ORIGINAL RESEARCH

CURRENT DEVELOPMENTS IN NUTRITION

Community and Global Nutrition

Health Mothers' Groups in Nepal: Barriers, Facilitators, and Recommendations

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ABSTRACT

Background: Nepal's female community health volunteers (FCHVs) each lead a monthly health mothers' group (HMG) to share health-related information and engage communities in the health system. *Suaahara II* (SII), a US Agency for International Development–funded multisectoral nutrition program, uses social and behavior change interventions to promote HMG participation and uses its health systems interventions to strengthen HMG quality.

Objectives: This study aimed to explore HMG functionality and variation across Nepal, including barriers and facilitators to attending HMG meetings.

Methods: SII's cross-sectional annual survey data from 16 districts ($n = 192$ FCHVs and 1850 mothers with children <2 y) were used. Descriptive and logistic regression analyses were conducted where the outcome variable was whether mothers were active HMG members or not, with FCHV and maternal characteristics as explanatory variables. Qualitative data were obtained from 3 of 16 survey districts ($n = 30$ observations, $n = 30$ in-depth interviews with mothers, and $n = 16$ focus group discussions with mothers, family members, FCHVs, health workers, and SII staff).

Results: Among FCHVs, 90% reported facilitating HMG meetings, whereas 64% of mothers reported HMG availability, and only 25% reported participating actively in meetings. Household head sex, maternal age, maternal education, maternal self-efficacy, and engagement with an FCHV and SII were associated with whether mothers were active participants in HMG meetings. Qualitative findings highlighted systems-level barriers, including lack of FCHV skills, demotivation, and heavy workload. Mothers noted time as the major constraint and family support, the HMG's savings component, and active FCHVs as facilitators to participation.

Conclusions: Findings suggest that both supply- and demand-side solutions are needed to improve HMG performance and uptake in Nepal. These solutions need to include improving FCHV skills and motivating them to provide high-quality HMG services, as well as encouraging family members to support women so that they have time to participate in the HMGs. *Curr Dev Nutr* 2022;6:nzac039.

Keywords: mothers' group, women's group, health group, barriers, facilitators, participation, functioning, Nepal, low- and middle-income countries

Manuscript received September 29, 2021. Initial review completed March 2, 2022. Revision accepted March 16, 2022. Published online March 22, 2022.
Suaahara II, funded by the US Agency for International Development (USAID) Cooperative Agreement AID-367-A-16-00006, provided financial support for the survey, the qualitative study, and analysis. This study is made possible by the generous support of the American people through USAID.
Author disclosures: The authors report no conflicts of interest. The contents are the responsibility of the authors and do not necessarily reflect the views of USAID or the US government.
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Abbreviations used: FCHV, female community health volunteer; FGD, focus group discussion; GoN, Government of Nepal; HMG, health mothers' group; IDI, in-depth interview; SII, *Suaahara II*; WASH, water, sanitation, and hygiene.

Introduction

In the last 2 decades, Nepal's maternal mortality ratio declined by 52% and under-5 mortality declined by 67% (1). This progress can, in part, be attributed to Nepal's female community health volunteers (FCHVs) (2–6). In 1988, Nepal's Ministry of Health and Population mobilized a large cadre of FCHVs to be the immediate contact for health-related information and services for communities and they continue this role today (2–5). Child health services provided by FCHVs include deworming and vitamin A supplementation, diarrhea treatment, acute respiratory infection treatment, immunization, as well as family planning and outreach services, nutrition education, and awareness on pregnancy and newborn care (3).

FCHVs also lead health mothers' groups (HMGs), which are community groups that bring together women of reproductive age (15–49 y) monthly to discuss and promote safe motherhood, maternal and child health, and nutrition, family planning, water, sanitation, and hygiene (WASH), and other topics (7). Currently, over 52,000 FCHVs work at the community level, each leading an HMG (3, 6). The HMGs are formed by the local health facility in coordination with the local

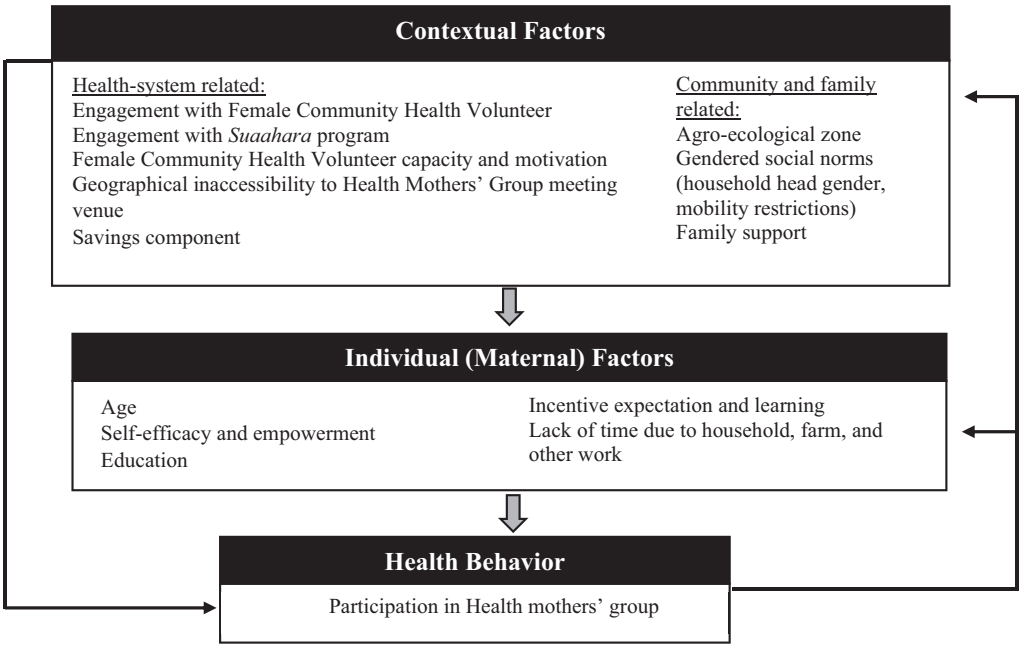

FIGURE 1 Factors affecting participation in health mothers' groups.

government (6). Most of the HMGs also have a savings component (7) where members contribute a certain amount every month (amount decided by the HMG members themselves) and can access loans at reduced or no interest (6). While the Nepal government does not mandate a savings component in an HMG (6), it is common practice for an HMG to have a savings component, which functions similar to any micro-credit or micro-finance group run by the HMG members themselves (7).

