, Hoddinott, & Alderman, 1994). In this study, we conceptualize women's, specifically mothers', intra-household bargaining power as consisting of four domains: (i) ownership and control of household assets; (ii) social participation; (iii) workload; and (iv) household decision-making control (Richards et al., 2013). Women's bargaining power represents a resource of care for children as it enables women to have more economic, social and human capital, which is important for child feeding and nutrition (Engle, Menon, & Haddad, 1999). Higher bargaining power can enable women to access information, make informed decisions and follow recommended IYCF practices (Engle et al., 1999).

Exposure to appropriate IYCF information is a prerequisite to following appropriate IYCF practices (Hackett, Mukta, Jalal, & Sellen, 2015; Sanghvi, Jimerson, Hajeebhoy, Zewale, & Nguyen, 2013). Women with greater access to and control of economic and social resources and time, which indicate high bargaining power, may possess means to improve their exposure to IYCF information. For example, women's ownership of assets may provide greater access to potential communication channels such as television, radio or telephone or improve their access to health services and thereby increase their exposure to IYCF information (Demilew, 2017; Sharma et al., 2007; Wu et al., 2014). Similarly, social participation can facilitate information and knowledge exchange, which can improve access to health resources and knowledge networks related to child nutrition, thus improving IYCF practices (Harpham, De Silva, Jones, & Garlick, 2006; Lin, 1999). Membership in groups, especially in those that include information on maternal and child nutrition, has shown significant positive association with improved IYCF practices

### Key messages

- Women's social participation had a small but significant association with exposure to IYCF information, which in turn had a small but significant association with early initiation and dietary diversity.
- Household decision-making control had a modest positive association with exclusive breastfeeding but not with other IYCF practices.
- Access to and control of assets and workload did not have any association with any IYCF practices.
- Specific domains of women's bargaining power relate differently to specific IYCF practices, and thus addressing poor feeding practices will require strengthening women's bargaining power, particularly women's social engagements and household decision-making power.
- Improving IYCF practices will also require increasing maternal exposure to IYCF information.

in South Asia (Kumar et al., 2017; Sraboni, Malapit, Quisumbing, & Ahmed, 2014). Women with lower workload and greater household decision-making control may have more opportunities to seek health services and information during pregnancy and after child birth to follow recommended IYCF practices (Carlson, Kordas, & Murray-Kolb, 2014; Duong, Binns, & Lee, 2004).

Prior studies on women's bargaining power have mainly focused on child nutritional status as the outcome (Carlson et al., 2014; Cunningham et al., 2014). Evidence on how bargaining power relates to IYCF practices is limited (Cunningham et al., 2015; Shroff et al., 2011). Studies have either focused on specific aspects of bargaining, such as household decision-making, or used proxies such as level of education. There is also limited understanding of how domains such as social participation or workload affect different IYCF practices. Research is needed to understand if and how specific domains of women's bargaining power influence IYCF practices differently and to identify mechanisms through which these relationships operate (Cunningham et al., 2014). Explaining linkages between different domains of bargaining power and different IYCF practices can strengthen the scientific plausibility of this associative relationship. Understanding the mechanisms through which this relationship may operate also provides input for evidence-based nutrition interventions.

The objectives of this study were to (i) understand which domains of bargaining power were associated with different IYCF practices and (ii) examine if women's bargaining power was related to exposure to IYCF information, and if exposure to IYCF information was in turn associated with improved IYCF practices.

## 2 | METHODS

### 2.1 | Study design and sampling

We conducted a secondary analysis of *Suaahara*'s cross-sectional baseline survey from 2012, part of its impact evaluation. *Suaahara*, a multisectoral intervention, aims to reduce undernutrition among women and children in Nepal by increasing access to quality health and nutrition services, improving health and nutrition behaviours, increasing access to nutrient-rich foods and improving coordination for nutrition policies and programmes. Initially implemented from 2011–2016, *Suaahara* is now in its second phase (2016–2021) with interventions covering all communities across 42 of Nepal's 77 districts. Ethical approval for the data collection was obtained from the Nepal Health Research Council and for this secondary data analysis was obtained from the Institutional Review Board of University of South Carolina.

The 2012 *Suaahara* survey used multistage cluster sampling. For the first stage, 16 districts (8 interventions and 8 matched comparisons) were purposefully selected. A total of 80 Village Development Committees (VDCs) were selected using probability proportional to size for the second stage with five VDCs per district. For the third stage, three rural wards were selected from each VDC using probability proportional to size to get a total of 240 wards. For the last stage, within each ward, a complete listing of households was done, and 17 households with children under 5 years were randomly selected to obtain a total sample of 4080 households. Within each household, one child younger than 5 years of age was randomly selected as the index child for the survey. The mother of the index child was interviewed, as was another major household decision-maker with preference given to the father or another adult male, when present. Because the outcome variables for this analysis were IYCF practices, we only included data from households with children aged 0–23 months ( $n = 1787$ ).

