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Determinants of suboptimal birth spacing among reproductive-age women in Adama district, Ethiopia: a community-based unmatched case-control study

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Abstract

Background Birth spacing is crucial for ensuring the health of mothers and their children, as well as determining population growth. Short birth intervals represent a universal public health problem associated with adverse maternal, fetal, neonatal, and child outcomes. However, there is limited information in the study area regarding the determinants of suboptimal birth spacing. Thus, this study aimed to identify the determinants of suboptimal spacing among women of reproductive age in the Adama district, Ethiopia.

Methods A community-based unmatched case-control study was conducted among 568 randomly selected reproductive-age women using the multi-stage sampling technique. Data were collected using an interviewer-administered, structured questionnaire. The collected data were entered into Epi Info version 7.2 and analyzed using SPSS version 26. Binary logistic regression analysis was used to model the association between suboptimal birth spacing and independent variables. Adjusted odds ratios with their 95% confidence intervals were calculated to determine the strength of the association. A p-value < 0.05 was considered to declare statistical significance.

Result Educational status (no formal education) (AOR = 2.40; 95% CI: 1.23–1.75), inadequate knowledge of optimal birth space (AOR = 2.60; 95% CI; 1.80–3.90), non-use of modern contraceptives (AOR = 3.00; CI: 1.90–4.20), short breastfeeding duration (AOR = 2.30; 95% CI: 1.50–3.40), and having female index child (AOR = 1.60; 95% CI: 1.13–2.50) were independent determinants of suboptimal birth spacing practice.

Conclusion Encouraging women's education, contraceptive use, and breastfeeding is crucial for birth spacing. Community health initiatives should also focus on preventing sex-based birth intervals.

Keywords Reproductive-age women, Suboptimal birth spacing, Contraceptive, Adama, Ethiopia

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Introduction

Birth spacing refers to the time between two successive births, including postpartum amenorrhea, menstruating periods, and subsequent gestation [1]. The optimal spacing for the next pregnancy is generally considered the resting period between pregnancies, allowing mothers time to recover from pregnancy, labor, and lactation [1, 2]. A suboptimal birth interval is defined by the World Health Organization (WHO) as a period of less than 33 months between consecutive live births [1]. Recognized as a crucial life-saving measure, birth spacing plays a vital role in safeguarding the health of both mothers and newborns [3, 4]. Adequate timing and spacing of pregnancies, which could reduce deaths by 25%, could annually prevent more than one million deaths [5].

A suboptimal interval between births amplifies the adverse health impact on newborns, children, and maternal well-being. studies indicate that a condensed birth interval heightens the likelihood of abortion, early neonatal and childhood fatalities, preterm birth, and low birth weight [2, 6–9]. Additionally, Studies indicate that children born after shorter preceding birth intervals face a higher probability of experiencing malnutrition, manifested as stunting, underweight conditions, and anemia [10].

Closely spaced pregnancies not only lead to adverse neonatal outcomes but also pose significant risks to maternal health, including conditions like preeclampsia, obstructed and prolonged labor, infection, anemia, and hospitalization [11–14]. These stem from factors such as nutritional deficiencies, cervical insufficiency, vertical transmission of infections, and inadequate healing of the uterine scar resulting from a previous cesarean delivery [3]. Beyond health concerns, accelerates population growth, hindering women's economic participation and straining family resources [1, 15].

Globally, family planning programs have significantly improved maternal and child survival by preventing unintended and closely spaced pregnancies and their complications. In Africa, including Ethiopia, many women still experience untimely and closely spaced pregnancies, despite the availability of family planning services. This situation exposes them to a higher risk of health issues and even death during pregnancy and childbirth [14, 16, 17]. Efforts by the government and other stakeholders have not fully addressed this issue, as suboptimal or short birth intervals continue to occur. Despite various interventions by the government and non-governmental organizations, the prevalence of suboptimal birth spacing in Ethiopia remains at 46% [18–21]. Recognizing this, understanding the determinants of suboptimal birth spacing is crucial for improving interventions, revising policies, and developing targeted strategies at both the facility and community levels in the study area. Thus, this study aimed to identify the determinants of suboptimal birth spacing among reproductive-age women in Adama district, Ethiopia.