Evidence from developing countries shows that participatory women's education groups are effective in improving maternal (8, 9) and child (9–11) health outcomes, with other benefits such as increased knowledge (12, 13) and empowerment of members (11). Prior studies have shown that community health workers can significantly improve population health, including maternal and child health, particularly in resource-constrained settings (2, 14, 15). Other benefits of participation in such groups include an increase in social capital (16), increased likelihood of adaptation of good/recommended behaviors (13, 16), and an increase in members' ability to solve problems (12) and challenge community norms (12). Few studies, however, have looked at factors affecting women's participation in community groups. A study in India revealed that the savings component in a women's group positively affected participation, whereas lack of effective leadership negatively affected participation (17). There is a clear gap in our understanding of what factors affect women's participation in community groups; in particular, qualitative exploratory and mixed-methods studies on health-related women's groups are lacking.

Despite the HMGs being the nearest platform for communities to access health information in Nepal, HMG meetings are irregular (3) and participation is low (7, 18). Existing studies in Nepal provide some context about HMG awareness and participation. In Nepal, while the national FCHV strategy mandated each FCHV to lead an HMG (6), less than half of FCHVs reported routinely conducting HMG meetings in 2014 (3) and only half of women of reproductive age reported awareness of the HMGs in 2009 (7) in nationally representative surveys. Another survey in 2012 among caregivers of children under 5 y showed that only 18% of child caregivers had ever participated in HMG meetings (18). Additionally, FCHVs have a high workload (3) considering their voluntary status and they do not receive adequate supervision (3) or additional incentives for conducting HMG meetings (6), which can limit motivation to facilitate meetings effectively and regularly. On the other hand, Nepali women, particularly young women, are often subjected to mobility restrictions and are expected to follow the decisions of their husbands and seniors in the family (19).

According to Andersen (20, 21), contextual and individual characteristics interact to influence individual health behaviors. Any health behavior has outcomes, which again cyclically impact the contextual and individual characteristics. Contextual factors include family or community factors, such as health beliefs, social norms, quality of health services including human resources, and so on. Individual factors include individual demographics, health beliefs, family support, access to quality health services, and one's need for health services (**Figure 1**).

In Nepal, donors work with the Government of Nepal (GoN) and international and local nongovernmental organizations to improve health systems and strengthen the capacity of Nepal's FCHVs. These programs often work with FCHVs to build their capacity and support them to reach households and perform other programmatic activities (1). One of these development programs is *Suaahara II* (SII) a US Agency for International Development–funded multisectoral nutrition program that builds on the first phase of *Suaahara* implemented from 2011 to 2015. SII is implemented in 42 of Nepal's 77 districts from 2016 to 2023, with an aim to reduce maternal and child malnutrition.

SII is part of the GoN's FCHV subcommittee where SII supports revision of FCHV-related strategies and training materials. SII community-based staff continuously support FCHVs to re-start or

maintain the HMGs; build FCHVs' knowledge and skills on maternal and child health and nutrition; provide technical assistance to FCHVs on group formation, recruitment of new members, and other management issues; and provide FCHVs with job aids and ideas for how to make meetings more interesting and effective. SII also uses its diverse social and behavior change approaches to encourage mothers in the 1000-day period (between conception and a child turning 2 y of age) to attend monthly HMG meetings. SII implements some of its own activities, such as demonstrations of nutritious recipes, during HMG meetings.

In Nepal, the HMGs are the nearest platform for communities, particularly women of reproductive age, to access health information. Although it is known that HMG meeting functionality, participation, and quality vary, there is a lack of evidence on the underlying causes. Therefore, this study used both quantitative and qualitative data to assess barriers and facilitators to attending HMG meetings, focusing on FCHV and maternal factors.

Methods

Quantitative data collection and data management

This study uses data from the SII cross-sectional survey conducted in 2017 that used a multistage cluster-sampling design to select the following: *1*) 16 of SII's 42 districts, *2*) 2 municipalities (1 urban and 1 rural) per district ($n = 32$), *3*) 3 wards per municipality ($n = 96$), and *4*) 2 clusters (sub-wards) per ward ($n = 192$), all based on probability proportional to size. In the final stage, 19 households with children under 5 y were randomly selected, after a full household listing, in each sub-cluster ($n = 3648$). The primary respondents were mothers of children under 5 y ($n = 3642$; 6 respondents refused participation) and household decision makers (father of the selected child or other adult male decision maker, when possible) ($n = 3642$). FCHVs (1 per cluster/sub-ward, $n = 192$) in the same clusters were also surveyed. For this manuscript, we limited our analyses to households with a child under 2 y ($n = 1850$) to align with the qualitative data more closely, which were also collected among households with mothers and children falling withing the 1000-day window (between conception and a child turning 2 y of age).

A local survey firm, New Era (Nira Joshi, Deputy Director, New Era; Rudramati Marg, Kalopul, Kathmandu) conducted the data collection electronically. The FCHV questionnaire gathered data on socioeconomic and demographic characteristics; exposure to training on key health and nutrition areas; work experience, including conducting HMG meetings; exposure to SII platforms; and health, nutrition, and WASH knowledge and practices (22). Mothers' survey questions spanned household socioeconomic and demographic characteristics; nutrition, health, WASH, and agriculture-related knowledge and practices; 24-h dietary recalls; empowerment and other dimensions of gender equality; exposure to SII platforms; and utilization of the Nepal government's health and nutrition services including HMG meetings.