### 2.2 | Outcome variables

We chose four IYCF practices that affect nutrient intake and dietary quality in the first 24 months of life and were measured based on the World Health Organization definition of these IYCF practices (World Health Organization, 2010). Early initiation of breastfeeding was coded as a binary variable indicating if a child aged 0–23 months was put to the breast within an hour after birth. Exclusive breastfeeding was a binary variable indicating that a child 0–5 months of age had only consumed breast milk determined based on a 24-h recall that ascertained current breastfeeding and not receiving water, other liquids or semi-solid or solid foods. Minimum meal frequency was a binary variable based on whether a child aged 6–23 months received the required number of semi-solid or solid meals or milk feeds in the previous day. For breastfed children aged 6–8 months, the minimum number of meals was two; for breastfed children aged 9–23 months, the minimum number of meals was three; and for

non-breastfed children aged 6–23 months, the minimum number of meals was four. Dietary diversity score was a continuous variable obtained by the summation of foods consumed by children aged 6–23 months in the 24 h prior to the survey, with foods categorized into seven groups: (i) grains, roots and tubers; (ii) legumes and nuts; (iii) dairy products; (iv) flesh foods (meat, fish, poultry and organ meats); (v) eggs; (vi) vitamin-A-rich fruits and vegetables; and (vii) other fruits and vegetables. Dietary diversity in South Asia is often below the four food group cut-off of the minimum dietary diversity indicator; examining the relationship between different predictors and every additional food group provided a nuanced understanding of relationships with diet quality (Arimond & Ruel, 2004). The dietary diversity score was used rather than the less informative indicator of minimum dietary diversity.

### 2.3 | Explanatory variables

Women's bargaining power was measured through four domains: (i) ownership and control of household assets; (ii) social participation; (iii) workload; and (iv) household decision-making control. We created an additive scale to measure ownership and control of ten assets: (i) house and other structures; (ii) large consumer durables (e.g. fridge, TV and sofa); (iii) small consumer durables (e.g. radio and cookware); (iv) mobile phone; (v) transportation (motorized or non-motorized); (vi) agricultural land; (vii) non-agricultural land; (viii) non-mechanized farm equipment; (ix) large livestock; and (x) small livestock. For each asset, a value of 1 was assigned if the female respondent either solely or jointly owned the asset and was also involved in sole or joint decision-making regarding the selling or renting of a particular asset (Cunningham et al., 2015; Malapit, Kadiyala, Quisumbing, Cunningham, & Tyagi, 2015). Because our study's focus was on intra-household bargaining, which relates to *relative* socioeconomic position, we examined sole or joint ownership and control of assets, as opposed to only sole ownership, which would indicate total autonomy. A total score ranging from 0 to 10 was calculated for each respondent based on the number of assets that were solely or jointly owned.

Social participation was based on active group membership, where the respondent regularly attended meetings, participated in discussions and/or volunteered, in different community-based groups (Cunningham et al., 2015; Malapit et al., 2015). Participation in groups such as agricultural groups, water user's, land/forest users', credit or microfinance, mutual help or insurance group, trade or business association, civic groups, religious groups, mother's group or other women's groups was measured. A value of 1 was assigned for each group in which a respondent reported she participated. The total number of groups in which a respondent participated was calculated. As most of those with group membership participated in one group, we created a binary variable to indicate whether the respondent participated in any community group.

The workload domain measured the total time spent by the respondent on work activities in a 24-h period (Cunningham et al., 2015; Malapit et al., 2015). Information was collected via a 24-h time

diary recall on all productive and personal activities such as sleeping and resting, personal care, wage work or employment, domestic work, care for children/adults/elders, time spent of leisure activities and social and/or religious activities. To create a continuous workload variable, total time spent on domestic work, care for children and elders, wage work or employment and subsistence activities such as farming and livestock and schoolwork was calculated based on the respondent's recall of her activities in the 24 h prior to the survey.

Household decision-making was measured as the proportion of household decisions in which the respondent had sole or joint control (Bhagowalia, Menon, & Quisumbing, 2012) of eight decisions: (i) major household expenditures such as refrigerator or television; (ii) minor household expenditures such as food for daily consumption or other household necessities; (iii) use of family planning products; (iv) respondent's health and nutrition; (v) child healthcare; (vi) child feeding; (vii) how to keep from domestic violence; and (viii) mobility to go to a relative or friend's house. For each joint decision, we also assessed the extent of decision-making control. The response scale for the extent to which the respondent feels she can contribute to the joint decision was measured as 1 = *not at all*, 2 = *small extent*, 3 = *some extent* and 4 = *to a large extent*. For each type of decision, a person was adequate if she was the sole decision-maker, or for joint decision-making, if the respondent felt she can be involved at least to some extent of decision-making. To calculate the proportion of decision in which the woman was involved in decision-making, all decisions made in the household were computed for the denominator and a total of sole or joint decisions made served as the numerator.

