

ORIGINAL ARTICLE

Association between maternal social capital and infant complementary feeding practices in rural Ethiopia

Yunhee Kang¹  | Jane Kim² | Eunkyo Seo³

¹Center for Human Nutrition, Johns Hopkins Bloomberg School of Public Health, Baltimore, Maryland, USA

²Independent Consultant, Baltimore, Maryland, USA

³International Ministry Division, World Vision Korea, Seoul, South Korea

Correspondence

Yunhee Kang, Center for Human Nutrition, Department of International Health, Johns Hopkins Bloomberg School of Public Health, 615 N. Wolfe Street, Baltimore, Maryland 21205, USA.

Email: ykang12@jhu.edu

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Abstract

Few studies have explored the potential of social capital in improving child nutritional status; however, most components of pathways between social capital and nutritional status have remained unexplained. Complementary feeding practice is a strong mediator of child nutritional status. This study examined the association between complementary feeding practice and maternal social capital in rural Ethiopia, using cross-sectional data of infant aged 6–12 months and their mother pairs ($n = 870$). The Short Social Capital Assessment Tool was used to assess maternal structural (i.e., community group membership, having emotional/economic support from individuals, and citizenship activities) and cognitive social capital (i.e., trust, social harmony, and sense of belonging) in the past 12 months. Infant's dietary diversity score (DDS, range: 0–7), minimum dietary diversity (MDD), and minimum meal frequency (MMF) were assessed using a 24-hr dietary recall. Multivariable ordinal/binary logistic regression analyses were conducted. Having support from two or more individuals was associated with higher DDS (OR = 1.84) and meeting a minimum level of dietary diversity (MDD: OR = 5.20) but not with MMF, compared to those having no support. Having two or more group memberships was associated with higher DDS (OR = 2.2) but not with MDD or MMF, compared to those without group membership. Citizenship activities showed mixed associations with MMF and no association with DDS or MDD. Cognitive social capital showed no association with DDS or MDD and lower odds of meeting MMF (OR = 0.56). These mixed results call for further studies to examine other potential pathways (e.g., hygiene and caring behaviours) in which social capital could improve child nutritional status.

KEYWORDS

child undernutrition, cognitive social capital, dietary diversity, Ethiopia, infant feeding practices, structural social capital

1 | INTRODUCTION

Ethiopia has a high prevalence of child stunting. Overall, 40.4% children aged under 5 years are growth faltered (Central Statistical Agency [Ethiopia], 2014). Optimal complementary feeding practices, including increasing dietary diversity, are known to reduce stunting (Bhutta et al., 2013). However, only 4.8% of children 6 to 23 months of age met the criteria of consuming four or more food groups (minimum dietary diversity in the age group), and 48.5% met the minimum number of feeding times or more that are appropriate for their age (Central Statistical Agency [Ethiopia] and ICF International, 2012). If appropriate complementary feeding practices are effectively promoted in Ethiopia, the prevalence of stunting in the country may reduce rapidly.

Social capital is a multifaceted concept that is described by some experts as “features of social organization, such as trust, norms and networks that can improve the efficiency of society by facilitating coordinated actions” (Dasgupta & Serageldin, 1999; Putnam, Leonardi, & Nanetti, 1993). Others (Bourdieu, 1986; Coleman, 1988) explained it as an asset or resource held by persons within a social relation or organization that facilitates action.

Associations between social capital and better health outcomes and healthy behaviours have been reported mostly in high-income countries. Kim, Subramanian, and Kawachi (2008) reported that social cohesion such as trust, associational membership, and reciprocity were collectively associated with reduced all-cause mortality outcomes and better self-rated health. A dearth of studies is available in exploring the associations between social capital and health outcomes in low-

income countries. In a few African countries, social exclusion was associated with risky sexual behaviours and showed mixed relationships with HIV and other infectious diseases (Agampodi, Agampodi, Glozier, & Siribaddana, 2015; Story, 2013). A prospective case-control study conducted in Ethiopia reported that relatively low social capital in women was associated with higher child mortality (Fantahun, Berhane, Wall, Byass, & Högberg, 2007). A study conducted in four developing countries including Peru, Ethiopia, Vietnam, and India reported that structural (e.g., group membership) and cognitive measures of maternal social capital were associated with improved child nutrition status (De Silva & Harpham, 2007).