Methods

Study design, area, and period

A community-based unmatched case-control study was conducted in Adama district, central Ethiopia, from March 1 to April 30, 2023. Adama district is bordered by the Arsi zone to the south, the Lome district to the west, the Boset district to the east, and the Amhara Regional State to the north. The district is comprised of 4 urban and 36 rural kebeles, situated approximately 100 km from Addis Ababa, the capital of Ethiopia. According to the regional health office, the estimated total population is 229,237 (115,567 males and 113,673 females). Among this population, women of reproductive age account for 49,614, and under-five children account for 36,083.

Study population, and eligibility criteria

The study population consisted of all women of reproductive age who had experienced at least two consecutive births in the past five years. Cases were defined as those with a birth spacing of less than 33 months, while women of reproductive age with a birth spacing between 33 and 59 months (including 33 months and up to 59 months) were considered controls. The study included women of reproductive age who had given birth within the last 5 years. Women who were seriously ill, unable to communicate, or mentally ill during the data collection period were excluded from the study.

Sample size, and sampling procedure

The sample size was calculated using Epi info version 7.2 statistical software, employing an unmatched case-control formula. This was done under the assumptions of 80% power, a 95% confidence interval (CI), and a 1:1 case-to-control ratio. Five determinants of suboptimal birth spacing practices identified in previous studies, such as residence, maternal education, wealth index, status of the index child, and postnatal care use after the previous birth, were used as determinant variables [22–24]. Under the assumptions, the variable 'postnatal care use after the previous birth' yielded the largest sample size, which was 344. After accounting for a design effect of 1.5 and a 10% non-response rate, the sample size consequently became 568. As a result, a total of 284 cases and 284 controls were included in this study.

A multistage sampling approach was employed to select study participants. Initially, the district was categorized into rural and urban kebeles. Subsequently, 10 rural and 2 urban kebeles were randomly chosen from a total of 4 urban and 36 rural kebeles in the district. In the first phase, a preliminary survey was conducted to

compile a list of all eligible women of reproductive age who had given birth from all health posts' family folders to identify the cases and controls. During this survey, each woman of reproductive age, having had two or more successive births and residing in the same household, was individually registered. Following this, a proportional allocation was implemented to determine the required sample size from each kebele. Finally, cases and controls were selected from the respective study population using a simple random sampling technique, with the household list serving as the sampling frame.

Study variables

Dependent variable

Suboptimal birth spacing (Yes/No).

Independent variables

Socio-demographic maternal age, maternal educational level, husband educational level, residence, religion, ethnicity, occupation of husband, maternal occupation, family size, wealth index.

Maternal, obstetrics, and reproductive health services parity, age at first birth, postnatal care, antenatal care, knowledge of optimal birth spacing, contraceptive use, place of previous birth, and planned pregnancy.

Child and child-related characteristics sex of the index child, survival status of the index child, breastfeeding duration.

Operational definitions

Optimal birth spacing

The period between pregnancies that allows the mother time to recuperate from pregnancy, labor, and lactation, with inter-birth intervals ranging from 33 to 59 months [1].

Suboptimal/ short birth spacing

Inter-birth intervals of less than 33 months [1].

Knowledge

Knowledge of optimal birthing spacing was assessed using twelve multiple-choice questions. The total knowledge score was dichotomized into inadequate and adequate categories, with a score greater than 60% considered adequate [18, 25, 26].

Index child

The child born immediately before a immediately child [26, 27].

Data collection procedure and quality control

Data were collected using a pretested, structured, interviewer-administered questionnaire. The questionnaires were adapted from various relevant literature with necessary modifications tailored to the specific context of the study [14, 20–22, 28–30]. A team of 8 trained data collectors and 2 supervisors was enlisted for the data collection process. Throughout this phase, continuous supervision of data collectors took place, and regular meetings were convened among the data collectors, supervisors, and investigators. Additional visits were conducted for participants who were unavailable during the initial visit. The collected data were reviewed and checked for completeness before data entry.

The household's wealth status was assessed using the equity tool, incorporating asset variables such as electricity, electric appliances, refrigerator, television, radio, etc. Principal component analysis was employed for the analysis, with each wealth variable categorized as 0 (no) or 1 (yes) prior to the analysis. The suitability of the data for principal component analysis was confirmed through checks of both Kaiser-Meyer-Oklin (KMO) and Bartlett tests. The wealth status was subsequently categorized into five groups, ranked from the poorest to the wealthiest quintile. Further analysis categorized participants into the first, second, third, fourth, and fifth quintile groups, which were then transformed into three categories representing lower, middle, and higher wealth status.

