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Research Article

The Contribution of Mother Coordinators towards Maternal Health Service Utilization in Rural Pastoralist Community of Afar Regional State, Ethiopia

Misgan Legesse Liben[1]*, Abel Gebre Wuneh[2] and Nejimu Biza Zepro[3]

[1]*Assistant Professor, School of Public Health, College of Health Science, Woldia University, Amhara, Ethiopia*

[2]*Assistant Professor, Department of Public Health, College of Medical and Health Sciences, Samara University, Afar, Ethiopia*

[3]*Assistant Professor, Department of Nursing, College of Medical and Health Sciences, Samara University, Afar, Ethiopia*

***Corresponding Author:** Misgan Legesse Liben, Assistant Professor, School of Public Health, College of Health Science, Woldia University, Amhara, Ethiopia.

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Abstract

Introduction: In Ethiopia, access to health care facilities in the rural hard-to-reach population is limited. To overcome this situation, in 1990's community based interventions using mother coordinators was adopted.

Objective: To assess the contribution of mother coordinators towards maternal health services in the rural pastoralist community.

Methods: A community based comparative cross-sectional study supplemented by qualitative methods was employed in February 16-27/2016 in Zone one and Zone three of Afar National Regional State. A multistage cluster sampling was employed to select the study participants. Quantitative data were analyzed using SPSS version 20. The qualitative data were analyzed by thematic frameworks.

Results: A total of 1124 mothers were included in the study. Of these 49.8% were enrolled from AMREF intervention sites (sites with mother coordinators). Thirty three percent and 53.8% of the study subjects in comparison and intervention sites, respectively, heard about ANC checkup. Of the mothers who had danger signs during the pregnancy of the index child, 73.2% from intervention and 89.5% of mothers from comparison sites seek medical care. About 21% and 34.8% of the study subjects in comparison and intervention sites, respectively, attended PNC checkup. Of the study subjects who had attended PNC checkup in the intervention sites, 60.5% heard about PNC from mother coordinators. The chi-square test showed a significant difference in antenatal and postnatal care checkups.

Conclusion: This survey showed that mother coordinators can improve maternal health services in pastoralist communities. Therefore, it is important to strengthen the capacity of community health workers.

The findings of this survey showed that mother coordinators can improve maternal health services in pastoralist communities. Perhaps the most important of these is through the provision of important messages on maternal health services. Therefore, it is better to strengthen the capacity of mother coordinators on maternal health services in rural (pastoralist) communities.

***Keywords**: AMREF; Afar; Mother Coordinator; Pastoralist; Maternal Health*

Abbreviations

AMREF: African Medical and Research Foundation; ANC: Antenatal Care; AOR: Adjusted Odd Ratio; CI: Confidence Interval; COR: Crude Odds Ratio; HEW: Health Extension Worker

Introduction

Maternal and child health is a public health priority at different levels in Africa. The disparities in health care access are more pronounced among the nomadic pastoralist communities of Sub-Saharan Africa [1]. The inequities in access to quality antenatal care services were driven mainly by the type of localities of the mothers [2]. Access to health care overall is a challenge to rural residents, who have a lower proportion of the population insured, a greater difficulty in traveling to primary, preventative, prenatal, and emergency care providers, and less diversity in health care resources to choose from. Rural residents are left without these services, increasing the physical barriers to quality and timely healthcare [3].

In Kenya, Ng'adakarin BAMOCHA model, based on migratory routes of the pastoralists and container clinics was adopted in 2007 to improve access to maternal and child health services by the nomads. Knowledge of the community on the importance of ANC visits was improved. Furthermore, traditional birth attendant assisted deliveries and deliveries under a skilled health worker were increased. However, there was no improvement in the fourth ante-natal care visits between pre-intervention and post-intervention groups [3].

African Medical and Research Foundation (AMREF) is an international nongovernmental organization (NGO) which is implementing a range of community development activities. Since its foundation, AMREF has been devoted to address the health needs of the poor and the marginalized. AMREF has a wealth of experience and expertise in developing training programs aimed at strengthening community health systems. These include training of health professionals, health extension workers (HEWs) and community health committees (CHCs) [4].

