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Original Research

An Evaluation of Equitable Access to a Community-Based Maternal and Newborn Health Program in Rural Ethiopia

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Introduction: The Maternal and Newborn Health in Ethiopia Partnership (MaNHEP) aimed to promote equitable access to safe childbirth and postnatal care through a community-based educational intervention. This study evaluates the extent to which MaNHEP reached women who are socially and materially disadvantaged and, thus, at high risk for inadequate access to care.

Methods: The data used in this analysis are from MaNHEP's cross-sectional 2010 baseline and 2012 endline surveys of women who gave birth in the prior year. A logistic regression model was fit to examine the effects of sociodemographic characteristics on participation in the MaNHEP program. Descriptive statistics of select characteristics by birth and postnatal care provider were also calculated to explore trends in services use.

Results: Using data from the endline survey (N = 1019), the regression model showed that age, parity, education, and geographic residence were not significantly associated with MaNHEP exposure. However, women who were materially disadvantaged were still less likely to have participated in the program than their better-off counterparts. From the baseline survey (N = 1027) to the endline survey, women's use of skilled and semiskilled providers for birth care and postnatal care increased substantially, while use of untrained providers or no provider decreased. These shifts were greater for women with less personal wealth than for women with more personal wealth.

Discussion: MaNHEP appears to have succeeded in meeting its equity goals to a degree. However, this study also supports the intractable relationship between wealth inequality and access to maternal and newborn health services. Strategies targeting the poor in diverse contexts may eventually prove consistently effective in equitable services delivery. Until that time, a critical step that all maternal and newborn health programs can take is to monitor and evaluate to what extent they are reaching disadvantaged groups within the populations they serve.
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INTRODUCTION

Social and material inequalities in developing countries are critical determinants of the kind of care that women and their newborns receive at childbirth. Whether a woman has skilled care at birth is highly dependent on her relative socioeconomic positioning in a particular community context. What is less obvious is how to address this problem. Can programs working for maternal and child health (MCH) in diverse political, economic, and sociocultural settings effectively include women who are disadvantaged? In the context of rural Ethiopia, we evaluate to what extent the Maternal and Newborn Health in Ethiopia Partnership (MaNHEP) reached these women, including an examination of the relationship between socioeconomic inequalities and participation in a primary program intervention: community maternal and newborn health (CMNH) family meetings. Led by MaNHEP-trained community-based health workers, these meetings educated pregnant women and family caregivers on safe birth and postnatal care practices, including referral to health facilities for complications.

Inequalities in Access to Maternal and Postnatal Care

Across a range of low-income countries, enormous inequalities in accessing childbirth care are consistently documented between rich and poor, educated and less educated, urban and rural, and otherwise categorized women. Over the past decade, numerous studies have shown that relative wealth has an extremely strong and direct influence on birth with a skilled attendant (usually defined as a physician, midwife, or nurse) or in a health facility.[1–5] Significant positive associations have also been repeatedly found between the use of skilled care and the level of maternal education, as well as with urban versus rural residence.[4–8] Although inequalities are also observed in the use of other MCH services and practices such as antenatal care, early breastfeeding, family planning, immunizations, and treatment of child illnesses, most of these disparities are not nearly as great as those exhibited by skilled care at and around birth.[1–3,9–11]

Sub-Saharan Africa has some of the greatest wealth inequality gaps in the world for access to skilled care at birth.[1,12] Even in rural areas with widespread poverty and low education, some women receive more and higher quality care

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Quick Points

- Social and material inequalities in sub-Saharan Africa are critical determinants of the kind of care that women and their newborns receive at and after childbirth.
- In the context of rural Ethiopia, we evaluate to what extent MaNHEP reached women who were socially and materially disadvantaged, including an examination of the relationship between measures of socioeconomic status and participation in a MaNHEP-led educational intervention.
- In implementing this key intervention, MaNHEP appears to have overcome barriers that may have been posed by age, parity, education, and geographic residence. The program may have also promoted increased and more equitable use of skilled and semiskilled providers for childbirth and postnatal care. Still, women who were materially disadvantaged were less likely to have participated in MaNHEP than wealthier women.
- Although there is growing evidence that community-based programs can effectively reach disadvantaged groups and improve MCH outcomes, there may also be limits to what such approaches alone can achieve in terms of equitable services delivery.