Exposure to IYCF information was measured as an additive scale from 0 to 8 based on if a mother had ever heard of eight IYCF messages: (i) early initiation of breastfeeding within the first hour of life; (ii) colostrum feeding; (iii) exclusive breastfeeding for the first 6 months of life; (iv) not giving any water or liquids other than breast milk for the first 6 months of life; (v) starting complementary feeding (semi-solid/mashed foods) at 6 months; (vi) feeding eggs, fish and meat to children older than 6 months; (vii) hand washing with soap and water before feeding a child; and (viii) how to feed a child during

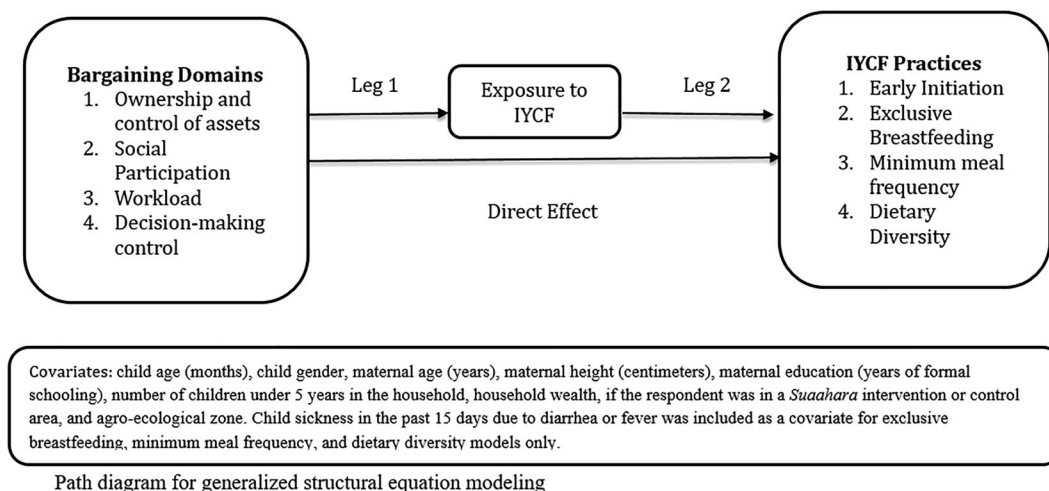
illness. Because the aim of this variable was to capture maternal exposure to IYCF information, an overall score of all messages was considered rather than using one or two specific messages related to each practice as a mediator for each outcome.

We considered maternal, child and socioeconomic characteristics and geographical factors as potential confounders based on prior evidence suggesting an association with child feeding practices, exposure to IYCF information and/or bargaining power (Addo et al., 2013; Miller et al., 2017; Vir, 2016). The covariates used in all multivariable analyses were child age (months), child gender, maternal age (years), maternal height (centimetres), maternal education (years of formal schooling), number of children under 5 years in the household, household wealth (sum of number of small durable assets, large assets and agricultural assets), if the respondent was in a *Suaahara* intervention or control area and agro-ecological zone of the household (*terai*, hills and mountains). Child sickness in the past 15 days due to diarrhoea or fever was included as a covariate for exclusive breastfeeding, minimum meal frequency and dietary diversity, as sickness may influence child food intake. Clustering at the VDC level was accounted using the *vce* option to get the appropriate standard errors.

## 2.4 | Statistical analysis

Analyses were conducted in Stata SE version 14. Descriptive statistics were obtained through proportions or means and standard deviation. Bivariate relationships were assessed for each of the main explanatory variables of bargaining power, exposure to IYCF messages and covariates with the four IYCF practices, separately. Simple logistic regression was used for bivariate analysis of early initiation, exclusive breastfeeding and minimum meal frequency. Simple linear regression was used for dietary diversity. Irrespective of the significance value of the findings in bivariate analysis, all bargaining domain variables were included in multivariable analyses.

Generalized structural equation modelling was used, which allows for path analysis using categorical variables. We used the product-



**FIGURE 1** Path diagram for generalized structural equation modelling

of-coefficients method for the path analysis to test for mediation (Fig. 1; Vanderweele, 2015). We employed this product-of-coefficients method where two regression equations were analysed for each IYCF outcome. One equation for each IYCF practice was regressed on the mediator (exposure to IYCF information), main explanatory variables of bargaining power and covariates. For the other equation, the mediator (exposure to IYCF information) was regressed on the main explanatory bargaining variables and covariates. The indirect effect was obtained as a product of each bargaining domain coefficient on the mediator and the mediator coefficient on the outcomes. The coefficient representing the estimated association between each of the bargaining domains and IYCF practices was the direct effect.