In Ethiopia, access to health care facilities in the rural hard-to-reach populations is limited due to geographical, economical and sociocultural barriers. To overcome this situation, in 1990's community-based malaria control interventions using mother coordinators was adopted in Ethiopia [5]. Mother coordinator, volunteer who are motivated to work without being paid, is a community based health promoter trained on health promotion and disease prevention, especially malaria early detection and referral of suspected case to nearby health facilities. In addition, mother coordinators were given training on maternal health services parallel to malaria control intervention [5,6].

In partnership with the Afar Regional Health Bureau and other key stake holders, AMREF has been implementing different health development programs in Afar regional state since 2005 [4]. In Afar, to address the concern of sustainability in maternal health services, AMREF linked the mother coordinators and local leaders (trained and supporting the programs) to the Health Extension Workers (HEWs). This was achieved by establishing a working team of HEWs, mother co-coordinators and local leaders at community level [7].

The multiplier effects of using mother coordinators were designed systematically. The mother coordinators were nominated by their communities in their kebeles. That is, one mother coordinator was selected among 30 mothers based on relevant and locally applicable criteria. A mother coordinator was responsible for educating up to 30 mothers based on the distances between households [5,8].

In 2007, a total of 506 mother coordinators were trained in their respective districts. Accordingly, 102 mother coordinators trained in Gewane, 77 in Burimodayt/gelalu, 96 in Amibara, 30 in Awash fentale, 94 in Argoba, 76 in Dulesa districts in zone three, and 16 in Delifage and 15 in Dewe district of zone five trained in 2007 [5].

However, there is no post-training survey on the contribution of Mother Coordinators to the implementation of maternal health services in pastoralist setting. Therefore, this study was conducted to assess the contribution of mother coordinators to MHS (Maternal Health Services) in the rural pastoralist community of Afar Regional State.

Methods

Study setting

Afar Regional state (ARS) is one of the nine regions in Federal democratic Ethiopia. The region is located in North eastern part of Ethiopia bordering with four national regional states: in the north and northwest; Tigray region, in the west and south-west; Amhara region, in the south; Oromia region and in the south-west; Somalia region. The ARS also shares international borders with Djibouti and Eritrea to the west and north-west, respectively. Administratively, the region is divided into five zones, which are further subdivided into 32 districts and 404 kebeles [8]. Currently, there are 6 hospitals, 62 health centers and 314 health posts. According to the recent Ethiopian mini demographic and health survey report antenatal care, institutional delivery and postnatal care coverage in Afar region are 31.8%, 6.4% and 8.5%, respectively [9].

A comparative community based cross sectional survey involving both quantitative and qualitative methods was conducted in February 16-27/2016 in Zone one-comparison (Afambo and Aysaita districts) and Zone three-intervention (Amibara and Awash Fentale) of Afar National Regional State. The study comprises of two districts from each zone: a total of four districts. In the intervention and non-intervention sites there are 44 and 37 health extension workers. There are 96 and 30 mother coordinators in Amibara and Awash fentale districts, respectively.

Sample size determination, sampling procedure and sampling technique

The study considered two population proportion assumptions where districts with mother coordinators were compared with those districts without. Three outcome variables namely ANC, delivery service and PNC services were considered to calculate the sample size. In calculating the sample size needed for this survey, the following assumptions were made: according to Mini EDHS 2014 [9] proportion of mothers who got ANC service in Afar region was found to be 31.8%. In this study a difference of 11 percentage points was assumed in areas with mother coordinators, 95% confidence level, 80% of power, the proportion between P1 and P2 equals to 1 and design effect 1.5 and non-response rate of 20%. Based on the above assumptions, using Epi Info statCalc sample size calculation for unmatched case control, a total sample size of 640 was calculated and considering the design effect of 1.5 and 20% for non-response, a final sample size of 1152 (576 for each group) is determined.

A multistage cluster sampling technique was employed for the selection of the study participants. First, among the five zones of Afar region, two zones (Zone one, comparison and Zone three- intervention) were purposively selected. Secondly, among the 14 districts (Eight- in Zone one and six in Zone three) of the two zones, a total of four districts (two in each zone) were randomly selected. Thirdly, a kebele is defined as a cluster and a total of 38 clusters (20 in the intervention and 18 in comparison) were formed. Of these clusters, 23 (12 intervention and 11 comparison) were randomly selected.