than others. Reasons for this finding involve complex aspects of inequality that produce and reproduce power relations and social positioning. Quantitative studies signify such relations by identifying sociodemographic factors with significant independent effects on use of services, including age, parity, marital status, education, household wealth, ethnicity, religion, and indicators of women's autonomy.[6,13–22] Qualitative and mixed-methods studies illustrate how and why these patterns translate into uneven access to care.[18,23–27] For example, processes of social exclusion in rural Tanzania have been shown to influence access to childbirth services through mechanisms of affordability, risk perception, sense of entitlement to public goods and services, and to identity as more broadly constructed—each of which is tied to relative standing in both family and community.[18,27]

As another largely rural country in sub-Saharan Africa, Ethiopia is no exception to such structuring of access to childbirth services. Age, parity, household wealth, geographic residence, education, and female literacy have all been found to shape the use of skilled care in Ethiopia.[3,9,28–30] Officially, all antenatal, childbirth, and postnatal services provided by the Ethiopian government at rural health posts and health centers are free, while public hospitals vary with regard to what fees they charge for specific services. However, a recent national study showed that no-fee maternity care is implemented in only a minority of government facilities, with 65% of health centers charging for services, supplies, or drugs.[31] Even if most facilities were to adhere to the federal policy, other studies in sub-Saharan Africa show that there often are costs for obtaining childbirth services that extend beyond facility-based fees, such as those involving transport, labor complications, opportunity losses, and corruption in the health care system.[27,32–34]

Evidence for the effect of social and material inequalities on access to postnatal care within the first 48 hours is not nearly as well documented as the impact of inequalities on other MCH services. There is little research on how inequalities relate to the extent and timing of postnatal care or how these parameters differ by provider type and place of birth. Only one population analysis was found to specifically examine the effect of socioeconomic differentials on the use of postnatal care within 48 hours of birth.[35] Using national-level data from India, this study showed that the use of postnatal care within 48 and 24 hours of birth, respectively, was significantly lower than the use of antenatal care and birth in health facilities. Women with home births were less likely to have received postnatal care than those with facility births, but marked differences in access to postnatal care persisted across wealth quintiles for home and facility-based care. The few other studies that touch on this topic also suggest that socioeconomic patterns for postnatal and newborn care follow those that have been documented for access to childbirth services.[21,36]

The Maternal and Newborn Health in Ethiopia Partnership's Response to Inequitable Access to Care

In attempts to address the critical issue of inequitable access to care, health development organizations and scientists have devoted efforts to implementing and studying program strategies that explicitly benefit groups that are disadvantaged. Such programs are often described as being "pro-poor" and are defined by the proportion of their services that go to the poorest subgroups in their population or by the proportion of poor people who are reached by the program.[37] Using this approach, the World Bank's *Reaching the Poor* project[37] evaluated the ability of 11 different health programs to serve disadvantaged and marginalized groups, developing an evidence base for successful approaches and a subsequent report that outlines specific strategies for designing pro-poor programs.[38] In addition, a number of prominent studies have examined MCH interventions to improve equity in services coverage and use,[39–42] including a United Nations Children's Fund (UNICEF) study showing that an equity-based approach is the most practical and cost-effective way to meet Millennium Development Goals 4 and 5.[42] Recently, the US Agency for International Development (USAID) has also published a guide for building equity into MCH projects.[43]

However, despite the overwhelming evidence for uneven access to skilled care at birth and the various efforts being made to address this problem, many governments and nongovernmental organizations are still slow to meet the need for more equitable models of services delivery. In particular, not enough programs routinely monitor, evaluate, and implement

interventions to improve access to skilled care specifically for disadvantaged pregnant and recently pregnant women. Such a lack of action contributes to continued inequitable outcomes, as most public health spending has been demonstrated to favor those who are better off and thus already likely to obtain existing services.[38]

The MaNHEP program[44] explicitly aimed to promote equitable access to safe childbirth and postnatal care through a community-based educational intervention that includes women of all social and material positions. In partnership with the Federal Ministry of Health, MaNHEP worked in 6 rural *woredas* (districts) in the Amhara and Oromiya regions of Ethiopia to strengthen the implementation of CMNH services at the community level, increase the demand for these services, and improve self-care behaviors. To achieve these objectives, MaNHEP employed a strategy that included training community-based health workers to provide a package of focused CMNH care and to educate pregnant women and their family caregivers on this care through CMNH family meetings. These health workers included government-employed health extension workers, volunteer community health development agents, and local traditional birth attendants (TBAs). These 3 groups of health workers are collectively referred to here as semiskilled providers because the great majority of them received some amount of MaNHEP training in the project setting.[45] The MaNHEP intervention that community members experienced most directly, and that will therefore be examined in this study, was the series of 4 CMNH family meetings that took place in women's homes and was conducted by teams of semiskilled providers organized at the *woreda* level.