Our study has paid attention to the pathway conceptualized by De Silva and Harpham (2007) in which maternal social capital enhances the child's nutritional status. The benefits of maternal social capital on child nutritional status was shown without providing information about potential mediating paths such as feeding, caring, and hygiene behaviours, which may link maternal social capital and child nutrition. The limitations of this study require further research so that social capital can be carefully considered when designing nutrition programmes in developing settings.

We hypothesize that appropriate complementary feeding practices (i.e., feeding diverse food groups and with appropriate frequency) could be strong mediators in the above pathway (Figure 1). The theoretical ground of our study framework is adapted from the conceptualization of social capital of Szreter and Woolcock (2004), focusing on bonding social capital and linking social capital. Bonding social capital refers to relations between individuals who belong to a community that shares a similar social identity, such as family and friends, who comprise the individual's support networks. Linking social capital occurs between individuals who represent different institutionalized power or authority, vertically. An example of this relation could be between a provider of some sort (e.g., health care provider or local government official) and a person who is on the receiving end of a service or interaction. On the basis of this theory, we propose that bonding social capital may increase the amount of food supplies, and linking social capital may improve mothers' access to knowledge on optimal complementary feeding practices. Mothers with high social bonding and linking capital would be able to feed their child more appropriately, and the optimally fed children would be less likely to have growth deficits in the context of Ethiopia where suboptimal complementary feeding and child stunting are prevalent.

Key messages

- Maternal social capital is proposed to influence infant feeding practices in rural Ethiopia.
- Having various community membership or having more individual supports were associated with infant's higher dietary diversity in this setting.
- The collective cognitive social capital among mothers did not show a relationship with infants' dietary diversity because the positive aspects and the negative aspects of each domain of cognition were balanced.
- Nutrition policies and interventions that take into account the types and strengths of maternal social capital may help improve the nutritional status of children in rural Ethiopia.

Our study aims to explore the association between mother's social capital and dietary diversity (score [range: 0–7]: minimum dietary diversity defined as receiving foods from four or more food groups) and meal feeding frequency, which are representative complementary feeding practice indicators, among infants (6 to 12 months) in rural Ethiopia. To the best of our knowledge, this study will be the first to explore the association between maternal social capital and infant feeding practices in a developing setting.

2 | METHODS

2.1 | Study setting

This study was conducted in Habro and Melka Bello districts, Hararghe zone, Oromya region, Ethiopia. Habro and Melka Bello districts are located 396 and 488 km, respectively, east of Addis Ababa (World Vision Ethiopia, 2011a, 2011b). Most of community members in the two districts are ethnically Oromo and Muslim in religion. Mixed agriculture of crop production and livestock rearing together is the predominant source of livelihood for the majority of the population. In addition to these, the districts have a practice of producing legumes and pulses, root crops, vegetables, and other cash crops,