For this study, the primary outcome was a yes/no binary variable, whether the mothers of children under 2 y of age were active HMG members or not, where active members were those who attended HMG meetings regularly and participated in discussions. Explanatory variables included FCHV demographic and socioeconomic characteristics. FCHV variables included several categorical variables: *1*) equity quintile, which measures household socioeconomic status using the Equity Tool to generate quintiles based on ownership of key assets and quality of household structures, in relation to national averages (23); *2*) agro-ecological zone of residency in the mountains, hills, and *terai* (plains); *3*) caste/ethnicity (Brahmin/Chhetri vs. others) (24); *4*) education (primary or lower vs. higher); and *5*) length of time as FCHV (<10 y, 10–20 y, and >20 y). FCHVs' household size, age (in completed years), and hours spent per month in FCHV-related work were constructed as continuous variables. Presence of other FCHVs in the ward, perception of increased workload, various reasons for increased workload (e.g., more meetings and more trainings), and one-on-one interactions with beneficiaries the previous day were constructed as yes/no binary variables. Six questions covering job satisfaction and motivation were summed (0 to 6), where a higher value indicates higher satisfaction. Similarly, 5 questions covering supervision were used to create a sum (0 to 5), where a higher value indicates higher satisfaction. HMG-related variables included the following: *1*) whether the FCHV facilitated HMG meetings (binary), *2*) whether training was received on facilitating group meetings in the past year (binary), *3*) HMG size constructed as a categorical variable (10–20, 20–30 and >30), *4*) number of HMG meetings in the past 3 mo (continuous), and *5*) hours spent in preparing for and conducting group meetings (continuous).

Several variables for maternal characteristics (equity quintile, agro-ecological zone, caste/ethnicity, education, and household size) were constructed similarly as for the FCHVs. Maternal age (15–19, 20–24, 25–29, and ≥30 y) and child age (0–6, 6–12, and 12–23 mo) were constructed as categorical variables. Hours per day spent on work (including household chores, farm, and other work) was constructed as a continuous variable. All other remaining variables were constructed as binary: *1*) family structure (nuclear vs. joint/extended); *2*) household head sex (male vs. female); *3*) maternal occupation (agriculture/animal husbandry vs. others); *4*) self-efficacy (above average vs. average or below); *5*) input in child health decisions (most or all decisions vs. some or none); *6*) visited community gathering, meeting, training, etc., at least once a month (yes/no); *7*) FCHV-facilitated group (HMG) exists in community (yes/no); *8*) engagement with FCHVs outside of these group meetings (yes/no); *9*) engagement with SII field staff and/or listened to SII's *Bhancchin Aama* radio program (yes/no); and *10*) child sex (male vs. female). Similarly, under preferred source of health/nutrition information, FCHV/HMG, health facility, SII, radio, television, internet, mobile/SMS, and information, education, and communication materials were constructed as yes/no binary variables.

Logistic regression was used for two individual models, where FCHV and maternal characteristics served as explanatory variable respectively. Then, a mixed-effects model was run combining FCHV and maternal characteristics. All analysis was conducted using Stata/IC 14 (StataCorp).

Qualitative data collection and data management

In July 2018, qualitative data were collected at the national, district, municipality, and community levels to explore barriers and facilitators to 1000-day mothers' attendance at HMG meeting in 3 purposively selected districts—Bajhang (western mountains), Bhojpur (eastern hills), and Rupandehi (western *terai*)—ensuring geographic variation, among the 16 annual survey districts. Similarly, 1 of the 2 annual survey

municipalities per district and 1 ward per municipality were purposively selected based on feasibility (transportation access) and ensuring socioeconomic heterogeneity.

Another local research firm, Square One Research and Training (Nirjal Sharma Pokharel, Managing Director, Square One Research and Training, Kopundole, Lalitpur, Nepal), collected data through 30 participatory observations of 1000-day households, 30 post-observation follow-up in-depth interviews (IDIs) with the respective 1000-day mothers, and 16 focus group discussions (FGDs) with SII central staff, district staff, government health facility staff, FCHVs, and 1000-day household members (mothers, grandmothers and fathers). Sample sizes were predetermined keeping in mind the concept of saturation, population heterogeneity, requirement of a fixed sample size a priori, and the study purpose (25, 26). Three national SII staff, 4 district SII staff, 6 health facility workers, 17 FCHVs, 19 SII field staff, and 26 mothers, 15 fathers, and 19 grandmothers (not necessarily from the same households) in the 1000-day period participated in the FGDs.

One field researcher spent an entire day at a 1000-day household and noted key observations in a diary at regular intervals for the participatory observation and then conducted a follow-up IDI with the 1000-day mother to discuss interesting observations and clarify confusions. The FGDs and IDIs were audio-recorded. All audio recordings were transcribed verbatim, whereas observation notes were transcribed in as much detail as possible. All transcripts were translated into English and coded in NVivo 10 (QSR International). A few transcripts were triple coded by 3 researchers from Square One Research and Training to ensure intercoder reliability. Iterative discussions enabled codes to be standardized. Coding themes and subthemes were generated based on the study tool modules and inductively from the transcripts, and thematic analysis was conducted by Square One Research and Training. Since the qualitative data collection focused on several SII program issues, the first author, SM, recoded and analyzed all participatory observations and follow-up IDI transcripts to gain specific and more in-depth information on HMG participation. Taking Andersen's behavioral model (20, 21) as the basis, we analyzed and categorized the factors affecting HMG participation into contextual and individual factors and sought to understand how they led to the desired health behavior (HMG participation or not). Quantitative and qualitative data integration was achieved during the analysis and interpretation phase.

Ethical approval

All data collection was approved by the Nepal Health Research Council (registration numbers: 18/2017 for the annual survey and 197/2018 for the qualitative research). Written informed consent for data collection was taken from all survey respondents. Written informed consent for data collection and audio recording was taken from all qualitative study participants, other than a few SII staff who participated in FGDs via Skype rather than in person and provided verbal consent.