MaNHEP's equity goal reflects growing evidence that community-based programs and community outreach workers in low-income countries are indeed capable of effectively reaching disadvantaged populations and improving MCH outcomes.[46–49] A recent study of 54 developing countries found that the MCH interventions that can be performed at the community level are far more evenly distributed than those delivered in health facilities.[9] In this article, we aim to expand this evidence base by examining the results of the MaNHEP program from an equity perspective and by considering whether the program met its goal to ensure that all women and newborns receive appropriate care at and around childbirth "in time, every time."

METHODS

The data used in this analysis are from MaNHEP's cross-sectional surveys of women who had given birth within the previous year. The surveys were conducted in the rural villages of 3 districts in Amhara Region and 3 districts in Oromiya Region where MaNHEP was operating. The baseline survey was conducted from June to August of 2010 and the endline survey was conducted May to July of 2012. The design was not a longitudinal assessment of the same individual women, but rather 2 separate surveys of the same population. A complete description of the research setting and data collection procedures is provided elsewhere in this issue.[44] All statistical calculations for this analysis were performed using Stata 12 statistical software package.[50] Ethical approval for the study was granted by the Emory University and Addis Ababa University institutional review boards, as well as by the Ethiopia Federal Ministry of Health and the Amhara and Oromiya Regional Health Bureaus.

Summary statistics of women's sociodemographic characteristics from the endline survey were calculated to consider patterns of MaNHEP participation from an equity lens. A logistic regression model was then estimated to examine associations between MaNHEP exposure (participation) and indicators of social and material positioning while controlling for potential confounders. Program exposure was assessed by calculating the proportion of women who received the CMNH family meetings intervention. Because the initial meeting served as an introduction to the content of the subsequent 3 meetings, women with 2 or more meetings were considered exposed to the program, and those with no meetings or only the first meeting were considered unexposed. Finally, to explore trends in services use among women of different social and material positions, descriptive statistics of select sociodemographic characteristics by birth and postnatal care provider were calculated from MaNHEP's baseline and endline surveys.

Independent variables were included in the logistic regression model on account of their theoretical importance as well as significance in the literature. Variables of interest included age, parity, education, personal cash income in the last month, and household assets. Marital status was not included as a variable of interest because 97% of women in the total sample reported being married. Religion was likewise excluded because 97% reported being Orthodox Christian. Based on consultation with MaNHEP team members in the study setting, 8 asset variables were tested that are typically used to indicate household wealth in low-income countries. Rather than construct a scale that assigns equal weight to each variable, stepwise regression was used to determine which assets representative of different wealth dimensions (ie, property ownership, house construction, and commercial goods) would be retained in the model. The final asset variables included land ownership, pit latrine, and radio. Local MaNHEP team members again verified these assets as valid indicators of household wealth in both regions.

Control variables in the model include distance to the nearest health facility, number of antenatal visits, previous miscarriage or fetal demise, and region. Distance to the nearest health facility (in minutes walking) measured physical proximity to formal health services and to other goods and services because health posts and health centers were typically stationed in central locations close to main roads. The amount of antenatal care received was used to indicate ties to the formal health system and was defined as number of visits conducted by a skilled provider (ie, physician, health officer, nurse-midwife, nurse) or a health extension worker (ie, a community-level, paid government health worker with one year of training who is typically stationed at a health post). Previous miscarriage or stillbirth was included to control for the presence of complications in women's obstetric history; other items indicating pregnancy, childbirth, or postnatal complications were not available in the dataset. Finally, region was included in the model because preliminary analyses suggested marked differences between Amhara and Oromiya in

Table 1. Sociodemographic Characteristics of Endline Survey Participants (N = 1019)