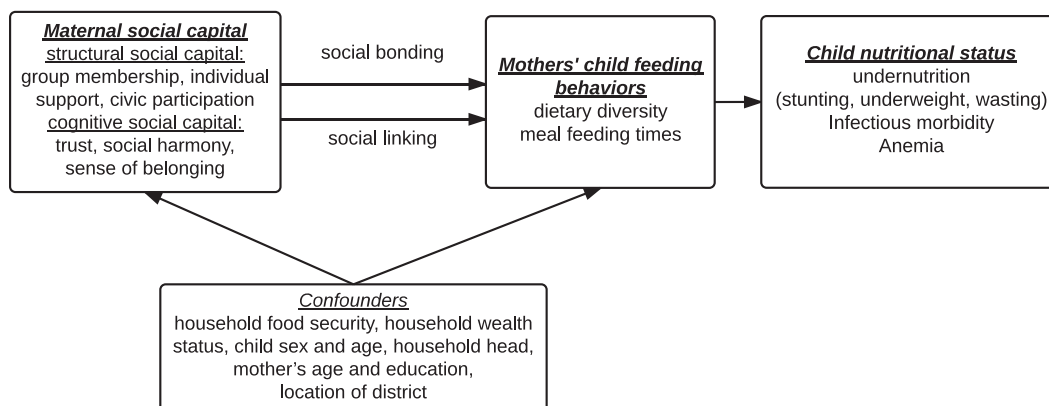


FIGURE 1 Conceptual framework of the study (adapted and modified from De Silva & Harpham, 2007)

predominantly “khat,” a type of plant with stimulating effects. The areas were often hit by drought, economically poor, and have least developed infrastructure. Diversified local community-based associations support each other in their social and economic activities. “Afosha” (a social and savings association), “Ekub” (a credit association), cooperatives, youth associations, women's associations, and farmers' associations are some of the community organizations found in the two districts. The availability and the level of activities of these voluntary local self-help groups and associations vary from kebele (the smallest administrative unit in Ethiopia) to kebele and even within the same kebele.

2.2 | Study design and subject selection

This study employed a secondary data analysis using cross-sectional data collected from a cluster-randomized field trial that evaluated the effectiveness of a community-based participatory nutrition promotion programme on child nutritional status in Ethiopia (Kang, Kim, Sinamo, & Christian, 2016). In the trial, infants aged 6 to 12 months were enrolled and followed up every 3 months until reaching the age of 18 to 24 months. We only used data collected on infants aged 6 to 12 months and their mothers living in the control area at enrolment.

The effectiveness trial involved 12 clusters, which constituted three to four kebeles. A random selection of 1,032 households in the control area were conducted using a random number-generating table from six clusters including 14 kebeles in Habro and 11 kebeles in Melka Belo district. Details on how clusters and kebele were defined and selected are described elsewhere (Kang et al., 2016). Out of randomly selected 1,032 households, 914 mothers completed the survey from the control area. Out of 914 mothers, only 870 (95.2% of 914) mothers who had all information on social capital, feeding practices of their children based on 24-hr recall, and potential confounding variables were included in the analysis.

2.3 | Data collection

Data collection was conducted by trained interviewers who were at least college graduates and recruited from the study area. Informed consent was obtained from all subject mothers by taking their signature or fingerprint signature (from mothers who were illiterate) after reading the consent form. Interviews took place at the mothers' homes. Using a structured questionnaire prepared in the local language, Afan-Oromo, mothers were asked about their age and education; parity; husband/male partner information (e.g., age and education); child information (e.g., age and sex); household characteristics such as main living sources, household assets, and dwelling condition; and access to drinking water sources and sanitation facilities.

Regarding infant feeding behaviours, each mother was asked the following questions, using a structured questionnaire for a 24-hr dietary recall: whether or not she was currently breastfeeding her child; how many times she had fed her child in the past 24 hr (meal frequency); and what type of foods she had fed her child in the past 24 hr using a list of food items (food group consumption and dietary diversity).

The Short Social Capital Assessment Tool developed by Harpham, Grant, and Thomas (2002)—a shortened version of the Adapted Social Capital Tool (A-SCAT)—has been used in Ethiopia. This tool was

adapted for this study population, translated into Afan-Oromo, tested in the field, and used to assess maternal social capital. This tool, containing eight structured questions, was used to quantitatively measure structural (four questions) and cognitive social capital (four questions; Table S1). The original A-SCAT tool was evaluated for its validity in Peru and Vietnam (De Silva et al., 2006).