Results

Sociodemographic characteristics

FCHVs were, on average, 41 y of age with over half (56%) belonging to the Brahmin/Chhetri ethnic group. Forty-three percent of FCHVs had a primary level of education or lower. The majority belonged to the middle (30%) or the second wealthiest (26%) equity quintiles. On average, FCHVs had 16 y of experience as an FCHV (**Table 1**).

The majority of the mothers were in the second poorest (29%) and the middle (23%) equity quintiles. Four in 10 mothers belonged to the Brahmin/Chhetri caste group. Just over half the households were headed by men and the average household size was 5.3 persons. Slightly more than half (56%) of mothers resided in joint/extended families. The average age of mothers was 25 y, with the majority (58%) engaging in agriculture and/or animal husbandry as their main occupation. Over one-third (38%) of the mothers had some form of primary education or lower (**Table 2**).

HMG availability and participation

The majority (90%) of FCHVs reported facilitating HMG meetings where they spent an average of 3 h/mo preparing for and conducting group meetings. FCHVs reported approximately 30 members in an HMG and an average of 2.8 meetings conducted in the past 3 mo (Table 1). In contrast, only 64% of mothers reported that an HMG existed in their community. Among those who reported HMG availability, only 1 in 4 mothers reported being active members (Table 2).

In our qualitative data collection sites, almost all health workers and FCHVs reported that HMG meetings were conducted monthly. Among 1000-day mothers, most in Bajhang and Bhojpur knew about the HMGs; however, in Rupandehi, many mothers did not know about any such groups.

> No, I don't have any idea of HMG meeting. I don't even know who the FCHV is. I don't know what an HMG is. I don't know what kind of discussion is done in such meetings and who are involved in them. When I get further information about this group, I would like to be a member.… (Mother, IDI, Rupandehi)

During interviews, many mothers in Bajhang and Bhojpur reported participating in HMG meetings, although most reported infrequent participation. In Rupandehi, however, only 3 of 10 mothers interviewed reported participating in HMG meetings, but only one said she participated regularly.

> Participant: Yes, I attend meetings…. I take my baby with me to the meeting. Day before yesterday, I attended a meeting in Rural Municipality (office)…. It was related to mother's group (HMG). I attend (HMG meetings) only sometimes, may be once a year.
>
> Interviewer: How old is your baby?
>
> Participant: Only 12 months old.
>
> Interviewer: In these 12 months, how many times did you attend HMG meetings?
>
> Participant: In these 12 months, I have attended HMG meetings twice. (Mother, IDI, Bajhang)

Many mothers from Bajhang and Bhojpur mentioned that the date and time of HMG meetings are fixed and known to all members. In Bhojpur, FCHVs reported group sizes ranging from 10 to 32. In Bajhang, SII field staff and HMG members reported there were "too many" participants (>50) in their HMG because of the savings component. In Bajhang and Bhojpur, when asked about group membership, it appeared that savings group members were automatically considered

TABLE 1 Female community health volunteer characteristics[1]

	Values
Equity quintile	
Poorest	13.5%
Second poorest	19.3%
Middle	29.7%
Second wealthiest	26.0%
Wealthiest	11.5%
Agro-ecological zone	
Hill	56.2%
Mountain	12.5%
Terai	31.3%
Caste/ethnicity: Brahmin/Chhetri	55.7%
Household size (number of people in the household)	4.7 ± 3
Age in completed years (range: 18–70 y)	41.1 ± 11
Education: primary education or lower	42.7%
Length of time as female community health volunteer ($n = 190$) (range: 0–29 y), y	15.8 ± 8.8
<10 y	31.6%
10–20 y	30.0%
>20 y	38.4%
Other female community health volunteers present in ward	38.5%
Female community health volunteers' perception of more work in the previous year	68.2%
Reasons for increasing workload ($n = 131$)	
Increased number and duration of group meetings	33.6%
Increased number and duration of home visits	70.2%
Larger catchment area	23.6%
More paperwork	20.6%
More meetings	33.6%
More trainings	32.1%
Required to increasingly work across sectors	19.9%
Hours spent per month doing female community health volunteer-related work	33.3 ± 48.5
Hours spent per month in group meeting and preparation	3.1 ± 8.4
Trained in the previous year on setting up/facilitating groups	9.9%
Facilitates health mothers' group meetings	90.1%
Health mothers' group size ($n = 173$) (number of members in health mothers' group)	29.6 ± 15.9
10–20	16.2%
20–30	48.0%
>30	35.8%
Number of meetings in last 3 months ($n = 173$)	2.8 ± 0.5
One-on-one health-related interactions with beneficiaries by female community health volunteer the previous day	64.1%
Job satisfaction and motivation (range: 0–6) (6 indicates highest satisfaction)	5.0 ± 0.9
Supervision satisfaction (range: 0–5) (5 indicates highest satisfaction)	4.1 ± 1.3

[1] $n = 192$. Values are means ± SDs or percentages.

HMG members if they made the mandatory savings contribution during monthly meetings.

Participants in Bajhang and Bhojpur reported discussing diverse maternal and child health and nutrition topics as well as related issues such as handwashing and growing healthy foods in HMG meetings. Although HMG meeting participation was low among mothers in Rupandehi, in the 1 FGD with HMG members, they, too, mentioned diverse topics discussed in their HMGs:

> HMG meetings have also taught us to live in community and groups. It has taught us to share a different bonding between men and women. Before we did not even sit with men but now things have changed. Due to HMG meetings, we treat everyone equally. (HMG member, FGD, Rupandehi)

Factors affecting HMG participation

Based on Andersen's behavioral model of health service use, the factors affecting HMG participation have been categorized into contextual (health system–related and community/family-related) and individual (maternal) factors (Figure 1).

Health system-related contextual factors.

Quantitative data showed that 68% of FCHVs perceived an increase in workload during the previous year; one-third (34%) of them said it was due to an increase in the number and duration of group meetings. On average, FCHVs spent 33 h doing FCHV-related work per month, out of which they spent approximately 3 h preparing for and conducting group meetings. Nearly two-thirds (64%) of FCHVs reported one-on-one health-related interactions with beneficiaries the previous day. Job satisfaction and motivation, as well as satisfaction with the supervision they received, were notably high. One in 10 (10%) FCHVs reported receiving training the previous year on setting up/facilitating groups (Table 1). We did not find any significant association between FCHV variables and mothers being active HMG members (**Table 3**).