	Amhara Region, n (%)		Oromiya Region, n (%)	
	Total Sample (n = 479)	Exposed to MaNHEP[a] (n = 206)	Total Sample (n = 540)	Exposed to MaNHEP[a] (n = 326)
Age, y				
15-19	24 (5.0)	6 (25.0)	31 (5.7)	19 (61.3)
20-34	356 (74.3)	155 (43.5)	410 (75.9)	251 (61.2)
≥ 35	82 (17.1)	41 (50.0)	99 (18.3)	56 (56.6)
Don't know	17 (1.7)	4 (23.5)	NA	NA
Parity				
1	70 (14.6)	24 (34.3)	75 (13.9)	47 (62.7)
2-4	233 (48.6)	103 (44.2)	287 (53.2)	174 (60.1)
≥ 5	176 (36.7)	79 (44.9)	178 (33.0)	105 (59.0)
Married	467 (97.5)	203 (43.5)	524 (97.0)	318 (60.7)
Education				
None	379 (79.1)	166 (43.8)	354 (65.6)	203 (57.3)
Any primary	89 (18.6)	35 (39.3)	173 (32.0)	114 (65.9)
Any secondary	11 (2.3)	5 (45.5)	13 (2.4)	9 (69.2)
Cash income[b]	299 (62.4)	150 (50.2)	386 (71.4)	250 (64.8)
Household land	366 (76.4)	166 (45.4)	396 (73.3)	244 (61.6)
Household latrine	396 (82.7)	183 (46.2)	396 (73.3)	258 (65.2)
Household radio	203 (42.4)	89 (43.8)	194 (35.9)	135 (69.6)
Antenatal care visits				
None	94 (19.6)	28 (29.8)	53 (9.8)	21 (39.6)
1-3	133 (27.8)	54 (40.6)	204 (37.8)	121 (59.3)
≥ 4	252 (52.6)	124 (49.2)	283 (52.4)	184 (65.0)
Distance to nearest health facility walking				
< 30 minutes	254 (53.0)	97 (38.2)	252 (46.7)	154 (61.1)
30-60 minutes	151 (31.5)	62 (41.1)	173 (32.0)	105 (60.7)
> 60 minutes	74 (15.5)	47 (63.5)	115 (21.3)	67 (58.3)
Previous pregnancy loss[c]	54 (11.2)	28 (51.9)	68 (12.8)	50 (72.5)

Abbreviation: MaNHEP, Maternal and Newborn Health in Ethiopia Partnership.
[a]Reported attending 2 or more Community Maternal and Newborn Health (CMNH) family meetings.
[b]Any personal cash income in the last month.
[c]Including miscarriage, abortion, or stillbirth.

program uptake as well as in birth and postnatal care practices. Separate models were also estimated by region to examine relationships of interest within different regional contexts.

RESULTS

Table 1 provides descriptive statistics from the endline survey (N = 1,019) of characteristics indicating social and material status by region and by MaNHEP exposure. About half of the women (52%) in the total sample reported receiving 2 or more CMNH meetings, but 60% were in Oromiya and only 43% were in Amhara. Compared to women in Amhara, more women in Oromiya also attended primary school (32% vs 19%), earned personal cash income (71% vs 62%), and received antenatal care in their previous pregnancy (90% vs 80%). In both districts, the majority of women lived in households that owned land, had a pit latrine, and did not have a radio. Half of all women lived within 30 minutes walking distance to the nearest health facility. Only 12% reported ever experiencing a pregnancy loss, inclusive of miscarriage, abortion, and stillbirth. Of the women participating in MaNHEP intervention, 25% did not have cash income, 23% lived in households that did not own land, 17% did not have a latrine, and 58% did not have a radio.

The results of the logistic regression model fit to examine the relationships between socioeconomic factors and exposure to MaNHEP are shown in Table 2. In Amhara Region, 17 women (1.7% of the total sample) reported not knowing their age. After ensuring that no other systematic differences existed for these women in relation to those who did report age, the observations were dropped from the model. As opposed to imputing the missing values, this choice was made because the proportion of women with unknown age was determined to be too small to affect the results. The sample size of the final model was therefore 1002 women. Tests for multicollinearity indicated that no variables in the model

Table 2. Sociodemographic Characteristics of Endline Survey Participants Associated with Exposure to MaNHEP (N = 1002)