Data processing and analysis

Following the coding and inputting of data into Epi-Info version 7.2, the data were exported to the Statistical Package for Social Sciences (SPSS) Version 26 for cleaning and analysis. Descriptive statistics were employed to present key characteristics of the study population. The association between independent variables and suboptimal birth spacing practice was modeled using binary logistic regression analysis. In the bivariable logistic regression model, a significance level of 0.25 was set as a threshold to select variables for multivariable logistic regression analysis, aiming to control confounding effects. The existence of multicollinearity among explanatory variables was explored using the variance inflation factor along with standard error. The multivariable logistic regression utilized adjusted odds ratios (AOR) with a 95% confidence interval (CI) to identify factors independently associated with the suboptimal birth spacing practice. The model was fitted using the standard model-building approach. Hosmer and Lemeshow's goodness-of-fit test was used to assess the model's fitness in the final model, variables with a p-value less than 0.05 were deemed statistically significant.

Results

Socio-demographic characteristics

A total of 568 reproductive-age women, including 284 cases and 284 controls, participated in this study. The mean age of the participants was 29 years (SD: ±5.17), with a minimum age of 35 and a maximum age of 39 years. The majority of cases 214(75.4%) and controls 223 (78.5%) were rural residents, while 252 cases (87.5%) and 250 controls (89.0%) were married. Among the cases, 132 mothers (46.5%) and 153 husbands (53.9%) attended primary school, while among the controls, 138 mothers (48.6%) and 157 husbands (55.3%) attended primary school. The wealth index of households revealed that 100 cases (35.1%) and 93 controls (32.7%) were in lower-wealth states (Table 1).

Table 1 Sociodemographic characteristics of women of reproductive age in Adama district, Central Ethiopia,2023

Variables	Category	Case	Control
		Number (%)	Number (%)
Age of the mother	15–19	4(1.4)	3(1.1)
	20–24	64(20.0)	56(18.7)
	25–29	89(31.3)	88(31.0)
	30–34	59(23.3)	67(25.4)
	35–39	63(22.4)	58(20.4)
	< 40	5(1.4)	10(3.5)
Residence	Rural	214(75.4)	223(78.5)
	Urban	70(24.6)	61(21.5)
Marital status	Married	252(87.8)	250(89.0)
	Widowed	10(3.8)	5(0.7)
	Divorced	22(8.8)	29(10.3)
Religion	Orthodox	130(45.8)	143(50.4)
	Protestant	72(25.4)	67(23.6)
	Muslim	61(21.5)	57(20.1)
	Catholic	21(7.4)	17(6.0)
Ethnicity	Oromo	192(67.6)	181(63.7)
	Amhara	89(31.3)	100(35.2)
	Other*	3(1.1)	3(1.1)
Educational status of the mother	No formal education	56(19.7)	25(8.8)
	Primary school	132(46.5)	138(48.6)
	High school and preparatory	69(24.3)	85(29.9)
	Diploma and above	27(9.5)	36(12.7)
Educational status of the husband	No formal education	17(6.0)	12(4.2)
	Primary school	153(53.9)	157(55.3)
	High school & preparatory	77(27.1)	79(27.8)
	Diploma &above	37(13.0)	36(12.9)
Occupation of the mother	Farmer	35(12.3)	36(12.7)
	Housewife	183(64.3)	174(61.3)
	Merchant	51(18.0)	52(18.3)
	Government employee	15(5.3)	22(7.7)
Occupation of the husband	Farmer	156(54.9)	146(51.4)
	Merchant	47(16.5)	31(10.9)
	Government employee	54(19.0)	63(22.2)
	Other* *	27(9.5)	44(15.5)
Family size	< 4	97(32.2)	145(51.1)
	≥4	187(65.2)	139(48.9)
Wealth index	Lowest quartile	131(35.1)	93(32.7)
	Middle quartile	50(33.6)	72(29.4)
	Highest quartile	103(31.3)	119(37.9)

Notes * Wolaita, Selte **Daily labor, and non-governmental organization employee

Maternal obstetrics and reproductive health-related characteristics

Among the cases, 141 (47.1%) had ANC follow-up for their former pregnancy, while 162 (52.9%) controls had ANC follow-up. Regarding knowledge of optimal birth spacing, 158 cases (65%) and 83 controls (35%) had inadequate knowledge. Ninety-four cases (34.4%) and 187 controls (65.8%) used modern contraceptives between their last two births (Table 2).