Finally, in each cluster, spin of bottle was made to determine the direction in the selection of the first study subject. Then data collectors identified eligible study subjects and administered questionnaire through a face to face interview until the total sample size is achieved. On average in each cluster 48 mothers from intervention and 52 from the comparison groups were included in the study. If more than one eligible is found in a household, one was selected by lottery.

Study variables

In this study the dependent variable was Maternal Health services (ANC, delivery and postnatal care). The independent variables includes socio-demographic (age, marital status, occupation, ethnicity, educational status, religion, family size) and reproductive health related characteristics of respondents (place of antenatal care attendance, plan of pregnant mother related to delivery and postnatal care, danger signs of pregnancy, delivery related complications, source of health information, treatment seeking behavior, awareness of the mothers on maternal health services).

Quantitative data collection process and instrument

Data were collected by preparatory school female graduates using a pre-tested, structured and interviewer administered questionnaire. The questionnaire was prepared first in English then translated in to Amharic and back to English to check for consistency. The Amharic version of the questionnaire was used to collect the data. In this study, there were one overall coordinator and two teams (one team per Zone) of five people (four data collectors and one supervisor).

Qualitative data collection process and instrument

Qualitative data was collected by health professionals (BSc Nurses) using semi-structured interview guide through individual in-depth interview and key informant interviews. The guides were prepared first in English and translated in to Amharic. The Amharic version of the guides was used to collect the data. Six key informant interviews were conducted with district maternal health focal person, midwiferies and health extension workers. An individual in-depth interview was conducted with one mother coordinator from each district.

Data quality control

Preparatory school female graduates who can speak both the local language (Qafaraf) and Amharic were recruited as data collectors. Data collectors and supervisors were trained for two days on the study instrument, consent form, how to interview and data collection procedure. The questionnaire was pretested on mothers before the initiation of the study. The pretest was done to ensure clarity, wordings, logical sequence and skip patterns of the questions. Then the pretest amendments on the questionnaire were made accordingly. The supervisors closely supervised the performance of the data collectors in the field.

Data processing and analysis

Quantitative data were checked for completeness and consistencies. Data were also cleaned, coded and entered into EpiData version 3.02, and exported to SPSS version 20 statistical package for analysis. Accordingly, descriptive statistics was computed to produce frequencies, percentages and chi square test results. Then, the results are tabulated.

Qualitative data were transcribed in to an English text by the investigators. Different ideas in the text were merged in their thematic areas and a thematic framework analysis was employed manually. The results were presented in narratives in triangulation with quantitative findings.

Ethical consideration

The study was approved by the institutional review board (IRB) of Samara University. An official letter was written from Samara University to each district administration offices. Then permission and support letter was written to each selected Kebeles. The participants enrolled in the study were informed about the study objectives, expected outcomes, benefits and the risks associated with it. A written signed consent was taken from the participants before the interview. Confidentiality of responses was maintained throughout the study.

Results and Discussion

Socio-demographic characteristics of the study subjects

A total of 1124 mothers were included in the study, resulting in a response rate of 97.6%. Of these five hundred sixty (49.8%) were enrolled from AMREF intervention sites (sites with mother coordinators) and the remaining from comparison sites (sites without mother coordinators). Majority of the mothers were from 20 to 34 years of age and Afar by ethnicity (Table 1).