TABLE 2 Maternal characteristics[1]

	Values
Equity quintile	
Poorest	21.0%
Second poorest	28.6%
Middle	23.2%
Second wealthiest	21.0%
Wealthiest	6.2%
Agro-ecological zone	
Hill	55.0%
Mountain	12.9%
Terai	32.1%
Caste/ethnicity group: Brahmin/Chettri	40.0%
Household size (number of people in the household)	5.3 ± 2.4
Age in completed years	24.9 ± 5.2
15–19 y	11.7%
20–24 y	41.0%
25–29 y	29.2%
≥30 y	18.1%
Main occupation: agriculture/animal husbandry	58.4%
Education: primary education or lower	37.8%
Family structure: joint/extended	56.3%
Household head sex: men	50.7%
Child age groups (in completed months)	
0–6 mo	24.6%
6–12 mo	28.8%
12–23 mo	46.5%
Child sex: male	54.0%
Self-efficacy: above average	41.3%
Hours per day spent on work	11.3 ± 3.0
Input in child health decisions: most/all	88.9%
Visited community gathering, meeting, training, etc., at least once a month	22.9%
Female community health volunteer-facilitated group exists in community	64.0%
Active member of the group	24.8%
Engagement with *Suaahara*: ever met *Suaahara* frontline worker or listened to *Bhancchin Aama* radio program	34.3%
Engagement with female community health volunteer outside of group meetings (ever)	71.5%
Preferred source of health/nutrition information	
Female community health volunteer/health mothers' group	32.9%
Health facility	13.7%
Suaahara	3.1%
Radio	61.7%
Television	48.1%
Internet	13.2%
Mobile/SMS	26.2%
Information education communication materials	8.4%

[1] $n = 1850$. Values are means ± SDs or percentages. SMS, short message service.

During qualitative data collection, major health system–related contextual factors affecting HMG participation that emerged were as follows: lack of community awareness regarding HMG meetings, FCHV motivation, and access, including transportation costs and seasonal challenges. Mothers in Rupandehi mentioned not even knowing their FCHVs let alone about HMG meetings, whereas mothers in Bajhang and Bhojpur reported that FCHVs' encouragement motivated them to participate in meetings. In Bajhang, a district SII staff member mentioned that often FCHVs migrate out of their catchment area, after which the responsibility is unofficially handed over to their relatives, such as daughters-in-law, who have not received any training. FCHVs and health workers from Bajhang elaborated that FCHVs do not get any additional incentives from the government for conducting HMG meetings, which could affect their motivation. In the mountainous areas of Bajhang and Bhojpur, distance was also reported as a barrier by some participants, as some mothers would need to walk more than 1 h to participate in the meeting. An FCHV from Bajhang elaborated that some mothers have to pay Rs200 (∼US $2) for transportation to get to the meeting venue. Two grandmothers from Bajhang added that, in the monsoon, it is risky to travel as there is risk of landslides and floods; a few mothers in Rupandehi reported the lack of appropriate physical facilities as a barrier to attending HMG meetings.

> We sit on the ground under a tin roof. If it rains, we shift to one of the member's house and continue our meeting. The main problem is we have to sit on the ground and have to go to other people's house. (Mother, IDI, Rupandehi)

TABLE 3 Associations between female community health volunteer characteristics and mother being an active member of a health mothers' group

Female community health volunteer characteristics ($n = 1850$)	OR	*P*	95% CI
Equity quintile (reference: poorest)			
Second poorest	1.421	0.185	0.845, 2.390
Middle	1.658	0.053	0.992, 2.770
Second wealthiest	1.468	0.203	0.813, 2.650
Wealthiest	1.070	0.856	0.515, 2.223
Agro-ecological zone (reference: hills)			
Mountain	1.517	0.102	0.920, 2.501
Terai	0.667	0.088	0.418, 1.063
Caste/ethnicity group: non-Brahmin/Chhetri	0.951	0.725	0.717, 1.260
Age	0.996	0.626	0.980, 1.012
Education: above primary	1.281	0.176	0.895, 1.835
Perception of less work in the previous year	0.814	0.205	0.592, 1.119
Hours spent per month in group meeting and preparation	1.000	0.922	0.996, 1.004
Trained in the previous year on setting up/facilitating groups	1.120	0.355	0.881, 1.425
One-on-one interaction with households the previous day	1.093	0.629	0.762, 1.567
Job satisfaction and motivation	0.777	0.298	0.483, 1.249
Supervision satisfaction	1.126	0.508	0.791, 1.603

A major facilitator to HMG participation was the savings component. Many participants from Bajhang and Bhojpur said that saving a certain amount monthly would be beneficial in the future and, thus, meetings were not cancelled. Some participants in Bhojpur mentioned that mothers who missed a meeting paid a fine, which also regularized attendance. In all 3 districts, but mostly in Bajhang and Bhojpur, coupling savings group meetings with HMG meetings, however, was also noted as a barrier to inclusive participation and less/no focus on health issues during the meetings. Central and district-level SII staff and community participants from Bajhang noted that older mothers in the HMGs do not leave the group because they have a certain amount saved in the savings group and do not want to leave, and it was difficult for new mothers to join because of resistance from existing members. Many participants in Bajhang and Bhojpur mentioned that, because collecting the savings amount and interest calculations were done before the health discussion, mothers often left the meeting after depositing money and did not stay for the health discussion.

SII program activities and staff were reported frequently as a facilitator to HMG meeting regularity and effectiveness. Many mothers and FCHVs mentioned SII field staff joining HMG meetings and discussing health and nutrition; in Bajhang and Bhojpur, many mothers mentioned SII field staff conducting food demonstrations of nutritious recipes from locally available products during HMG meetings. National and district SII staff elaborated that SII field staff supported FCHVs in making a list of health/nutrition topics and encouraged mothers to attend HMG meetings.