	Odds Ratio (robust standard error)	95% Confidence Interval	*P* Value
Age, y			
(15-19)			
20-34	1.43	0.75, 2.74	.28
≥ 35	1.31	0.62, 2.75	.48
Parity			
(1)			
2-4	0.97	0.61, 1.52	.88
≥ 5	1.00	0.56, 1.67	.99
Education			
(None)			
Any primary	1.13	0.81, 1.56	.47
Any secondary	1.57	0.61, 4.04	.35
Cash income[a]	1.94	1.46, 2.58	< .001
Household land	1.38	1.00, 1.90	.05
Household latrine	1.99	1.43, 2.77	< .001
Household radio	1.26	0.96, 1.67	.10
Antenatal care visits			
(None)			
1-3	1.59	1.03, 2.44	.04
≥ 4	2.09	1.39, 3.14	< .001
Distance to nearest health facility walking			
(< 30 minutes)			
30-60 minutes	1.07	0.79, 1.45	.66
> 60 minutes	1.47	1.02, 2.12	.04
Previous pregnancy loss[b]	1.63	1.08, 2.46	.02
Region			
(Amhara)			
Oromiya	2.00	1.52, 2.63	< .001

[a] Any personal cash income in the last month.
[b] Including miscarriage, abortion, or stillbirth.

were found to be highly collinear, including age and parity (with variance inflation factors of 1.24 and 1.30, respectively). The Hoesmer and Lemeshow goodness-of-fit test resulted in a *P* value of .58, indicating that the model fits the data well.

From the adjusted odds ratios in Table 2, it appears that age, parity, and education were not associated with women's exposure to the MaNHEP program. Women aged 20 to 34 years and 35 years and over were as likely to receive 2 or more CMNH meetings as were younger women, and the null hypothesis that exposure was the same for all age groups could not be rejected ($P = .50$). Women with 2 to 4 or with 5 or more live births were no more likely to have participated than primiparous women, and parity overall was not significant ($P = .97$). Similar results were found for women with any primary or secondary schooling versus those with none, as well as for education overall ($P = .55$). However, the wealth indicators in the model show significant effects. Women reporting any personal cash income in the last month were twice as likely to have received 2 or more CMNH meetings compared to those with no cash income ($P < .001$), as were women living in a household with a latrine compared to those without this asset ($P < .001$). Land ownership was also significant for MaNHEP exposure ($P = .05$). Household radio did not exhibit a significant association ($P = .10$), but was predictive for women living in Oromiya (odds ratio [OR] 1.56, 95% confidence interval [CI], 0.01-0.85; $P = .04$;). No other variable in the regional models yielded substantially different results from those of the combined model.

Turning to the other variables in the model (Table 2), the amount of antenatal care that women received strongly influenced exposure to MaNHEP. Women with 1 to 3 visits were more likely to have received at least 2 CMNH meetings than women with no care (OR 1.59), and women with 4 or more visits had even greater odds of exposure (OR 2.09). There was no difference in program exposure between women living within 30 minutes of the nearest health facility and those living 30 to 60 minutes away, but women living more than 60 minutes away had a moderately higher probability of receiving the intervention (OR 1.47). However, because the overall effect was not significant ($P = .11$), we conclude that distance to a health facility (as well as remoteness from goods and services) was not a critical factor for program participation. Although perhaps underreported, previous pregnancy loss appeared to influence exposure to some degree ($P = .02$), possibly controlling for a higher motivation to participate in CMNH meetings based on past obstetric complications. Finally, the independent effect of region was predictably strong given the descriptive analysis ($P < .001$), warranting closer examination of how and why this effect was produced.

The descriptive comparison of women's services use between baseline (N = 1027) and endline surveys is presented in Tables 3 and 4. Overall, childbirth and postnatal care with a skilled or semiskilled provider increased between the 2 surveys, while care with an unskilled provider (eg, family, friend, other) or no provider decreased. Both regions had a higher use of skilled and semiskilled providers at birth (21%-70% in Amhara and 44%-78% in Oromiya), but greater advances in Amhara brought the regions to more comparable levels by the time that the endline survey was conducted. Use of these providers for postnatal care also became more equivalent (6%-58% in Amhara and 25%-64% in Oromiya), with especially considerable gains in care from health extension workers. Across education groups, use of skilled providers increased fairly evenly, as did use of semiskilled providers for women with primary school or no education. However, the increases in women without cash income receiving skilled or semiskilled care (31%-73% for birth care and 14%-57% for postnatal care) were substantially greater than this shift for women with cash income (48%-75% for birth care and 31%-63% for postnatal care), and likewise for declines in using an unskilled provider or no provider.