2.4 | Variables construction

2.4.1 | Infant feeding practices

Dietary diversity score was calculated on the basis of the number of different food groups the infant consumed in the past 24 hr. Each mother was asked whether she had fed a food item/food group to her child from the following food items/groups: breastmilk formula; animal milk; any food made from grains; any food made from pumpkins, carrots, red sweet potatoes, or mango; any green leafy vegetables; any other fruits; any organ meats; any meat; any food made from legumes or nuts; any food made with oil, fat, or butter; eggs; fish; cheese or yogurt; and any sugary foods. During data analysis, these items were grouped into seven food groups as follows: (a) grains; (b) legumes and nuts; (c) dairy foods; (d) yellow-coloured fruits and vegetables; (e) green leafy vegetables and other fruits; (f) meat, poultry, and fish; and (g) eggs. Dietary diversity score was defined as the sum of food groups consumed by the infant during the previous day, giving a possible range of 0–7. According to the World Health Organization (2010) infant and young child feeding guidelines, minimum dietary diversity was defined as “the proportion of children 6–24 months of age who receive foods from 4 or more food groups”, and minimum meal frequency was defined as “the proportion of the children breastfed and non-breastfed 6 to 24 months of age who receive solid, semi-solid, or soft foods the minimum number of times or more.”

2.4.2 | Maternal social capital

The Short Social Capital Assessment Tool included questions to separately assess structural social capital and cognitive social capital. Structural social capital is mainly concerned with and can be measured by assessing people's actions, specifically how people take part in community activities. On the other hand, cognitive social capital is measured by assessing people's perceived level of solidarity, trust and cooperation, and peaceful conflict resolution in the community (Grootaert & Van Bastelaer, 2002; Uphoff, 2000). Three aspects of structural social capital (i.e., support from individuals in the community, membership of groups, and involvement in citizenship activities) and cognitive social capital (i.e., trust, social harmony, sense of belonging, and perceived fairness) were assessed. Support from individuals (assessed by one question) was scored 0 for no support, 1 for support from one individual, and 2 for support from two or more individuals. Group membership (one question) was scored with a range of 0–2: 0 for no membership, 1 for one membership, and 2 for two or more memberships. Involvement in citizenship activities (two questions) was scored with a range of 0–2: 0 for no involvement in citizenship activities, 1 for “talked to authorities about community matters” or joined together to address community matters, and 2 for talked to authorities and joined together to address community matters. A variable construction of cognitive social capital was based on three questions: trust in

community people, social harmony, and sense of belonging. The sum of the answers from three questions with each as 0 or 1 had a score range of 0–3: 0–2 as low cognitive social capital and 3 as high cognitive social capital. The question regarding perceived fairness was not included in the analysis due to random measurement error that occurred among interviewers during the data collection process.

2.4.3 | Confounders

Potential confounders included location of district (i.e., Habro or Melka Bello), religion (Muslim, Ethiopian Orthodoxy, or Catholic), household head (i.e., father, mother, or others), household food insecurity, household wealth index, mother's age and education, number of parity, and infant sex and age. Household food insecurity was assessed using nine questions from the Household Food Insecurity Access Scale followed by frequency questions from which four levels of food insecurity were computed (Food and Nutrition Technical Assistance Project, FANTA, 2007). The household wealth index was calculated using principal component analysis and categorized into quintiles.

2.5 | Statistical analysis

The measure of mothers' feeding practices, structural and cognitive social capital, and household socioeconomic and demographic characteristics were presented with means (*SD*) for continuous variables and with proportions for categorical variables. The association between components of social capital and infant feeding practices were presented as odds ratios for minimum dietary diversity and minimum meal frequency using logistic regression and for dietary diversity score using ordinal logistic regression. The association of breastfeeding practice and social capital was not evaluated in this study because almost all infants were being breastfed between the ages of 6 to 12 months. Bivariate regressions were first run (not presented in text), and multivariable regressions were assessed adjusting for potential confounders. All regression models accounted for geographical clustering at kebele level using clustered robust standard errors. Statistical significance was tested at $P < .05$. Data analysis was performed using Stata version 14.0 (Stata Corporation, College Station, TX, USA).