Child and child-related characteristics

This study showed that 141 cases (63.8%) and 103 controls (54.4%) had a female index child. A majority, 224 cases (78.0%) and 218 controls (77.6%) initiated breastfeeding for their previous child within an hour after birth. One hundred twenty-two cases (56.1%) and 62 controls (19.9%) breastfed their previous-to-last child for less than 24 months (Table 3).

Determinants of suboptimal birth Spacing practice

After conducting binary logistic regression analysis, factors such as knowledge of optimal birth spacing, wealth index, use of modern contraceptives between the last two births, duration of breastfeeding, sex of the index child, survival status of the index child, educational status of the mother, and wealth index showed statistically significant associations with suboptimal birth spacing practice at a p-value < 0.25.

In the multivariable analysis, the educational status of the mother, the use of modern contraceptives between the last two births, knowledge of optimal birth spacing, duration of breastfeeding, and sex of the index child were identified as independent determinants of suboptimal birth spacing practice at a p-value < 0.05. Accordingly, the odds of suboptimal birth spacing practice were 2.4 times higher among mothers with no formal education compared to those with a diploma and above school level of education (AOR = 2.40; 95% CI: 1.23–1.75). Mothers who had inadequate knowledge of optimal birth spacing had 2.4 times greater odds of suboptimal birth spacing practice compared to mothers with adequate knowledge (AOR = 2.60; 95% CI;1.80–3.90). Mothers who did not use modern contraceptive methods between the index child and the last pregnancy had 2.8 times higher odds of suboptimal birth spacing practice compared to those mothers who used modern contraceptives (AOR = 3.00; CI: 1.90–4.20). Mothers who breastfed the preceding

Table 2 Maternal obstetrics and reproductive health-related characteristics of women of reproductive age in Adama district, Central Ethiopia, 2023

Variable	Category	Case	Control
		Number (%)	Number (%)
Age at first birth	< 15	24(8.5)	19(6.7)
	15–19	130(45.8)	114(40.1)
	20–24	64(22.5)	76(26.8)
	25–29	39(13.7)	40(14.1)
	≥ 30	27(9.5)	35(12.3)
Parity	Two children	36(12.7)	41(14.4)
	Multipara	195(68.7)	190(66.9)
	Grand multi para	53(18.7)	53(18.7)
Planned pregnancy	Yes	102(35.2)	104(36.6)
	No	182(63.8)	180(63.3)
Knowledge of optimal birth spacing	Inadequate	158(65)	83(38.3)
	Adequate	126(35)	201(61.7)
ANC Follow-up between the last pregnancy	Yes	141(45.6)	162(52.9)
	No	143(54.4)	122(45.4)
Number of ANC visit ($n=303$)	Only once	41(14.3)	33(11.7)
	Two times	25(8.7)	21(5.0)
	Three times	54(19.9)	87(31.0)
	Four times	21(7.3)	21(7.5)
Place of delivery of former birth (between the last two birth)	Home	138(48.1)	151(50.2)
	Health institution	146(51.6)	133(49.8)
PNC use after former birth (between the last two birth)	Yes	168(57.5)	150(55.9)
	No	116(43.0)	134(44.1)
Use of modern contraceptives between the last two births	Yes	94(34.4)	187(65.8)
	No	190(65.8)	97(34.0)
Type of modern contraceptives used	Pills	3(4.3)	18(15.3)
	Injectable	42(45.1)	82(38.1)
	Condom	14(15.8)	12(9.2)
	Implant	22(20.3)	41(22.7)
	IUCD	13(16.3)	33(16.7)
Duration of contraceptive use	< 24 months	65(48.2)	115(41.3)
	≥ 24 months	32(51.0)	72(58.7)

Abbreviations: ANC: antenatal care, PNC: postnatal care, IUCD: Intrauterine device

Table 3 Child and child-related characteristics of women of reproductive age in Adama district, Central Ethiopia, 2023