Table 3. Comparison of Baseline (N = 1027) and Endline (N = 1019) Survey Respondents on Select Sociodemographic Characteristics by Childbirth Care Provider

	Skilled Provider[a]		Health Extension Worker		Community Health Development Agent or Traditional Birth Attendant		Family Member, Friend, Other Provider, No Provider	
	Baseline	Endline	Baseline	Endline	Baseline	Endline	Baseline	Endline
Total sample, n (%)	88 (8.6)	151 (14.8)	63 (6.2)	129 (12.7)	186 (18.2)	480 (47.1)	686 (67.1)	259 (25.4)
Region, n (%)								
Amhara	33 (6.7)	79 (16.5)	14 (2.9)	83 (17.3)	56 (11.4)	175 (36.5)	389 (79.1)	142 (29.7)
Oromiya	55 (10.4)	72 (13.3)	49 (9.2)	46 (8.5)	130 (24.5)	305 (56.5)	297 (55.9)	117 (21.7)
Education, n (%)								
None	37 (4.7)	86 (11.8)	48 (6.1)	97 (13.3)	141 (17.9)	354 (48.5)	561 (71.3)	193 (26.4)
Any primary	35 (17.4)	50 (19.1)	12 (6.0)	30 (11.5)	42 (20.9)	118 (45.0)	112 (55.7)	64 (24.4)
Any secondary	16 (45.7)	13 (54.2)	3 (8.6)	1 (4.2)	3 (8.6)	8 (33.3)	13 (37.1)	2 (8.3)
Cash Income, n (%)[b]								
None	65 (7.4)	50 (15.0)	47 (5.3)	35 (10.5)	158 (17.9)	158 (47.3)	612 (69.4)	91 (27.3)
Any	23 (16.8)	101 (14.7)	16 (11.7)	94 (13.7)	27 (19.7)	322 (47.0)	71 (51.8)	168 (24.5)

[a] Physician, health officer, nurse-midwife, or nurse.
[b] Any personal cash income in the last month.

Table 4. Comparison of Baseline (N = 1027) and Endline (N = 1019) Survey Respondents on Select Sociodemographic Characteristics by Postnatal Care Provider Within 48 Hours of Birth

	Skilled Provider[a]		Health Extension Worker		Community Health Development Agent or Traditional Birth Attendant		Family Member, Friend, Other Provider, No Provider	
	Baseline	Endline	Baseline	Endline	Baseline	Endline	Baseline	Endline
Total sample, n (%)	53 (5.2)	121 (11.9)	54 (5.3)	382 (37.5)	58 (5.7)	119 (11.7)	862 (83.9)	397 (39.0)
Region, n (%)								
Amhara	7 (1.4)	48 (10.0)	18 (3.7)	197 (41.1)	6 (1.2)	32 (6.7)	462 (93.7)	202 (42.2)
Oromiya	46 (8.6)	73 (13.5)	36 (6.7)	185 (34.3)	52 (9.7)	87 (16.1)	400 (74.9)	195 (36.1)
Education, n (%)								
None	17 (2.2)	66 (9.0)	38 (4.8)	272 (37.3)	42 (5.3)	93 (12.7)	692 (87.7)	299 (41.0)
Any primary	23 (11.3)	44 (16.8)	14 (6.9)	102 (38.9)	16 (7.9)	25 (9.5)	150 (73.9)	91 (34.7)
Any secondary	13 (37.1)	10(41.7)	2(5.7)	7(29.2)	0(0.0)	0(0.0)	20(57.1)	7(29.2)
Cash Income, n(%)[b]								
None	35(4.0)	41(12.3)	40(4.5)	107 (32.0)	46 (5.2)	41 (12.3)	764 (86.3)	145 (43.4)
Any	18 (13.0)	80 (11.7)	14 (10.1)	275 (40.2)	11 (8.0)	78 (11.4)	95 (68.8)	252 (36.8)

[a] Physician, health officer, nurse-midwife, or nurse.
[b] Any personal cash income in the last month.

DISCUSSION

On the whole, the ability of MaNHEP to reach women of different social and material positions was mixed. Age, parity, and education did not have a significant association with MaNHEP exposure, so the program appears to have included childbearing women equally with respect to these sociodemographic characteristics. It is possible that age and parity are not important access factors to begin with in this population, but the fact that there were no differences in education (as noted above, a consistent predictor of access to services in Ethiopia and elsewhere) demonstrates that the program achieved some success in reaching women equitably. MaNHEP also succeeded in including women who were living far from health facilities at least as much as, if not more than, those living in more central locations. Implementation of the CMNH family meetings through the local community-based semiskilled health workers at the village level most likely accounts for this finding. Conversely, other indicators remained as relatively strong determinants of MaNHEP

participation. Provided that the amount of antenatal care that is received signifies social ties to the formal health system, the impact of this factor is not surprising. But the indicators for material wealth, and perhaps also for women's autonomy in the case of cash income, mattered as well. Women with more personal and household wealth were significantly more likely to receive 2 or more meetings than their poorer counterparts.