Family-related contextual factors.

Quantitative data showed that household responsibilities placed a heavy burden on mothers: more than 11 h/d were required for doing household chores, agriculture, and childcare activities (Table 2). Mothers residing in the plains (*terai*) were 58% less likely ($P = 0.005$) to be active HMG members than mothers living in the hilly districts (**Table 4**). However, this association was not significant in the combined model of FCHV and maternal characteristics (**Table 5**). In women-headed households, mothers were 1.4 times more likely ($P = 0.012$) to be active members of an HMG (Tables 4 and 5).

In all qualitative study districts, mothers were primarily responsible for household chores, which included cooking, cleaning, washing dishes, childcare, cattle-rearing, fieldwork, and so on. In Bajhang and Bhojpur, the most consistently reported barrier to mothers participating in HMG meetings was lack of time. From the 10 participatory observations in Bajhang, mothers were primarily responsible for household chores, working from early morning to late night. Two fathers from Bhojpur mentioned during an FGD that mothers woke up at 3:00–4:00 AM (1–2 h earlier than usual) on the day of the meeting to complete household work before the meeting. One of the strongest and most frequently reported facilitators for mothers in Bajhang and Bhojpur was support and encouragement from the family, particularly from their husbands and mothers-in-law. Fathers from Bajhang and Bhojpur stressed that they engaged in household chores and so should other men. Mothers-in-law from both districts said that they did not restrict their daughters-in-law and encouraged them to learn new things. During participatory observations in Bhojpur, we noted that household work division was far more equitable, compared with the other 2 districts, with men in the family engaging extensively in childcare, fieldwork, cooking, and washing dishes.

> It is us who are useless. Don't we have hands to wash dishes? If we wash dishes properly, wouldn't it be good for our children? That is why we are useless. (Father, FGD, Bhojpur)

In Rupandehi, the majority of participants reported that the norm, particularly among Muslim and other Madhesi groups, was that younger women could not leave the house alone and/or needed permission from the husband or mother-in-law. Many mothers in Rupandehi did not know about the HMG because they did not go out and had lim-

TABLE 4 Associations between maternal characteristics and mother being an active member of a health mothers' group[1]

Maternal characteristics (n = 1850)	OR	P	95% CI
Equity quintile (reference: poorest)			
Second poorest	0.998	0.990	0.695, 1.433
Middle	1.151	0.471	0.785, 1.688
Second wealthiest	1.190	0.496	0.721, 1.962
Wealthiest	1.117	0.727	0.600, 2.008
Agro-ecological zone (reference: hills)			
Mountain	1.545	0.115	0.900, 2.653
Terai	0.584	0.005**	0.400, 0.853
Caste/ethnicity group: non-Brahmin/Chhetri	1.049	0.744	0.788, 1.397
Household size	0.969	0.320	0.909, 1.031
Family structure: nuclear	1.190	0.238	0.892, 1.589
Household head sex: women	1.377	0.008**	1.087, 1.744
Age (reference: 15–19 y)			
20–24 y	1.707	0.021*	1.084, 2.686
25–29 y	2.548	<0.000***	1.626, 3.993
≥30 y	2.893	<0.000***	1.707, 4.903
Education: above primary	1.457	0.009**	1.099, 1.931
Main occupation: other than agriculture/animal husbandry	0.788	0.077	0.604, 1.026
Self-efficacy: above average	1.361	0.008**	1.084, 1.710
Time (hours) on work-related activities	1.014	0.444	0.978, 1.052
Decision making for child health: input into most or all activities	1.154	0.485	0.772, 1.724
Engagement with *Suaahara:* ever met *Suaahara* frontline worker or listened to *Bhancchin Aama* radio program	1.498	0.012*	1.093, 2.051
Ever had contact with female community health volunteer outside health mothers' group	1.842	<0.000***	1.373, 2.472
Preferred source of health/nutrition information: female community health volunteer/health mothers' group	1.391	0.014*	1.070, 1.808

[1] *$P < 0.05$, **$P < 0.01$, ***$P < 0.001$.

ited social interaction. Mothers in Rupandehi mentioned that women who frequently went outside by themselves were perceived to be having an affair.

> In our caste, new brides are not allowed to go outside their house. When they will give birth to 1 to 2 children, then only they are allowed because they will be old after that. Even that is rare in most cases…. My work in my house is only to cook food, wash clothes and look after the children. (Mother, IDI, Rupandehi)

Individual maternal factors.

Nearly three-fourths (72%) of mothers reported engaging with FCHVs outside of the HMGs. One-third (33%) of mothers surveyed reported to prefer FCHV and/or HMG meetings as the source of health and nutrition information. Over one-third (34%) of mothers reported engagement with SII (via field staff or the *Bhanchhin Aama* radio program), 1 y after the start of these interventions (Table 2). Regression models showed that mothers who had had contact with the FCHV outside of HMG meetings were twice as likely ($P < 0.000$) and mothers who preferred the FCHV/HMG as source of health and nutrition information were 1.4 times more likely ($P = 0.012$) to be active HMG members (Table 5). Mothers who engaged with SII via its field staff, community programs, or its radio program *Bhanchhin Aama* were 1.6 times more likely ($P = 0.003$) to be active HMG members (Table 5).

We also found a consistent positive association between the age of mothers and likelihood of being active members of the HMGs, with mothers in the age ranges of 20–24, 25–29, and 30 y and above 1.8 ($P = 0.012$), 2.8 ($P < 0.000$), and 3 ($P < 0.000$) times more likely to be active HMG members compared with mothers aged 15–19 y (Table 5). In the individual regression model, mothers with above primary education were 1.5 times more likely ($P = 0.009$) to be active HMG members (Table 4). This association, however, was not significant in the combined model (Table 5). Findings also showed that mothers with above average self-efficacy were 1.4 times more likely to be active HMG members ($P = 0.008$) (Table 5).