Variables	Comparison (%)	Intervention (%)
	n = 564	n = 560
Maternal age (year)		
< 20	46 (8.2)	13 (2.3)
20 - 34	429 (76.0)	411 (73.4
> 34	89 (15.8)	136 (24.3)
Mean (± SD) age of mothers	28.14 (± 6.96) years	29.37 (± 5.82) years
Religion		
Muslim	557 (98.8)	480 (85.7)
Orthodox	7 (1.2)	54 (9.7)
Protestant	0 (0.0)	26 (4.6)
Ethnicity		
Afar	423 (75.0)	408 (72.9)
Amhara	116 (20.6)	124 (22.1)
Oromo	23 (4.0)	16 (2.9)
Tigray	2 (0.4)	12 (2.1)
Maternal educational status		
Non formal education	456 (80.8)	397 (70.9)
Grade 1 - 8	73 (12.9)	150 (26.8)
Grade 9 - 12	24 (4.3)	13 (2.3)
12^{+}	11 (2.0)	0 (0.0)
Family size		
2	32 (5.7)	34 (6.1)
3 - 4	285 (50.5)	209 (37.3)
> 4	247 (43.8)	317 (56.6)
Current maternal occupation		
Government Employee	27 (4.8)	20 (3.6)
Housewife	259 (45.9)	235 (42.0)
Private business	25 (4.4)	22 (3.9)
Pastoralist	248 (44.0)	276 (49.3)
Daily laborer	5 (0.9)	7 (1.2)
Marital status		
Single	14 (2.5)	2 (0.4)
Married	511 (90.6)	550 (98.2)
Divorced	19 (3.4)	4 (0.7)
Widowed	20 (3.5)	4 (0.7)

Table 1*: The distribution of the study subjects in Afar Regional state, 2016.*

Antenatal care (ANC) checkup

One hundred eighty six (33%) and 301 (53.8%) of the study subjects in intervention and comparison sites, respectively, heard about ANC checkup. Of 301 mothers who ever heard about ANC in the intervention sites, 104 (34.6%) mothers had got information about ANC from mother coordinators. Furthermore, of the mothers who ever heard about ANC, 153 (82.3%) and 280 (93%) from intervention and comparison sites, respectively, had attended ANC checkup (Table 2).

As shown in table 2, majority of the study mothers attended ANC at health centers. On the other hand, mothers who did not attend ANC reported the following reasons: health institution is very far; lack of enough money; no trust on the health institution; their husband was not willing for ANC checkup.

Variables	Comparison (%)	Intervention (%)
Mothers ever heard about ANC	**n = 564**	**n = 560**
Yes	186 (33.0)	301 (53.8)
No	378 (67.0)	259 (46.2)
Source of information about ANC	n = 186	n = 301
Health extension workers	145 (78.0)	196 (65.1)
Traditional birth attendant	23 (12.4)	33 (11.0)
Health professionals	15 (8.1)	36 (12.0)
Media	20 (10.8)	34 (11.3)
Mother coordinators	1 (0.5)	104 (34.6)
Others (religious, clan leaders, family members)	3 (1.6)	12 (4.0)
Attended ANC checkup (at least once)	n = 186	n = 301
Yes	153 (82.3)	280 (93.0)
No	33 (17.7)	21 (7.0)
Number of ANC checkup	n = 153	n = 280
1	6 (3.9)	15 (5.4)
2-3	81 (53.0)	195 (69.6)
≥ 4	66 (43.1)	70 (25.0)
Place of ANC attendance	n = 153	n = 280
Health post	26 (17.0)	64 (22.9)
Health center	67 (43.8)	210 (75.0)
Public hospital	59 (38.6)	4 (1.4)
Private health institution	1 (0.6)	2 (0.7)
Reasons for not attending ANC checkup	n = 33	n = 21
Health institution is very far	12 (36.4)	14 (66.7)
Lack of enough money	13 (39.4)	11 (52.4)
No trust on the health institution	6 (18.2)	3 (14.3)
Husband not willing	6 (18.2)	3 (14.3)
Other reasons	2 (6.2)	2 (4.8)

***Table 2**: Distribution of the study subjects by Antenatal care checkup in Afar Regional state, 2016*

Current pregnancy status

One hundred twenty nine (11.5%) of the study mothers were currently pregnant. Ninety seven (75%) of pregnant mothers were attending ANC. About 43.3 % of the surveyed pregnant mothers from comparison and 17.2% intervention sites plan to deliver at home (Table 3).