Variables	Category	Case	Control
		Number (%)	Number (%)
Survival status of index child	Dead	44(46.9)	53(53.2)
	Alive	240(52.3)	231(48.7)
Sex of the index child	Male	143(36.2)	181(45.6)
	Female	141(63.8)	103(54.4)
Stillbirth history	Yes	41(14.3)	45(24.9)
	No	243(85.7)	239(85.1)
Breastfeeding initiation time after the previous birth	In an hour	224(78.0)	218(77.6)
	After an hour's	63(22.0)	61(21.4)
Duration of breastfeeding	< 24 months	122(56.1)	62(19.9)
	≥ 24 months	162(43.9)	222(30.1)

child for less than 24 months had 2.2 times greater odds of suboptimal birth spacing practice than those mothers who breastfed for 24 months or more (AOR = 2.30; 95% CI: 1.50–3.40). Compared to mothers with a male child in the previous birth, mothers with a female index child had a 60% higher likelihood of practicing suboptimal birth spacing (AOR = 1.6; 95% CI: 1.13–2.50) (Table 4).

Discussion

The study focused on mothers in the Adama district of Ethiopia who have given birth to two children within the last five years. These women provided valuable insights into their experiences and challenges related to birth spacing. The study highlighted that educational status, inadequate knowledge of optimal birth space, non-use of modern contraceptives, short breastfeeding duration, and having female index child were identified as independent determinants of suboptimal birth spacing practice.

In this study, compared to mothers with an educational level of a degree and above, those with no formal education had higher odds of suboptimal birth spacing. This finding is in line with previous studies conducted in Iran [31], Arba Minch district Ethiopia [24], Southwest Ethiopia [23, 32], southern Ethiopia [28, 29], Manipur India [33], and Southern Jordan [34]. This can be attributed to the positive impact of education on reproductive decision-making. Education enhances women's understanding of contraceptives and birth spacing, empowering them with knowledge of optimal healthcare choices and fostering greater autonomy in decision-making. Moreover, there is an increased likelihood of educated women pursuing occupations incongruent with childbearing, resulting in longer birth intervals [35, 36].

This study also revealed that, in comparison to mothers who used modern contraceptives, those who did not employ modern contraceptive methods between the index child and the last pregnancy had higher odds of suboptimal birth spacing. This finding is consistent with studies conducted in Uganda [37], Arba Minch district, Ethiopia [24], Eastern Ethiopia [30], Northwest Ethiopia [26], Southern Ethiopia [18, 28], and Southwest Ethiopia [32]. This can be justified by the crucial role of contraceptives in achieving optimal birth spacing. They enable to planning of pregnancies, prevent unintended conceptions, and improve overall family planning [38, 39]. Notably, those who did not use contraceptives exhibit a higher likelihood of experiencing shorter birth intervals.

Knowledge of optimal birth spacing was another significant factor associated with suboptimal birth spacing practice. In this study, those who had inadequate

Table 4 Determinants of suboptimal birth spacing among women of reproductive age in Adama district, Central Ethiopia, 2023

Variables	Category	Case (*N*)	Control (*N*)	COR (95%CI)	AOR (95%CI)
Educational status of the mother	No formal education	56	25	2.9 (1.5–5.9) *	1.3 (1.2–1.7) ***
	Primary	132	138	1.3 (1.5–4.8) *	1.1 (0.8–3.9)
	Secondary	69	85	1.1 (1.5–5.9) *	0.9 (0.9–3.7)
	Diploma and above	27	36	1	1
Wealth index	Lower quartile	131	93	1.6 (1.4–1.8) *	1.3 (0.9–1.9)
	Medium quartile	50	72	1.4 (1.0-1.9)	1.4 (0.6–1.4)
	Highest quartile	103	119	1	1
ANC Follow-up	Yes	126	169	1.84 (1.1–2.9) *	1.35(0.9–3.5)
	No	158	115	1	1
Use of modern contraceptives	Yes	94	187	1	1
	No	190	97	3.8 (2.51-5.0) *	3.0(1.9–4.2) ****
Knowledge of optimal birth space	Inadequate	158	83	3.0 (2.1–4.2)	2.6(1.8–3.9) ****
	Adequate	126	201	1	1
Survival status of the index child	Dead	49	38	1.3 (0.8–2.1) *	1.2 (0.6–2.3)
	Alive	235	246	1	1
Sex of the index child	Male	143	181	1	1
	Female	141	103	1.7 (1.4.2.7) *	1.6 (1.1–2.5) **
Duration of breastfeeding	< 24 months	122	62	2.6 (1.8–3.8) *	2.3 (1.5–3.4) ****
	≥ 24 months	162	222	1	1