We examined the following three assumptions for the recursive path analysis (Vanderweele, 2015). First, we found no exposure–mediator interaction by testing for interaction between each of the bargaining domains and exposure to IYCF information. Second, we

included covariates in all regression analyses to account for potential confounding between bargaining power and exposure to IYCF information, bargaining power and IYCF practices and exposure to IYCF information and IYCF practices based on previous evidence (Addo et al., 2013; Miller et al., 2017; Vir, 2016). Third, we used path analysis with cross-sectional data and justified no reverse causality based on theory related to women's empowerment that suggests women with greater access to resources and decision-making control are more likely to leverage their position for better health and nutrition outcomes (Carlson et al., 2014; Cunningham et al., 2014; Kabeer, 1999, 2005; A. Malhotra & Mather, 1997; Mosedale, 2005).

A total of four models were analysed, one for each IYCF outcome, and obtained unadjusted estimates and adjusted estimates with covariates. The mediator in each model was exposure to IYCF information. For the legs of the paths that were significant, the

**TABLE 1** Descriptive statistics of child, maternal and household characteristics for children under 24 months and their mothers in *Suaahara* study in Nepal

Variable	N	Mean (SD) or %	Range
<b>Child characteristics</b>			
Child age (months)	1787	12.3 (6.74)	0–23.9
Child gender (female)	1787	49.3	-
<b>Infant and young child feeding (IYCF) practices</b>			
Early initiation (age: 0–23 mo)	1787	39.0	-
Exclusive breastfeeding (age: 0–6 mo)	385	49.3	-
Minimum meal frequency (age: 6–23 mo)	1402	72.2	-
Minimum dietary diversity (age: 6–23 mo)	1402	45.6	-
Dietary diversity score (age: 6–23 mo)	1402	3.33 (1.20)	0–7
<b>Maternal characteristics</b>			
<i>Intra-household bargaining domains</i>			
Ownership and control of assets	1787	2.78 (2.25)	0–9
Social participation (%)	1679	15.72	-
Social participation score	1679	0.21(0.55)	0–5
Time allocated to work/24 h	1787	10.9 (2.98)	0.58–18.9
Sole/joint household decision-making <sup>a</sup>	1787	75.6 (21.4)	0–100
Exposure to IYCF information <sup>b</sup>	1787	4.82 (2.07)	0–8
Maternal age (years)	1787	24.9 (5.59)	15–52
Maternal height (cm)	1786	151.6 (5.50)	133.2–179.5
Maternal years of schooling	1786	5.16 (4.48)	0–15
<b>Household characteristics</b>			
Children under 5 years	1787	1.42 (0.62)	1–5
Household wealth (assets)	1787	5.81 (3.65)	0–26
<b>Agro-ecological area</b>			
Mountain		25.1	
Hills		50.6	
Terai		24.3	

<sup>a</sup>Refers to the average of the per cent of household decisions in which the respondent had sole or joint control.

<sup>b</sup>Refers to the number of ICYF messages heard by the respondent.

indirect effect was calculated as the product of the individual coefficients of each leg leading to the mediator and then to the outcome, using the *nlcom* procedure to obtain appropriate test statistics, standard errors and significance levels. All continuous variables were standardized.

### 3 | RESULTS

The prevalence of appropriate IYCF practices was generally low in the sample. Only 39.0% of children had been exposed to early initiation of breastfeeding and only 49.3% were exclusively breastfed, whereas minimum meal frequency was 72.2% (Table 1). On average, children consumed foods from three of the seven food groups and nearly 45.6% met the minimum dietary diversity cut-off of consuming foods from four of the seven food groups. Women were solely or jointly involved in three-quarters (75.6%) of household decisions. Women owned an average of 3 of 10 assets that were considered. Only 15.7% of the mothers actively participated in one or more community groups, and on average, they worked for about 11 h a day. Mothers had heard an average of 5 of the 8 IYCF messages.

None of the bargaining domains were significantly associated with early initiation or dietary diversity in bivariate analyses (Table 2). Workload was positively associated with minimum meal frequency ( $P$

= .033) and not the other three IYCF practices. Household decision-making was positively associated with exclusive breastfeeding only ( $P$  = .076). Access to IYCF information was associated with 1.16 times higher odds of early initiation of breastfeeding ( $P$  < .001) and with higher dietary diversity by 0.1 food groups ( $P$  < .001) but was not associated with the other two child feeding practices.