Variables	Comparison (%)	Intervention (%)
Current pregnancy status	**n = 564**	**n = 560**
Yes	30 (5.3)	99 (17.7)
No	534 (94.7)	461 (82.3)
Currently attending ANC	**n = 30**	**n = 99**
Yes	20 (66.7)	77 (77.8)
No	10 (33.3)	22 (22.2)
Plan of delivery place	**n = 30**	**n = 99**
Home	13 (43.3)	17 (17.2)
Health institution	17 (56.7)	82 (82.8)
Intend to attend PNC	**n = 30**	**n = 99**
Yes	24 (80.0)	88 (88.9)
No	6 (20.0)	11 (11.1)

Table 3: *Current pregnancy status among the study subjects in Afar Regional state, 2016.*

Knowledge on danger signs of pregnancy

As depicted in table 4, 84 (14.9%) of study subjects from comparison sites know danger signs of pregnancy. Of these 59 (70.2%) mothers got information from health extension workers followed by traditional birth attendants (50%). Thirty four (40.5%) and 30 (35.7%) of the study mothers were aware of vaginal bleeding and severe vomiting, respectively. Of 84 mothers 56 (66.7%) had at least one danger sign during the pregnancy of the index child in which severe vomiting was reported by 37.5% of the mothers.

On the other hand, from intervention sites, 182 (32.5%) of the study mothers know at least one danger sign of pregnancy. Of these 105 (57.7%) got information from health extension workers and 67 (36.8%) from mother coordinators. One hundred seventy two (94.5%) and 73 (40.1%) of the study mothers in intervention sites were aware of severe vomiting, and leg and facial swelling, respectively.

Of 182 mothers in the intervention sites, 153 (84.1%) had at least one danger sign during the pregnancy of the index child. One hundred thirty four (87.6%) and 31 (20.3%) reported severe vomiting, and leg and facial swelling, respectively. Of the mothers who had danger signs of pregnancy during the pregnancy of the index child, 73.2% of the mothers in comparison and 137 (89.5%) mothers in AMREF intervention sites go to the health institution for medical care (Table 4).

Variables	Comparison (%)	Intervention (%)
Mothers know at least one danger sign of pregnancy	**n = 564**	**n = 560**
Yes	84 (14.9)	182 (32.5)
No	480 (85.1)	378 (67.5)
Type of danger signs of pregnancy	**n = 84**	**n = 182**
Vaginal bleeding	34 (40.5)	18 (9.9)
Severe vomiting	30 (35.7)	172 (94.5)
Leg and facial swelling	23 (27.4)	73 (40.1)
Headache and blurred vision	29 (34.5)	21 (11.5)
Other (Abortion/miscarriage, loss of appetite)	0 (0.0)	8 (4.4)

Information source on danger signs of pregnancy	n = 84	n = 182
Traditional birth attendant	42 (50.0)	29 (15.9)
Health extension workers	59 (70.2)	105 (57.7)
mother coordinators	0 (0.0)	67 (36.8)
Others (religious, clan leaders, family members)	1 (1.2)	12 (6.6)
Had danger signs during the pregnancy of the index child	**n = 84**	**n = 182**
Yes	56 (66.7)	153 (84.1)
No	28 (33.3)	29 (15.9)
Danger signs mothers faced during their last pregnancy	**n = 56**	**n = 153**
Vaginal bleeding	14 (25.0)	8 (5.2)
Severe vomiting	21 (37.5)	134 (87.6)
Leg and facial swelling	13 (23.2)	31 (20.3)
Headache and blurred vision	19 (33.9)	14 (9.2)
Other (Abortion/miscarriage, loss of appetite)	1 (1.8)	5 (3.3)
Mothers go to health institution for danger signs	**n = 56**	**n = 153**
Yes	41 (73.2)	137 (89.5)
No	15 (16.8)	16 (10.5)
Source of information to go to the health institution	**n = 41**	**n = 137**
Traditional birth attendant	11 (26.8)	5 (3.6)
Health extension workers	32 (78.0)	118 (86.1)
Mother coordinators	0 (0.0)	40 (29.2)
Other (religious, clan leaders, family members)	2 (4.9)	3 (2.2)

Table 4: *Pregnancy and related factors among the study subjects in Afar Regional state, 2016.*

Place of delivery

One hundred ninety seven (34.9%) and 225 (40.2%) of the study subjects from comparison and intervention sites, respectively, gave birth at health institution. Of the mothers who gave birth at health institution, 7 (3.6%) and 131 (58.2%) from comparison and intervention sites, respectively, got information from mother coordinators. Of the mothers who gave birth at home, no trust on the health institution was reported by the study mothers as a reason to deliver at home by 155 (42.2%) of study mothers in the comparison and 123 (36.7%) of the study subjects in intervention sites (Table 5).