Qualitative findings also showed that maternal characteristics affected HMG participation. Lack of decision-making power of mothers was reported by some participants in Bajhang and Bhojpur, but this was the biggest barrier to participation in Rupandehi. As mentioned earlier, in Rupandehi, mothers were "allowed" more freedom as they grew older and had children. Mothers from Bajhang and Bhojpur, and HMG members from Rupandehi, frequently mentioned that learning about different health topics motivated them to participate in meetings. FCHVs, SII field staff, and beneficiaries reported that nonfinancial incentives, such as tea and snacks during meetings, motivated 1000-day mothers to participate in meetings. Participants from Bhojpur and Rupandehi also expressed that the HMG could be regularized, and participation increased if snacks and allowances could be provided. Therefore, learning and snacks serve as incentives for mothers to participate actively in HMG meetings. As mentioned earlier, mothers in Rupandehi noted not even knowing their FCHVs, let alone about the HMG meetings, whereas mothers in Bajhang and Bhojpur reported that FCHVs' encouragement motivated them to participate in meetings. Mothers, mostly from Bajhang and Bhojpur, noted the SII's contribution in HMG meetings and mentioned they enjoyed when SII field staff came to HMG meetings.

TABLE 5 Associations between female community health volunteer and maternal characteristics and mother being an active member of a health mothers' group: mixed-effects model[1]

	OR	*P*	95% CI
Female community health volunteer characteristics ($n = 1850$)			
Equity quintile (reference: poorest)			
Second poorest	1.298	0.408	0.700, 2.406
Middle	1.528	0.151	0.857, 2.726
Second wealthiest	1.192	0.617	0.598, 2.376
Wealthiest	0.893	0.806	0.364, 2.194
Age	0.990	0.308	0.972, 1.009
Education: above primary	1.297	0.218	0.857, 1.963
Perception of less work in the previous year	0.907	0.618	0.618, 1.331
Hours spent per month in group meeting and preparation	1.000	0.875	0.997, 1.004
Trained in the previous year on setting up/facilitating groups	1.202	0.159	0.931, 1.553
One-on-one interaction with households the previous day	1.062	0.752	0.730, 1.546
Job satisfaction and motivation	0.772	0.277	0.484, 1.230
Supervision satisfaction	1.142	0.413	0.831, 1.568
Maternal characteristics ($n = 1850$)			
Equity quintile (reference: poorest)			
Second poorest	0.983	0.926	0.680, 1.419
Middle	1.222	0.347	0.805, 1.855
Second wealthiest	1.402	0.165	0.870, 2.258
Wealthiest	1.529	0.227	0.768, 3.047
Agro-ecological zone (reference: hills)			
Mountain	1.617	0.084	0.938, 2.789
Terai	0.685	0.163	0.403, 1.166
Caste/ethnicity group: non-Brahmin/Chhetri	0.962	0.793	0.722, 1.282
Household size	0.968	0.347	0.903, 1.036
Family structure: nuclear	1.156	0.328	0.864, 1.547
Household head sex: women	1.405	0.012*	1.078, 1.831
Age (reference: 15–19 y)			
20–24 y	1.815	0.012*	1.139, 2.894
25–29 y	2.785	<0.000***	1.705, 4.550
≥30 y	3.060	<0.000***	1.787, 5.239
Education: above primary	1.357	0.054	0.995, 1.852
Main occupation: other than agriculture/animal husbandry	0.770	0.075	0.577, 1.027
Self-efficacy: above average	1.457	0.004**	1.129, 1.880
Time (hours) on work-related activities	1.010	0.655	0.967, 1.054
Decision making for child health: input into most or all activities	1.273	0.277	0.824, 1.968
Maternal engagement with *Suaahara*: ever met *Suaahara* frontline worker or listened to *Bhancchin Aama* radio program	1.642	0.003**	1.189, 2.268
Ever had contact with female community health volunteer outside health mothers' group	1.998	<0.000***	1.457, 2.741
Preferred source of health/nutrition information: female community health volunteer/health mothers' group	1.415	0.012*	1.078, 1.858

[1] *$P < 0.05$, **$P < 0.01$, ***$P < 0.001$.

Discussion

Both the quantitative and qualitative findings showed the importance of factors at the health system, family, and individual/maternal levels for ensuring functioning HMGs. Multivariate regression findings showed that engagement with FCHVs and SII, household head's sex, as well as maternal age, education, and self-efficacy, and her preference for the FCHV/HMG as a source of health and nutrition information were significantly associated with active HMG membership. Qualitative findings highlighted the following as important factors for HMG participation: the HMG's savings component, geographic accessibility to the meeting venue, FCHV motivation and activeness, provision of incentives for HMG participants, and changing gendered norms as well as women's empowerment including freedom of mobility, family support, and the mothers' decision-making capacity.

Our survey findings showed high motivation and job satisfaction among FCHVs, but increased workload due to different reasons including increased group meetings. We did not find a significant association between any of the FCHV characteristics and whether mothers were active HMG members. Many participants, however, highlighted the role of FCHVs' motivation and capacity for HMG functionality during qualitative interactions. Consistent with our findings, existing literature shows that FCHV satisfaction and motivation are high in Nepal (27). Although FCHVs in Nepal are not paid salaries from the Ministry of Health and Population (28) and do not receive any allowance to conduct HMG meetings (3), FCHVs have noted several nonmonetary intrinsic motivators, including earning religious merit by serving their community (4, 5), acquisition of health knowledge and skills (4, 5, 28), self-empowerment (5), and social recognition (4, 5, 28). The regional distinction we found in our qualitative findings with FCHVs being more

active and motivated in the hills compared to the *terai* was also noted in another qualitative study, where FCHVs in Dhading (hill district) reported receiving regular training and support from their local health facilities and using innovative approaches to educate mothers, but in Sarlahi (*terai* district), the FCHVs' role was more limited and they received less support from health facilities (5). Although FCHVs' limited knowledge and skills were noted by some participants during qualitative interviews as barriers to effective facilitation of HMG meetings, a national survey has shown that illiterate FCHVs perform equally well as literate FCHVs for most services provided (27). While FCHVs typically work between 4 and 8 h/wk fulfilling FCHV duties (2), FCHVs' roles have been extended to include a wide range of promotional, preventive, and curative health care services (29). Additionally, local and international nongovernmental organizations also often use FCHVs for community-level program activities (1), which further adds to their workload. Thus, increased workload may affect FCHVs' motivation and capacity to ensure proper HMG functioning.