Coefficients from path analyses not adjusted for covariates (Table 3) were generally larger in magnitude than those from path analyses adjusted for covariates (Table 4). From the unadjusted path analysis, social participation was positively associated with exposure to IYCF information for all IYCF indicator paths ( $P$  < .001). The unadjusted indirect paths for early initiation and dietary diversity were significant such that mothers who participated in social groups were exposed to more IYCF information and which in turn was positively associated with practicing early initiation ( $P$  = .003) and having greater dietary diversity ( $P$  = .001). Workload was positively associated with minimum meal frequency ( $P$  = .037; Table 3). From the path analyses adjusted for covariates, mothers who participated in social groups had significantly greater exposure to IYCF messages ( $\beta$  = 0.266,  $P$  < .001), which in turn was positively and significantly associated with early initiation of breastfeeding ( $\beta$  = 0.241,  $P$  = .001). The total indirect effect of this path was significant ( $\beta$  = 0.0642,  $P$  = .010). Similarly, mothers of children aged 6–23 months who were involved in social groups were significantly more exposed to IYCF

**TABLE 2** Bivariate associations of child, maternal and household characteristics with infant and young child feeding practices in children 0–24 months in *Suaahara* study in Nepal

Variable	Early initiation N = 1677 OR (P-value)	Exclusive breastfeeding N = 362 OR (P-value)	Minimum meal frequency N = 1315 OR (P-value)	Dietary diversity N = 1315 Coefficient (P-value)
<b>Child characteristics</b>				
Child age (months)	0.996 (.593)	0.491 (<.001)	1.044 (<.001)	0.0720 (<.001)
Child gender (female)	0.920 (.402)	1.359 (.146)	1.277 (.049)	0.0836 (.208)
<b>Maternal characteristics</b>				
Ownership and control of assets	0.984 (.457)	1.0308 (.523)	1.004 (.870)	-0.00563 (.702)
Social participation	0.885 (.376)	1.307 (.378)	0.976 (.886)	0.147 (.102)
Workload	0.989 (.525)	0.949 (.108)	1.046 (.033)	0.00991 (.389)
Household decision-making	1.175 (.490)	2.468 (.076)	0.951 (.863)	-0.0536 (.730)
Exposure to IYCF messages	1.116 (<.001)	1.020 (.720)	1.005 (.874)	0.0968 (.001)
Maternal age (years)	0.973 (.004)	0.999 (.960)	0.990 (.383)	-0.0133 (.030)
Maternal height (cm)	1.011 (.234)	1.046 (.022)	0.996 (.758)	0.0109 (.069)
Maternal years of schooling	1.028 (.013)	0.965 (.121)	1.020 (.148)	0.0622 (<.001)
<b>Household characteristics</b>				
Children under 5 years	0.935 (.412)	1.171 (.296)	0.904 (.334)	-0.265 (<.001)
Household wealth (assets)	1.019 (.179)	0.920 (.005)	0.979 (.220)	0.0595 (<.001)
<b>Agro-ecological area</b>				
Mountain	Ref	Ref	Ref	Ref
Hills	1.194 (.146)	0.979 (.936)	0.560 (<.001)	0.0622 (.435)
Terai	1.127 (.408)	0.426 (.004)	0.478 (<.001)	-0.166 (.087)

Note. Table presents unadjusted bivariate estimates.



**TABLE 3** Unadjusted path coefficients for relationship between the bargaining domains, exposure to IYCF information and IYCF outcomes

	Early initiation N = 1677 Model 1	Exclusive breastfeeding N = 362 Model 2	Minimum meal frequency N = 1315 Model 3	Dietary diversity N = 1315 Model 4
<b>Leg 1<sup>a</sup></b>				
Ownership & control of assets	0.00514 (P = .914)	-0.0731 (P = .317)	0.0262 (P = .583)	0.0262 (P = .583)
Social participation	0.388 (P < .001)	0.433 (P < .001)	0.380 (P < .001)	0.380 (P < .001)
Workload	0.0141 (P = .627)	-0.0184 (P = .712)	0.0202 (P = .521)	0.0202 (P = .521)
Household decision-making	-0.0746 (P = .032)	0.0220 (P = .611)	-0.101 (P = .011)	-0.101 (P = .011)
<b>Leg 2<sup>b</sup></b>				
Exposure to IYCF messages	0.249 (P < .001)	0.022 (P = .866)	0.00721 (P = .919)	0.141 (P < .001)
<b>Direct effect<sup>c</sup></b>				
Ownership & control of assets	-0.0789 (P = .379)	-0.0455 (P = .742)	0.0257 (P = .766)	-0.00884 (P = .749)
Social participation	-0.222 (P = .175)	0.283 (P = .310)	-0.0403 (P = .804)	0.0494 (P = .539)
Workload	-0.0365 (P = .521)	-0.190 (P = .071)	0.137 (P = .037)	0.0164 (P = .525)
Household decision-making	0.094 (P = .142)	0.224 (P = .064)	-0.0219 (P = .793)	0.00681 (P = .807)
<b>Indirect effect<sup>d</sup></b>				
Social participation	0.0964 (P = .003)	-	-	0.0537 (P = .001)
Household decision-making	-	-	-	-0.0143 (P = .026)

<sup>a</sup>Leg 1 denotes the relationship between bargaining domains and exposure to IYCF information, the first leg of the indirect path, measured using linear regression.