Variables	Comparison (%)	Intervention (%)
Place of delivery	**n = 564**	**n = 560**
Home	367 (65.1)	335 (59.8)
Health institution	197 (34.9)	225 (40.2)
Source of information to deliver at Health institution	**n = 197**	**n = 225**
Traditional birth attendant	61 (31.0)	31 (13.8)
Health extension workers	155 (78.7)	161 (71.6)
Mother coordinators	7 (3.6)	131 (58.2)
Other (religious, clan leaders, family members)	2 (1.0)	4 (1.8)

Reason to deliver at home	**n = 367**	**n = 335**
Health institution is very far	129 (35.1)	139 (41.5)
Lack of enough money	107 (29.2)	157 (46.9)
No trust on the health institution	155 (42.2)	123 (36.7)
Husband not willing	33 (9.0)	84 (25.1)
Other reasons	11 (3.0)	43 (12.8)
Complications during home delivery	**n = 367**	**n = 335**
Yes	19 (5.2)	21 (6.3)
No	348 (94.8)	314 (93.7)
Type of complications at home delivery	**n = 19**	**n = 21**
postpartum hemorrhage	10 (52.6)	10 (47.6)
placental retention	3 (15.8)	4 (19.0)
prolonged labour	5 (26.3)	4 (19.0)
Premature rapture of membrane	2 (10.5)	0 (0.0)
shock	4 (21.1)	5 (23.8)
Mothers go to health institution for the complication	**n = 19**	**n = 21**
Yes	7 (36.8)	7 (33.3)
No	12 (63.2)	14 (66.7)
Reason not to seek medical care for the complication	**n = 12**	**n = 14**
Do not know	6 (50.0)	3 (21.4)
Health institution is very far	1 (8.3)	7 (50.0)
Lack of enough money	2 (16.7)	2 (14.3)
No trust on the health institution	2 (16.7)	3 (21.4)
Husband not willing	1 (8.3)	0 (0.0)
Culture	4 (33.3)	2 (14.3)

Table 5: *Delivery place of the index child related characteristics among the study subjects in Afar Regional state, 2016.*

Postnatal care (PNC) checkup

One hundred sixteen (20.6%) and 195 (34.8%) of the study subjects in comparison and intervention sites, respectively, attended PNC checkup. Of the study subjects who had attended PNC checkup in the intervention sites, 118 (60.5%) heard about PNC from mother co-ordinators (Table 6).

Variables	Comparison (%)	Intervention (%)
Attended PNC checkup (at least once)	**n = 564**	**n = 560**
Yes	116 (20.6)	195 (34.8)
No	448 (79.4)	365 (65.2)
Source of information for the PNC checkup	**n = 116**	**n = 195**
Health extension workers	103 (88.8)	157 (80.5)
mother coordinators	6 (5.2)	118 (60.5)
Other (religious, clan leaders, family members)	10 (8.6)	26 (13.3)
Site of PNC checkup	**n = 116**	**n = 195**
Health post	27 (23.3)	47 (24.1)
Health center	59 (50.9)	148 (75.9)
Hospital	30 (25.9)	0 (0.0)
Reason not to attend PNC checkup	**n = 448**	**n = 365**
Do not know	181 (40.4)	39 (10.7)
Health institution is very far	92 (20.5)	183 (50.1)
Lack enough money	96 (21.4)	88 (24.1)
No trust on the health institution	77 (17.2)	63 (17.3)
Husband not willing	46 (10.3)	50 (13.7)
Culture	72 (16.1)	67 (18.4)

Table 6: *The distribution of the study subjects by postnatal care checkup in Afar Regional state, 2016.*

Chi-square test of the study sites

The chi-square test showed that the study site was significantly associated with antenatal and postnatal care checkups (Table 7).