Notes *Significant at p-value < 0.25 in unadjusted logistic regression analysis, **significant at $p < 0.05$ in adjusted logistic regression analysis, ***significant at $p < 0.01$ in adjusted logistic regression analysis, ****significant at $p < 0.05$ in adjusted logistic regression analysis 1 = Reference

Abbreviations: ANC: antenatal care; AOR: adjusted odds ratio; CI: confidence interval; COR: crude odds ratio

knowledge of optimal birth spacing had 2.4 times greater odds of suboptimal birth spacing practice compared to mothers with adequate knowledge. This finding is in line with studies conducted in the Arba Minch district, Ethiopia [24], Eastern Ethiopia [30], and Northern Ethiopia [20]. Knowledge of the optimal duration between childbirths is a key factor that encourages mothers to engage in family planning methods and adopt safe breastfeeding practices. This plays a crucial role in mitigating the potential adverse obstetric outcomes and shorter birth intervals.

The other determinant of suboptimal birth spacing was breastfeeding duration. Accordingly, the odds of suboptimal birth spacing practices were two times greater among mothers who breastfed the preceding child for less than 24 months compared to those who breastfed for 24 months or more. This finding is consistent with findings from studies conducted in Arba Minch district, Ethiopia [24], Arsi zone Ethiopia [25], Eastern Ethiopia [30], Southern Ethiopia [29], Southwest Ethiopia [32], Manipur India [33], Southern Jordan [34] and Pakistan [40]. This is attributed to lactation amenorrhea, a natural contraceptive effect of breastfeeding. Additionally, breastfeeding may extend the interbirth interval by influencing hormonal feedback mechanisms negatively [41, 42].

Moreover, the findings of this study indicated that the odds of suboptimal birth spacing were greater among mothers who had female index children than their counterparts. this is supported by findings from studies conducted in Arba Minch district, Ethiopia [24], Eastern Ethiopia [30], Northern Ethiopia [43], developing regions of Ethiopia [21], Southwest Ethiopia [32], Southern Ethiopia [18, 28], Manipur India [33], Southern Jordan [34], and Saudi Arabia [44]. This can be explained by the cultural preference for male offspring in various cultural settings [45]. In many Ethiopian communities, there exists a cultural inclination towards favoring male children. Families' preference for male children is often driven by the belief that males offer better protection against potential threats. In such cultures, if the preceding birth is a female child, mothers might be less inclined to postpone subsequent births as they may desire to have a male child sooner.

Limitations of the study

Assessing the gap between births through women's memory and breastfeeding duration may introduce recall bias into the findings. Given the case-control study design, deriving a direct causal link is a challenging prospect.

Conclusion

In conclusion, the educational status of the mother, non-use of modern contraceptives between the last two births, inadequate knowledge of optimal birth spacing, a short duration of breastfeeding, and having a female index child were all determinants of suboptimal birth spacing practice. Promoting education for women, advocating for the use of contraceptives, and encouraging

breastfeeding are essential for fostering birth spacing. Additionally, raising awareness and culturally promoting parental understanding can help prevent sex-based intervals between births.

Abbreviations

AOR	Adjusted Odds Ratio
ANC	Antenatal Care
CI	Confidence Intervals
COR	Crude Odds Ratio
OR	Odds Ratio
PNC	Postnatal Care
SPSS	Statistical Package for Social Sciences

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Author contributions
YAB contributed to the conception and design of the study, as well as the data curation, and analysis. YA, YMN, MSG, and BLS drafted the manuscript. YMN critically reviewed the draft manuscript and wrote the final version. MAK and WDG advised the study. All authors read and approved the final manuscript.

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Data availability
All data and materials are available from the corresponding author without undue reservation.

Declarations

Ethical approval and consent to Participate
Ethical approval was obtained from the Institutional Ethical Review Board of Adama Hospital Medical College, with Reference No. 058/K-373/15. The study's proposal was formally presented to both the Oromia Regional Health Office and the Adama District Health Office to secure official approval for carrying out research activities within the selected kebeles. Participants were informed of the study's purpose and benefits during the data collection period and informed written consent was obtained to ensure their decision to participate or refuse. To uphold respondents' rights and ensure confidentiality, anonymity, and privacy, safeguards were enacted, and all of the study's procedures followed the principles outlined in the Helsinki Declaration [46].

Consent for publication
Not applicable.

Competing interests
The authors declare no competing interests.

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