<sup>b</sup>Leg 2 denotes the relationship between exposure to IYCF information and IYCF outcomes, the second leg of the indirect path, measured using logistic regression for early initiation, exclusive breastfeeding and minimum meal frequency and using linear regression for dietary diversity.

<sup>c</sup>Direct effect denotes the direct path from bargaining domains and IYCF outcomes.

<sup>d</sup>Total indirect effect calculated for significant paths for Leg1 and Leg2 and is the product of coefficients of Leg 1 and Leg 2. Note. All continuous variables were standardized.

messages ( $\beta = 0.214$ ,  $P = .013$ ), and this exposure to IYCF messages was subsequently positively associated with dietary diversity ( $\beta = 0.0596$ ,  $P = .014$ ).

Maternal workload had a significant association with exposure to IYCF information ( $\beta = 0.0526$ ,  $P = .044$ ), but its indirect effect from exposure to IYCF information to early initiation of breastfeeding was not significant. Women involved in a greater proportion of household decision-making had a significant positive and direct relationship with early initiation ( $\beta = 0.132$ ,  $P = .042$ ) and exclusive breastfeeding ( $\beta = 0.350$ ,  $P = .036$ ) but did not have any indirect effect through exposure to IYCF information and was not associated with minimum meal frequency or dietary diversity. Ownership and control of assets did not have a significant direct or indirect relationship with exposure to IYCF information or any of the IYCF outcomes.

## 4 | DISCUSSION

Specific domains of women's bargaining power were associated with different IYCF practices. Social participation is likely to be an important factor for improved IYCF practices and that exposure to IYCF information is a potentially important mechanism linking bargaining power and IYCF practices. Social participation was associated with higher exposure to IYCF information, which subsequently was

associated with early initiation and dietary diversity. Household decision-making had a direct positive relationship with exclusive breastfeeding and early initiation. No other domains were significantly related to early initiation and dietary diversity, and no significant direct or indirect relationships were observed with minimum meal frequency.

The positive association between social participation and exposure to IYCF information is consistent previous findings. Group membership in nutrition education or mother-to-mother support groups is shown to have a positive relationship with maternal information and knowledge (Lutter et al., 2013; Nair et al., 2017; Singh et al., 2017). Group-based approaches are increasingly seen as an important strategy to improve maternal and child nutrition outcomes through multiple social, economic and agricultural paths (Brody, De Hoop, Vojtkova, Warnock, & Dunbar, 2015; Kumar et al., 2017). Group membership through targeted nutrition programming and relevant behaviour change messages may improve IYCF outcomes (Kumar et al., 2017). Greater social participation may enable increased social interaction and thus promote greater exposure to IYCF messages (Kanani, Singh, Baqar, Mahajan, & Belwal, 2015).

Although exposure to IYCF messages may indicate gain in knowledge on child nutrition practices, it was only associated with early initiation and dietary diversity, but not exclusive breastfeeding and minimum meal frequency. Contextual factors such as use of traditional foods for infants may get precedence over knowledge of practicing

**TABLE 4** Adjusted path coefficients for relationship between the bargaining domains, exposure to IYCF information and IYCF outcomes

	Early initiation N = 1677 Model 1	Exclusive breastfeeding N = 362 Model 2	Minimum meal frequency N = 1315 Model 3	Dietary diversity N = 1315 Model 4
<b>Leg 1<sup>a</sup></b>				
Ownership & control of assets	0.00754 (P = .845)	-0.0506 (P = .449)	0.0290 (P = .467)	0.0290 (P = .467)
Social participation	0.266 (P < .001)	0.390 (P < .001)	0.214 (P = .013)	0.214 (P = .013)
Workload	0.0526 (P = .044)	0.0476 (P = .331)	0.0492 (P = .096)	0.0492 (P = .096)
Household decision-making	0.0131 (P = .710)	0.0783 (P = .064)	-0.0150 (P = .699)	-0.0150 (P = .699)
<b>Leg 2<sup>b</sup></b>				
Exposure to IYCF messages	0.241 (P = .001)	0.185 (P = .202)	-0.00754 (P = .925)	0.0596 (P = .014)
<b>Direct effect<sup>c</sup></b>				
Ownership & control of assets	-0.0912 (P = .300)	-0.172 (P = .346)	0.0278 (P = .753)	-0.0205 (P = .404)
Social participation	-0.210 (P = .209)	0.218 (P = .572)	-0.197 (P = .239)	-0.0514 (P = .466)
Workload	-0.0287 (P = .611)	0.0205 (P = .898)	0.0893 (P = .159)	0.0167 (P = .478)
Household decision-making	0.132 (P = .042)	0.350 (P = .036)	-0.0105 (P = .898)	0.0337 (P = .203)
<b>Indirect effect<sup>d</sup></b>				
Social participation	0.0642 (P = .010)	-	-	0.0128 (P = .071)
Workload	0.0127 (P = .080)	-	-	-