2.6 | Ethical approval

The original study was approved by the Institutional Review Board, Oromya Regional Health Bureau, in Ethiopia, and was registered as a clinical trial at Current Controlled Trials as ISRCTN 89206590.

3 | RESULTS

Among the total of 870 mothers surveyed, the mean age was 26.2 (*SD*: 5.5) years, and the mean number of parity was 3.7 (*SD*: 2.1; Table 1). The percentage of mothers who had any primary education or higher was 13.2%. The average age of their child was 8.7 (*SD*: 1.9) months old, and 52.4% were boys. Regarding household characteristics, 95.9% had the father as the head of the household, 94.7% were Muslim, and 92.0% worked in self-supporting farm as main source of income.

Out of 870 mothers surveyed, 35.1% of mothers received support from one or more individuals; the supporting individuals were family

TABLE 1 Individual and household characteristics at the time of visit, Habro and Melka Bello districts, Ethiopia ($n = 870$)

	Mean \pm SD or %
Mother characteristics	
Age (years), mean \pm SD	26.2 \pm 5.5
Parity, mean \pm SD	3.7 \pm 2.1
Any primary education or higher, %	13.2
Child characteristics	
Age (month), mean \pm SD	8.6 \pm 1.9
Male sex, %	51.4
Household characteristics	
Father as a household head, %	94.1
Muslim religion, %	94.9
Self-supporting farming as main living source, %	87.5
Distance to market within 1 hr, %	31.5
Household food insecurity, %	
Food secure	28.2
Mild food insecure	22.0
Moderately food insecure	26.1
Severely food insecure	23.7

(63.5%), religious leaders (12.3%), and neighbours (10.9%; Table 2). Overall, 65.2% of mothers had only one community group membership, and 18.7% had two or more memberships. Out of those having two or more community memberships ($n = 163$), 79.1% were engaged in funeral/credit groups, 76.7% in community groups, and 62.6% in religious groups. The proportion of women who had any involvement in citizenship activities was 68.7%; almost half of mothers had talked to authorities about community matters, and 34.4% joined together to address community matters. Cognitive social capital among the mothers was by and large high; 65.5% replied that the majority of people in the community could be trusted; 79% replied that the majority of community people got along; and 91.5% replied that they felt themselves as part of the community. About 34.3% showed a high score (total score of 3) in cognitive social capital. Infant feeding practices by mothers' structural and cognitive social capital were tabulated (see Table 3). Most mothers (85.5%) met the minimum meal frequency. The mean dietary diversity score was 2.0 (*SD*: 1.5), and about 17% of mothers met the minimum dietary diversity.

Mothers who had support from two or more individuals showed marginally significantly higher child dietary diversity score ($OR = 1.84$), compared to that of those without any individual support (Table 4). Having membership of two or more groups was marginally significantly associated with higher dietary diversity score ($OR = 2.18$), compared to mothers without group membership. However, citizenship activities or cognitive social capital were not related to dietary diversity. Mothers having support from two or more individuals showed 5.2 times higher odds of meeting the minimum dietary diversity, compared to those having no support; however, other components of maternal social capital measured were not significantly associated with meeting minimum dietary diversity of infants.