Study site	ANC checkup			Know at least one pregnancy danger sign			Institutional delivery			PNC checkup		
	Yes	No	P-value	Yes	No	P-value	Yes	No	P-value	Yes	No	P-value
Intervention	280	21		182	378		225	335		195	365	
Comparison	153	33	< 0.001	84	480	< 0.001	197	367	0.079	116	448	<0.001

Table 7*: Chi-square test of the study sites by antenatal care (ANC), institutional delivery and postnatal care (PNC) checkup, 2016.*

Qualitative findings

Role and responsibility of mother coordinators in maternal health services

Collaboration of stakeholders is an important factor in effective service delivery. Moreover, given that the geographical distribution of pastoralist communities, the role of mother coordinators should be recognized. This study showed that mother coordinators are well known in their kebele/village and different community parts collaborate with them in the provision of maternal health services.

In support of this idea, a 53 years old mother in Amibara district said, "we work on maternal health services with religious leader, school director, kebele leader, HEW, clan leader and health professionals. However, the necessary materials are not provided to us even from AMREF". (In-depth interview-mother coordinator).

A maternal health focal person in intervention site said, "Mother coordinators work on antenatal care, delivery and postnatal care in collaboration with health extension workers" (KI- maternal health focal person).

A 25 years woman in Awash fentale district said, "I provide mother coordinators the necessary information on antenatal care and postnatal care, and the risks associated with home delivery. I also advise them that antenatal care, delivery and postnatal care are free of charge. As a result, mother coordinators are recommending mothers to deliver at health institution" (KI-HEWs).

Mother coordinators perform a house to house visit and contributed more on maternal health services.

In support of this idea, a 28 years woman in Amibara district said, "in the past mothers were delivering at home by the assistance of mother coordinators, now this is not the case. They advise mothers to deliver at health institution" (KI-HEWs).

A 55 years old mother in Amibara district said, "I move in the village and teach mothers on maternal health services. For instance, yesterday during my house to house visit, I got two pregnant mothers. Then, I took them to the health post for antenatal care visit" (In-depth interview-mother coordinator).

A midwife in Amibara district said, "Without mother coordinators, it is difficult to get mothers from remote areas. I can say this is the best opportunity to use mother coordinators to improve institutional delivery" (KI-midwifery).

A maternal health focal person in intervention site said, "The contribution of mother coordinators on maternal health services is significant, even though research is not conducted on this issue" (KI- maternal health focal person).

Key gaps and barriers related to mother coordinators in maternal health services

Some of the mother coordinators use home delivery as means to generate their income.

In support of this idea, a midwife in Awash fentale district said, "some of the mother coordinators prefer to attend home delivery" (KI-midwifery).

In addition, a 30 years woman in Amibara district said," Since mothers trust on mother coordinators, they prefer to deliver at home. The mother coordinators use this opportunity to generate their income, for instance they receive 100 birr per delivery" (KI-HEWs).

There is no follow-up, capacity building and review meeting in relation to mother coordinators.

In line with this idea, a maternal health focal person in intervention site said, "After AMREF trained and deployed mother coordinators, there is no follow-up and capacity building given for these mothers" (KI- maternal health focal person).

Another maternal health focal person said, "Review meeting is important to identify the gaps in the implementation of any program. But this is not organized in relation to mother coordinators towards the improvement of maternal health services" (KI- maternal health focal person).

Challenges faced by mother coordinators

Mother coordinators encountered several challenges while working. For example, some health professionals deployed in the health institutions did not collaborate with mother coordinators in the implementation of maternal health services.

In support of this idea, a 60 years old mother in Awash fentale district said, "If I take mothers to deliver at the health institution, health professionals do not allow me to enter into the delivery room. As a result, mothers in my village refuse to deliver at the health institution" (In-depth interview-mother coordinator).

Institutional delivery is the key to reduce maternal and newborn mortality. However, mother coordinators reported that some husbands prefer their spouses to deliver at home by mother coordinators assistance.

In line with this idea, a 55 years old mother in Amibara district said, "Some husbands prefer their wives to deliver at home. In this case we are forced to attend home delivery. Therefore, education should be given to mothers and their husbands" (In-depth interview-mother coordinator).

The other challenge reported was after deployment mother coordinators had no given any capacity building program.