Note. Covariates: child age (months), child gender, maternal age (years), maternal height (centimetres), maternal education (years of formal schooling), number of children under 5 years in the household, household wealth, if the respondent was in a *Suaahara* intervention or control area, and agro-ecological zone. Child sickness in the past 15 days due to diarrhoea or fever was included as a covariate for exclusive breastfeeding, minimum meal frequency and dietary diversity models. All continuous variables were standardized.

<sup>a</sup>Leg 1 denotes the relationship between bargaining domains and exposure to IYCF information, the first leg of the indirect path, measured using linear regression.

<sup>b</sup>Leg 2 denotes the relationship between exposure to IYCF information and IYCF outcomes, the second leg of the indirect path, measured using logistic regression for early initiation, exclusive breastfeeding and minimum meal frequency and using linear regression for dietary diversity.

<sup>c</sup>Direct effect denotes the direct path from bargaining domains and IYCF outcomes.

<sup>d</sup>Total indirect effect calculated for significant paths for Leg1 and Leg2 and is the product of coefficients of Leg 1 and Leg 2.

exclusively breastfeeding or norms surrounding breastfeeding maybe stronger than the effect of nutrition knowledge. IYCF messages were also specifically about diet quality rather than quantity, which could have resulted in the lack of association with minimum meal frequency despite an overall increase in exposure and possible increase in knowledge. The lack of a significant relationship between minimum meal frequency and information may also be due to a high prevalence of minimum meal frequency in our sample.

Women's household decision-making was significantly associated with both breastfeeding outcomes as is consistent with prior research findings. For example, women's financial autonomy was positively associated with exclusive breastfeeding in infants 3–5 months in rural India (Shroff et al., 2011). Mother's autonomy in child feeding was positively associated with exclusive breastfeeding in Vietnam (Duong, Lee, & Binns, 2005). Our results may be because most mothers made the household decisions regarding child health and child feeding. Exposure to IYCF messages did not mediate the relationship between household decision-making and exclusive breastfeeding, which may be due to the relatively smaller sample size, when limiting the dataset to children under 6 months of age, being insufficient to detect a relationship. The coefficient for exposure to IYCF messages and exclusive

breastfeeding was 0.185 in our analysis, corresponding to an odds ratio of 1.20; the power for this magnitude was only 25%. With this sample size, the power was 90% for coefficients of 0.470 (odds ratio of 1.60 or greater).

The lack of a significant relationship between household decision-making and other IYCF practices suggests that these other dietary practices may require additional finances, support from others, greater household food security or access to health care, in addition to decision-making control. Prior literature on household decision-making and IYCF practices has mixed results for complementary feeding practices. For example, household decision-making was only significantly related to minimum meal frequency and minimal acceptable dietary in 2 out of 10 countries in a multi-country study from sub-Saharan Africa (Na, Jennings, Talegawkar, & Ahmed, 2015). Mothers with low involvement in household decision-making had lower dietary diversity in a review of factors affecting feeding practices in South Asia; however, the effect size was small (Senarath et al., 2012). Material resource constraints for food acquisition and preparation may hinder mothers' provision of adequate quantity and quality of food, thereby modifying whether IYCF practices are related with decision-making. Other adults in the household, such as mothers-in-law, may



also influence some of the effect on feeding practices, and thus a deeper understanding of the relative bargaining power of the mother in comparison with other household members may be necessary.

Ownership and control of assets was not associated with exposure to IYCF information, contrary to expectation, because women with more assets may be better able to access resources that provide health information, such as having access to transportation to seek care and information or possessing media devices such as a television, radio or phone, which can help with improved access to information (Abate & Belachew, 2017; Ahmed, Creanga, Gillespie, & Tsui, 2010; Demilew, 2017). Future research can help evaluate the trade-offs between using a whole scale measure versus more specific items that focus on distinct avenues of gaining nutrition knowledge and improving practices.