This finding supports what has been documented in the literature as an intractable relationship between wealth inequality and access to MCH programs and services. To be clear, the MaNHEP program did not identify and target materially disadvantaged women for its primary intervention, but rather it relied on the grassroots nature of a community-based approach to facilitate a more even participation among women in the study setting. Nonetheless, in implementing its key intervention, MaNHEP appears to have overcome barriers that may have been posed by younger or older age, higher parity, lower levels of education, and remote geographic residence. The program may have also promoted increased and more equitable use of skilled and semiskilled providers for childbirth and postnatal care; a question that is examined further in other articles in this issue.[51,52] Still, women who were materially disadvantaged were less likely to have participated in MaNHEP than wealthier women. The precise reasons for this finding are unclear but are almost certainly tied to broader processes of social exclusion occurring within families and communities that restrict the ability of disadvantaged women to access MCH programs. These same processes are also likely to determine the kind of care that women and newborns receive at birth and shortly after birth.

This study has a number of limitations. First, the extent to which the household wealth indicators in the logistic regression model actually captured this characteristic is uncertain. Measurement of socioeconomic status in low-income countries has long been a challenge, particularly for household wealth in contexts where most people earn their living from subsistence farming or informal trade. A variety of measurement approaches can be taken (eg, individual assets, equally weighted assets scales, weighted wealth indices, consumption expenditures, food security measures), each of which has flaws and advantages.[53–55] We chose to use individual representative assets as indicators of relative household wealth in the study setting based on 1) the available data, 2) our ability to validate these data, 3) and a preference for simplicity. By no means does this approach provide a perfect measure, but it likely approximates the construct reasonably well. Second, missing variables in the dataset mean that the logistic regression model might be somewhat underestimated, particularly in terms of women's autonomy, social support, and obstetric history. Finally, detailed indicators of household wealth were not collected in the baseline survey; as a result, we could not assess how services use changed by these variables from the beginning to the end of the program.

Despite its constraints, this study brings to light issues regarding the prospect of community-based interventions to address inequities in MCH. On one hand, the findings speak to the importance of developing creative, community-based approaches to the delivery of MCH programs in specific contexts that promote more equitable inclusion. On the other hand, the analysis raises the question of whether increasing community-based programs and services is enough by itself to effectively engage women struggling under more entrenched forms of disadvantage. In other words, there may be limits to what community-based strategies alone can achieve in terms of facilitating equitable access. There remains a clear need for programs (community-based and other) to explicitly identify and target women at risk of systematic exclusion. Techniques such as poverty mapping can assist programs in directing a larger proportion of benefits to the poorest communities or families in their catchment area.[56] Participatory programs can conduct formative work to ensure the inclusion of disadvantaged women in community mobilization efforts. Besides removing user fees, programs oriented toward health systems might initiate community health plans, provide subsidies to targeted groups, give shared incentives to providers and disadvantaged clients, or contract with nongovernmental organizations to provide more sustainable services to the underserved.[12,38,57]

More implementation research is needed to understand which strategies work best under what kinds of circumstances to ensure a more equitable services delivery. Until the evidence base offers clearer direction, an essential step that all global MCH programs can take is to assess the extent to which they are reaching disadvantaged and marginalized groups within the populations they serve. A comprehensive conceptual framework is available to provide overall direction for these activities.[58] Simple tools for the routine monitoring and evaluation of household wealth can be found in guides to designing pro-poor health programs published by the Population Reference Bureau, USAID, and the World Bank.[38,43] However, we would caution against focusing solely on wealth inequality; societal disadvantage can take many different forms and is often specific to context. Regardless of exactly how it is accomplished, experts in global MCH concur that the issue of equity must be accounted for when implementing programs, scaling up interventions, and assessing progress.[59] Echoing recent remarks from Zulfiqar Bhutta, "achieving equity in global health" is an integral aspect of social justice, sustainable development, and overall human wellness in the 21st century.[60]

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CONFLICT OF INTEREST

The authors have no conflicts of interest to disclose.

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