Mixed findings were found for the association between maternal social capital and infants' meal frequency. Mothers who had both talked and joined in citizenship activities reported 2.2 times higher

TABLE 2 Maternal social capital in Habro and Melka Bello districts, Ethiopia (n = 870)

	%
Support from individual	
Family	63.5
Religious leader	12.3
Neighbours	10.9
Politicians	8.1
Community leaders	6.3
Charitable organizations/NGO	4.8
Friends who are not neighbours	4.1
Government officials/civil service	1.6
No support from individuals	64.9
Support from 1 individual	25.8
Support from 2 or more individuals	9.3
Group membership	
Funeral/credit group ^a	49.2
Community group ^b	24.6
Women's group	18.9
Religious group	13.7
Political group	4.3
Work related/trade union	3.5
Sports/social group	3.2
None	16.1
Member of 1 group	65.2
Member of 2 or more groups	18.7
Involved in citizenship activity	
Talked to authorities about community matters	45.9
Joined together to address community matters	34.4
No involvement in citizenship	31.3
Talked or joined in community matters	17.7
Talked and joined in community matters	51.0
Cognitive social capital	
The majority of people can be trusted	65.5
The majority of people get along	79.0
Really feel part of the community	91.5
Low cognitive social capital (0–2)	60.1
High cognitive social capital (3)	39.9

^aFuneral/credit group (AWWAALCHA/GAREE LIQII in Afan Oromo) solves financial issues in a community. In general, 3 to 10 community members who live together in a same area organize this group to borrow some money from a government or NGOs for the purpose of business preparation.

^bCommunity group (GAREE HAWAASAA in Afan Oromo) is a traditional group in rural and urban Ethiopia. The group is organized by community members who live together in the same village. The group discusses social and political issues in a community and prepares a solution to the community.

odds of meeting the minimum meal frequency, compared to mothers without any citizenship activity. However, being a member at one community group (OR = 0.39) or having only one type of citizenship activity (OR = 0.39) showed a decreased odds of meeting the minimum meal frequency. High cognitive social capital also showed a marginally lower odds of meeting minimum meal frequency (OR = 0.56).

4 | DISCUSSION

Our study first ever explored the associations between maternal structural and cognitive social capital and infant feeding practices, as potential mediators in the pathway in which social capital impacts on child nutrition, in a developing setting. Our findings showed that a few components of maternal structural social capital (e.g., having two or more group membership or two or more individual support) were related to increased dietary diversity in infants. However, associations with meal frequency were inconsistent or even lower with a couple of social capital components (e.g., partial civil activities and high cognitive social capital).

Regarding the association between community membership and higher dietary diversity, we draw upon the mechanisms of social capital—*information channels* (i.e., an individual can gain new knowledge through interaction with other people in one's social networks)—proposed by Coleman (1988) and *linking social capital* proposed by Szreter and Woolcock (2004). In contrast to the mothers who received support from family, relatives, and members of religious groups, mainly through bonding social capital, the mothers who participated in other community groups may have formed linking social capital, through which mothers could have had improved access to both physical materials and health information. We hypothesized that these mothers may have gained new knowledge about the importance of feeding children with diverse foods, opposed to the prevalent practice of feeding staple foods, through their affiliated larger networks, thus resulting in higher consumption of some food groups. This study finding adds evidence to the assertion of Szreter and Woolcock (2004) that having an open, active, and mutually respecting linking social capital, in addition to bonding social capital, can contribute to better health outcomes.

Considering that all mothers who had support from two or more individuals (n = 81) were also a part of the mothers who had two or more community group memberships (49.7%; n = 163), community groups would be the main channels through which mothers may have physical and emotional support and participation in the community. Regarding dietary diversity, receiving support from two or more individuals was related to higher consumption of staple-type food groups such as grains and legumes, whereas having two or more community memberships or participating in citizenship activities were associated with higher consumption of animal protein sources and essential micronutrient sources including animal milk and yellow-coloured fruits and vegetables (Table S2).