Supporting the qualitative finding that FCHVs' motivation and capacity affected HMG participation, regression models showed that mothers who had contact with the FCHV outside of HMG meetings and who preferred the FCHV/HMG as source of health and nutrition information were more likely to be active HMG members. A few studies in Nepal have noted the facilitative role that external organizations/programs, such as SII, play in improving HMG functionality and effectiveness where specific outcomes (e.g., care-seeking behavior among participants) improved following interventions with the HMG, and this is consistent with our finding, both in the quantitative and qualitative results, that mothers who engaged more with SII were more likely to be active in the HMGs (29–31).

The savings component of the HMGs was reported by participants during qualitative discussions as both a facilitator and a barrier to participation. Micro-finance or micro-credit or savings groups or self-help groups, common in low- and middle-income countries, are small groups, mostly targeted at women, where members save a certain amount periodically and then can take loans at minimal interest (32–36). These savings groups, particularly women's groups, enable mobility and provide an opportunity to form effective social networks (33, 35) and impact members' socioeconomic aspects, health-related knowledge, and service utilization (12, 32, 37, 38). A systematic review found positive associations between membership in micro-finance groups and increasing contraceptive use and better child nutrition status (34). Studies on micro-finance groups in Nepal have shown that these groups increase women's social participation and decision making (33, 39) as well as result in positive changes in health-related knowledge and practices (33, 40). Having both health interventions and savings components in women's groups, particularly in rural areas, can therefore be effective (41). There is, however, a major challenge when the savings component encourages a somewhat permanent membership, and the HMG is intended for new mothers to receive health and nutrition information. As reflected by our findings, HMG members who had savings were reluctant to leave the group and were also hesitant to allow newer mothers who had not been contributing to the savings to join the group. The FCHV National Survey Report 2014 also noted that, even when HMG meetings are conducted, further studies are needed to understand how often health education actually takes place in these meetings considering that savings and credit activities have started to dominate some HMG meetings (3). Therefore, we strongly recommend further studies to compare the benefits of the HMG savings component with the disadvantageous impact it has on the health education component and revisit the current model based on findings.

Gendered norms appear to be one of the strongest factors affecting HMG participation from the demand side: mothers who lived in households headed by women had a higher likelihood being active HMG members and in all 3 districts, albeit in varying degrees, gendered norms favoring men and burdening women were the biggest barriers reported qualitatively. While family support and encouragement to attend meetings served as a major facilitator in Bajhang and Bhojpur, the situation was much worse in Rupandehi, with almost all mothers reporting (and other household members agreeing) mobility restrictions imposed by their families and society. Other studies in Nepal have also shown that husbands and seniors in the family control women's mobility and autonomy; Chapagain (19, 42) also showed that mobility restrictions were more common in the *terai* than hills, and community group memberships were more common in hills than in the *terai*.

Regression results showed that individual (maternal) characteristics were the key determinants of HMG participation, with mother's age, education, and self-efficacy significantly associated with HMG participation. Similarly, qualitative findings showed that mobility and freedom of mothers in Rupandehi reportedly increased as they grew older and had children. Mirroring our findings, a mixed-methods study in Nepal also showed that mobility restrictions were fewer among older women and women with multiple children (42). Other studies in the region also showed that women's age (43–46) and education impact participation in community groups (43, 44, 46).

While the quantitative component of this study is cross-sectional and therefore causality cannot be established, this study offers several strengths. First, to our knowledge, this is the first study to have explored HMG functioning in Nepal to identify specific barriers and facilitators to participation from both supply and demand sides. Second, the study used a rigorous, mixed-methods design, comprising a survey with a large sample size across Nepal and qualitative research in a subset of the quantitative sampled areas to provide more insights. On the other hand, these survey findings may not be representative of non-SII districts, and the qualitative findings cannot be generalized to other areas of Nepal. Finally, while this study used both quantitative and qualitative data, neither approach included all of the subtopics comprehensively and some of the results are inconclusive; therefore, further studies to explore FCHV and maternal factors affecting HMG participation in other regions of the country are needed. We recommend further rigorous studies to test what works programmatically or at a policy level to improve HMG participation. Finally, exploratory studies on mothers' perspectives on how HMG meetings should function to be most beneficial would be helpful, especially considering the increasing access of the internet as an educational platform. Our policy and program recommendations include continuous efforts for women's empowerment and education, particularly in *terai* communities, and targeted awareness at key decision makers in the family to encourage women in the family to participate in HMGs.

Acknowledgments

We thank Nira Joshi and Umesh Ghimire from New Era who led the quantitative study. We also thank Nirjal Sharma Pokharel, Indu Raj

Joshi, and Subas Risal from Square One Research and Training who led the qualitative study. We also acknowledge our colleagues Min Raj Gyawali from CARE International and Bhim Kumari Pun from Helen Keller International for supporting the study design and verification of findings. The authors' responsibilities were as follows—SM: designed the qualitative study with support from KC and analyzed the qualitative data and drafted the manuscript; KC and RPA: designed the survey; RPA and SM: conducted the descriptive and regression analyses under the supervision of KC; KC and SM: led the conceptual design of this manuscript; AA and MMP: supported in reviewing the literature; PPR, LBN, PD, and NRD: are knowledgeable and experienced with Nepal's health mother's group program and provided technical feedback; and all authors: reviewed and provided feedback on the manuscript drafts and read and approved the final manuscript.

Data Availability

The data that support the findings of this study are available on request from the corresponding author. The data will be made publicly available via USAID's Development Data Library after the end of the *Suaahara* program.

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