Ownership and control of assets did not have a direct association with any of the IYCF outcomes. Although economic independence may relate to child nutrition, the results with IYCF practices have been mixed. For example, in India, maternal wealth as determined by her employment and household wealth had no significant positive association with IYCF practices (N. Malhotra, 2013). Greater women's empowerment in agricultural production and related decision-making was positively associated with maternal and child dietary diversity in Nepal, but specifically women's control over income had a positive relationship with long term child nutritional status (Malapit et al., 2015); thus suggesting that in the Nepali context of subsistence agriculture, direct access to food production may play a critical role in improving dietary diversity and that economic empowerment may relate to overall child nutritional status.

Workload was not significantly associated with IYCF practices, also contrary to our expectation. Child care could be compromised when mothers have a higher workload if more time is allocated to other activities or if children are left unattended (Samman et al., 2016). Working mothers may not get enough opportunity to exclusively breastfeed their child (A. Jones, Agudo, Galway, Bentley, & Pinstrip-Andersen, 2012; Kabir & Maitrot, 2017; Locks et al., 2015). Time allocation may be contextual and may affect IYCF practices differently. For example, data from women's empowerment in agriculture in five countries suggest that women involved in agricultural activities have greater dietary diversity and that this was related to production diversity (Komatsu, Malapit, & Theis, 2015). Therefore, women spending more time working for wages or in subsistence agriculture may be able to provide diverse foods, irrespective of access to information. We also did not find any significant indirect effect through exposure to IYCF information for workload except for a small effect with early initiation. Research related to health-seeking behaviour or healthcare utilization in India, Vietnam and Ethiopia show that heavy workload and time constraints limit a woman's ability to seek care (Duong et al., 2004; Garg, Agarwal, & Singh, 2007; Kabir & Maitrot, 2017). Future research can help our understanding of specific aspects of women's time allocation for care practices that may relate most to IYCF practices.

Specific bargaining domains may be important for improving certain IYCF practices. For example, higher household decision-making

was directly associated with exclusive breastfeeding and to a small extent with early initiation of breastfeeding. Given a mother's role as a primary caregiver, mothers would be expected to be more involved in child feeding-related decision-making. Although women may be better able to access health resources if they have more economic control, this control and access to economic resources likely has a small effect on breastfeeding behaviours in this population. Conversely, women's social participation is more likely to be associated with exposure to IYCF information and dietary diversity, which suggests that domains other than decision-making control may be more closely tied to complementary feeding behaviours that involve interactions or processes other than only the mother/child dyad. No significant direct relationship between other domains may suggest the need for measures that capture specific aspects of IYCF practices. For example, information on economic control of food resources or food expenditure may more precisely capture the relationship between economic control of resources and dietary diversity. Similarly, measures for assessing time spent in feeding or food-related practices for the child may help our understanding of the overall workload in relation to child feeding practices.

This is the first study to have simultaneously examined several domains of household bargaining and several IYCF practices in South Asia, providing a comprehensive view of the social, economic and cultural aspects of household bargaining power and IYCF practices. Additionally, we focused on testing a possible mechanism linking maternal bargaining power and IYCF outcomes; such testing is essential for elucidating the nature of relationships between bargaining power and IYCF practices. Certain bargaining domains were related to accessing IYCF information, thereby highlighting the need for behaviour change interventions to address gender-related barriers in gaining access to IYCF information, but also to understand that not all domains of bargaining relate to all child nutrition behaviours.

Our study has certain limitations. First, the cross-sectional data do not allow us to make any causal inferences. Second, owing to the specific age-range for exclusive breastfeeding, our sample size for this outcome was small and had limited power. Third, the data for the different bargaining domains and IYCF practices were self-reported; the possibility of socially desirability or memory error cannot be ruled out. Fourth, although the measures for bargaining domains are widely used, there is limited research on the validity of all these measures (Yount et al., 2019). We also acknowledge that bargaining power domains can operate through different paths, not tested in this analysis, to relate differently to IYCF outcomes.

Future research could focus on specific aspects of the individual domains of bargaining. For example, cognitive aspects of social capital such as trust, perceived support and/or reciprocity could be examined along with the structural aspects of participation and size of the network to understand the relative contribution of each aspect to influence IYCF practices. Mechanisms linking bargaining power to knowledge or intention of IYCF practices could be assessed to provide evidence of relationship between bargaining and cognitive processes such as knowledge and intention, which are shown to be associated with practices (Nguyen et al., 2016). Combining nutrition messaging

with social participation can help maximize women's use of social resources and time to build social capital, offer opportunities to economically contribute to the household and improve nutrition knowledge and related-self efficacy. Overall, our study highlights that addressing poor feeding practices will require strengthening women's bargaining power and exposure to IYCF information.

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## CONFLICTS OF INTEREST

The authors declare that they have no conflicts of interest.

## CONTRIBUTIONS

SK designed and conducted the analysis and wrote the paper. EAF and KC guided the analysis and interpretation of the results. EAF, KC, SM and CEB collaborated to provide critical inputs in the writing of the paper.

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