A 58 years old mother in Awash fentale district said, "there is no training and provision of necessary materials for us" (In-depth interview-mother coordinator).

Recommendation how to strengthen the contribution of mother coordinators in the future

Mother coordinators and health extension workers recommend that it is better if AMREF and other concerned bodies provide capacity building, necessary materials and other incentives to the mother coordinators.

In support of this idea, a 58 years old mother in Awash fentale district said, "It is better if AMREF and other concerned bodies provide us further training and necessary materials" (In-depth interview-mother coordinator).

Another 53 years old woman in Amibara district said, "If there is labor in my village, I will find phones to call ambulance, therefore it is best if I have a communication service like mobile. Furthermore, it is also better if concerned body link us with health professionals" (In-depth interview-mother coordinator).

A 30 years old woman in Amibara district said, "Some mother coordinators use home delivery as a source of their income. This is because incentives are not given in relation to their contribution on maternal health services. Therefore, mother coordinators may contribute more on institutional delivery if they have salary or other incentives" (KI-HEWs).

Furthermore, the integration of mother coordinators in formal health system is recommended by mother coordinators, health extension workers and midwiferies.

In support of this idea, a 60 years old woman in Awash fentale district said, "Since mothers do not want to deliver at health institution without us, it is better if we have permission paper to enter in the delivery room" (In-depth interview-mother coordinator).

In addition to this, a 26 years old woman in Awash fentale district said," Mother Coordinators have best experiences in maternal health services; therefore, it is better if they are linked with health institutions" (KI-HEWs).

Moreover, a midwife in Amibara district said, "In my opinion mother coordinators are the best entry points for such mobile community like Afar. Therefore, I recommend the concerned body to integrate them with the formal health system" (KI-midwifery).

Interpretation

This study was aimed to assess the contribution of mother coordinators in the implementation of maternal health services. The greatest improvements in antenatal and postnatal care checkups were seen among women in the communities with mother coordinators through community-based service delivery. On the other hand, in the quantitative findings the chi-square test showed non-significant association between the study sites and institutional delivery. This might be explained in such a way that health extension workers and midwiferies stated that mother coordinators use home delivery as means to generate their income and, therefore, they refer to attend home delivery.

About 33% of the study mothers in the comparison, and 53.8% of the study subjects in intervention sites heard about antenatal care checkup. Of these 82.3% and 93% of the mothers in comparison and intervention sites, respectively, attended antenatal care checkup. This difference could be explained in such a way that nearly seven mothers in every twenty (35%) of the study mothers in the intervention sites had got antenatal care related information from mother coordinators.

About 15% of the study subjects in comparison, and 32.5% of the study subjects in intervention sites know at least one danger sign of pregnancy. Furthermore, of the mothers who had danger signs of pregnancy, 73.2% of the study mothers from comparison and 89.5% from intervention sites go to the health institution for medical care. This shows that mothers in intervention sites were about 16% better to seek medical care. This could be explained in such a way that mother coordinators might provide essential information on danger signs of pregnancy.

Nearly 21% of the study subjects in the comparison and 34.8% in the intervention sites had attended postnatal care checkups. Of the study mothers who had attended postnatal care checkup in the intervention sites, nearly 61% heard about postnatal care from mother coordinators. This shows that the contribution of mother coordinators in the implementation of maternal health services is significant.

Conclusion

This study showed that mother coordinators can improve maternal health services in the pastoralist community through the provision of important messages. The chi-square test showed that the study sites were significantly associated with antenatal and postnatal care checkups. But there was no significant association between the study sites and institutional delivery. Therefore, efforts should be made to promote institutional delivery in the pastoralist community, and it is better to integrate mother coordinators within the formal health system.

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Availability of Data and Materials

All data generated or analyzed during this analysis are included in the manuscript.

Authors' Contributions

MLL, AGW and NBZ conceived and designed the study. All authors supervised the data collection. MLL performed the data analysis, interpretation of data, drafted and finalized the manuscript. AGW and NBZ assisted in designing the study and interpretation of data. All authors had read and approved the final manuscript.

Competing Interests

The authors declare that they have no competing interests.

Consent for Publication

Not applicable.

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