Involvement in citizenship activity was not related to infant dietary diversity but showed mixed results with meal frequency. Compared to mothers without any citizenship activities, those who both talked and joined in community matters showed higher minimum meal frequency, but doing only either of the two (i.e., only talking about or only joining in community matters) showed the opposite tendency. Talking to authorities about community matters alone had 3.52 times (95%CI [1.89, 6.57]) higher odds of meeting minimum meal frequency, but joining to address community matters alone was not related to this outcome. We found that 94.3% of mothers who talked about community matters also joined on addressing them as well. Thus, we concluded that higher odds of meeting minimum meal frequency among

TABLE 3 Infant feeding practices by maternal social capital in Habro and Melka Bello districts, Ethiopia (*n* = 870)

	N	Dietary diversity score Mean (SD)	Minimum dietary diversity ^a %	Minimum meal frequency ^b %
Support from individuals				
No support	565	1.9 (1.4)	14.5	81.6
1 individual	224	2.4 (1.7)	25.9	90.3
2 or more individuals	81	1.6 (1.2)	7.4	100.0
Group membership				
None	140	1.5 (1.5)	10.7	90.7
Member of 1 group	567	2.3 (1.5)	21.9	80.0
Member of 2 or more groups	163	1.5 (1.0)	4.3	100.0
Involved in citizenship activity				
No involvement in citizenship	272	2.1 (1.6)	20.6	83.0
Talked or joined in community matters	154	2.4 (1.5)	25.3	66.7
Talked and joined in community matters	444	1.8 (1.4)	11.5	93.5
Cognitive social capital				
Low	523	1.8 (1.5)	13.7	88.7
High	347	2.3 (1.4)	21.3	80.6
Total	870	2.0 ± 1.5	16.8	85.5

^aMinimum dietary diversity was defined as the proportion of infants who received foods from four or more food groups.

^bMinimum meal frequency was defined as the proportion of infants who received solid, semi-solid, or soft foods the minimum number of times or more.

TABLE 4 Association between maternal social capital and dietary diversity score, minimum dietary diversity, and minimum meal frequency among children aged 6 to 12 months in Habro and Melka Bello districts, Ethiopia (*n* = 870)

	Dietary diversity score OR [95% CI] ^a	P	Minimum dietary diversity OR [95% CI] ^b	P	Minimum meal frequency OR [95% CI] ^b	P
Support from individuals						
No support	1.00		1.00		1.00	
1 individual	0.94 [0.56, 1.57]	.70	1.27 [0.62, 2.62]	.51	2.21 [0.89, 5.50]	.09
2 or more individuals	1.84 [0.97, 3.51]	.06	5.20 [1.32, 20.4]	.02	1.00	-
Group membership						
None	1.00		1.00		1.00	
Member of 1 group	1.50 [0.89, 2.51]	.13	0.88 [0.52, 1.49]	.64	0.35 [0.20, 0.59]	<.001
Member of 2 or more groups	2.18 [0.97, 4.86]	.06	1.48 [0.46, 4.77]	.51	1.00	-
Involved in citizenship activity						
No involvement in citizenship	1.00		1.00		1.00	
Talked or joined in community matters	1.52 [0.91, 2.52]	.11	1.23 [0.57, 2.68]	.60	0.39 [0.20, 0.76]	<.01
Talked and joined in community matters	1.04 [0.56, 1.94]	.90	0.67 [0.27, 1.70]	.40	2.18 [1.13, 4.21]	.02
Cognitive social capital						
Low	1.00		1.00		1.00	
High	1.13 [0.75, 1.71]	.56	0.85 [0.56, 1.30]	.46	0.56 [0.30, 1.03]	.06

^aEstimated by ordinal logistic regression adjusted for location of district (i.e., Habro or Melka Bello), religion, household head (i.e., father, mother, or others), household food insecurity, household wealth index, mother's age and education, number of parity, infant sex and age, and geographical clustering at kebele level.

^bEstimated by logistic regression adjusted for location of district (i.e., Habro or Melka Bello), religion, household head (i.e., father, mother, or others), household food insecurity, household wealth index, mother's age and education, number of parity, infant sex and age, and geographical clustering at kebele level.

mothers who both talked about and joined in addressing community matters were mainly based on mothers who talked to authorities about community matters.

Although collective cognitive social capital showed marginally negative associations with meal frequency and no association with dietary diversity in infants, individual components of the cognitive social capital revealed various associations with feeding indicators.

Mothers who reported of not feeling a sense of belonging in their community showed a higher score in their children's dietary diversity (OR = 1.81; 95% CI [1.13, 2.91]), compared to those having a sense of belonging. Those who stated not having trust in community members showed reduced odds of meeting minimum meal frequency (OR = 0.44), compared to those reporting trust in community members. These findings suggest that the null findings

in dietary diversity are due to the scores created for cognitive social capital, which balances out positive and negative aspects of each form of cognitive social capital.

Our study findings regarding cognitive social capital conflict with findings from a previous study (De Silva & Harpham, 2007) that reported that mothers' cognitive social capital may have a positive influence on child nutritional status. The authors claimed in their study that the buffering effect of cognitive social capital (i.e., social capital acting as a protective factor against negative life events) may have promoted practicing better child care behaviours. However, in our study context, feeding behaviours would not be the route through which cognitive social capital works but structural social capital may. In an analysis of the Demographic and Health Surveys from 10 sub-Saharan African countries, the association between women's empowerment and infant and young child feeding indicators varied by context and by dimension of empowerment (Na, Jennings, Talegawkar, & Ahmed, 2015). Coleman (1988) also discussed the negative aspects of social capital that could limit innovation when an individual adheres to group norms. Perhaps, these mothers with high cognitive social capital were more influenced and convinced by the social norm in the community. On the other hand, this shows a need for more social capital studies to further examine the linkage between child feeding behaviours and cognitive social capital in diverse environments, even within the same country.

This study has several limitations. First, the current results have limitations in explaining what aspects of or how having community membership and individual support is related to higher dietary diversity, or the pathway through which these components work. Further research is needed to understand the potential mechanism (e.g., social capital affecting self-image, peer influence, or access to resources) and pathways that influence maternal community group membership and child dietary diversity to better target critical elements influencing child nutrition. Second, this study only included mothers of children aged 6 to 12 months due to enrolment criteria of the original trial. Considering the young age and growth trajectory of these children, their dietary diversity, types of consumed foods, and feeding frequency may be subject to rapid increase or change. Third, this study design was based on cross-sectional data, so we are not able to explain the causal effect of social capital on child feeding behaviours. Fourth, although the A-SCAT tool has been readily applied in many different settings in Asia and Africa, we found that the interpretation and reasoning regarding association between specific behaviours/attributes and components of social capital needed considerable assumptions. The availability of more informative tools that are easy to apply would be helpful in research and practice. Additionally, introducing a qualitative research component could provide richer data to better understand potential pathways.

To build on the knowledge gained through analysing the associations between maternal social capital and infant dietary diversity presented in this paper, further research is needed in the following areas. First, the study team needs to better understand why different aspects of social capital were associated with different outcomes. Second, studies that investigate the change in maternal social capital in nutrition interventions, particularly interventions involving mothers' behaviour change communication, need to be conducted

in a longitudinal study structure. Third, studies are needed to examine the association between social capital and child caring practices including feeding, health service utilization, and individual and environmental hygienic behaviours, reflecting another pathway in the child undernutrition framework. Furthermore, these assessment activities need to be conducted in different settings within Ethiopia and in other East African communities to give more collective information about the pathway.

Depending on the available types and strengths of specific components of social capital (or the lack thereof), programme practitioners may be able to consider tailoring the caregiver-targeted nutrition programmes to effectively influence related behaviour changes. Such social networks may enable mothers to acquire information related to child care and also receive physical and emotional help.

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CONFLICTS OF INTEREST

The authors declare that they have no conflicts of interest.

CONTRIBUTIONS

YK and ES developed the design of the study. YK conducted data analysis. YK, JK, and ES interpreted and wrote the main document.

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SUPPORTING INFORMATION

Additional Supporting Information may be found online in the supporting information tab for this article.

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