



OPEN Male involvement in infant care and associated factors among infants less than one year in Bibugn district of Ethiopia

Tadege Bishaw¹, Genet Degu² & Keralem Anteneh Bishaw²✉

Male involvement in infant care is an effective intervention to improve infant health outcomes. However, evidence regarding male involvement in infant care and its associated factors is limited in Ethiopia. To assess the male involvement in infant care and associated factors among infants less than one year in Bibugn district of Ethiopia. A community-based cross-sectional study was conducted among 606 participants from April 1–30/2023. A systematic sampling technique was used to select each study participant. Data was collected using interviewer-administered questionnaires. Data were entered into Epi data 4.6 and analyzed using statistical Product Service and Solution (SPSS) version 25. Both descriptives, mean, frequency and analytical statistics were employed. Variables with a p-value of less than 0.25 in bivariate logistic regression were entered into a multivariate logistic regression to identify associated factors. Statistical significance was declared at $p < 0.05$. The prevalence of male involvement in infant care was 42.2% with a 95% CI (38.26–46.12). Male who did not attend formal education (AOR = 0.24, 95% CI = 0.14–0.43), having one child (AOR = 5.66, 95% CI = 2.94–10.88), having male infants (AOR = 2.51, 95% CI = 1.60–3.95), first infant order (AOR = 2.70, 95% CI = 1.36–5.39), having adequate knowledge towards infant care (AOR = 5.56, 95% CI = 0.12–0.28), and having favorable attitude towards infant care (AOR = 1.70, 95% CI = 0.34–0.99) were factors associated with male involvement in infant care. Less than 50% (50%) of males are involved in their infant care. Educational status of males, number of infants, male infants, male knowledge, and attitude towards infant care were significantly associated with involvement in infant care. Therefore, efforts should be directed at improving males' educational status, knowledge, and attitude to improve their engagement in caring for their infants.

Keywords Bibugn district, Infant care, Male involvement, Ethiopia

Abbreviations

AOR	Adjusted Odds Ratio
CI	Confidence Interval
COR	Crude Odd Ratio
SPSS	Statistical Package for Product Solution

Infant care is vital for the proper growth of the infant and healthy infant life. Any damage caused during infancy leads to impaired cognitive development, malnutrition, poor growth and development, compromised educational achievement, and low economic productivity¹. Emerging evidence indicated that men's involvement in newborn health significantly improves the health of infants in low- and middle-income countries². Ethiopia implemented a Demand Creation Strategy for Community-based Newborn Care from 2015 to 2017 to ensure the involvement of individuals closest to the newborn, especially targeting male caretakers and household decision-makers³.

Male involvement in child care refers to the daily activities performed by the father⁴. Male involvement in child health is a practice in which fathers and male community members actively participate in infant care⁵. Engaging men in infant care leads to improved care-seeking behaviors, better home care practices, and increased utilization of health services during the postnatal period⁶. Male involvement in childrearing is critical because

¹Department of maternity unit, Bibugn primary hospital, Bibugn, Ethiopia. ²Department of Midwifery, College of Medicine and Health sciences, Debre Markos University, Debre Markos, Ethiopia. ✉email: keralemante2010@gmail.com; keralem_anteneh@dmu.edu.et

of the positive aspects of child development and the reduction of childhood morbidity⁷. Despite their important role in infant care, male actual involvement remains low⁸. Men's involvement in infant care includes cleanliness, feeding, diapering, changing clothes, playing, holding, and bathing⁹.

Because men make decisions about access to food and healthcare costs, their involvement in child nutrition is associated with improved nutrition status of the children¹⁰. A study in Northern Ghana reported that male involvement in infant care activities was high, particularly in financial support for food and healthcare¹¹. About 33% of male partners who lived together did not actively participate in children's care. Problematic couple relationship and mother's role as a housewife⁴, semi-skilled occupation, marital status, and work schedule were factors associated with male involvement in infant care¹². Traditional perceived responsibilities of men within the community also influenced male engagement in infant care⁹.

Male involvement is associated with better health outcomes. However, the practice is not always optimally implemented, optimally in low- and middle-income nations where women may lack access to economic resources and decision-making power⁵. Men frequently have authority over financial resources and household decisions, which affect whether women and newborns receive care. This influence can have a negative impact if men misjudge or ignore danger signs or if they refuse or are unable to pay for care. On the other hand, men contribute to their families' health by helping plan for delivery, supplementing women's understanding of danger signs, and encouraging the use of facility-based care⁶.

Women are typically the ones who are actively responsible for caring for the children in most communities, as they are often the ones who are responsible for taking care of the children⁹. One of the most challenging barriers in infant care is the lack of husband involvement. The challenges to male involvement in infant care in Ethiopia are multifaceted and include cultural barriers, gender-related constraints, and societal norms that limit men's active participation in maternal and child health services^{13–15}. This lack of involvement prevents the infant from seeking care. Infant mortality will remain a problem unless the world takes action to end it by implementing strategies such as ensuring male involvement in infant care. Aside from that, evidence on male involvement and its associated factors in Ethiopia is limited. Therefore, this study aimed to assess male involvement in infant care and associated factors among infants less than one year in Bibugn district of Ethiopia.

Methods

Study design, area and period

A community-based cross-sectional study was conducted in Bibugn district from April 1–30/2023. Bibugn is one of the woredas in the East Gojjam zone, bordering on the south by Sinan, on the west by Dega Damot, on the north by Gonchi Kolela, and the east by Hulet Eju Enese. It is 381 km from Addis Ababa, Ethiopia's capital city, 145 km from Bahir Dar, the capital of the Amhara, and 81 km from Debre Markos. It has 20 kebeles. There are¹ one government primary hospital⁴, four health centers, eighteen health posts, and² two private clinics. Based on the information obtained from the Woreda information communication office, of the year 2023, it has a total population of 100,064, of whom 48,574 are men and 51,490 are women. Within 22,037 households, 23,595 reproductive-aged women aged (15–49) and 3112 under year one age children lived.

Population

The study's source population includes all male in Bibugn woreda with infants under the age of one year. The study population included males with infants under one year old in randomly selected kebeles in Bibugn Woreda during the data collection period. The study included all male with infants < age of one year who had lived in the Bibugn region for at least six months.

Sample size determination

The sample size was determined by using a single population proportion formula based on the following assumptions: Prevalence of male involvement in infant care in Arsi Nagele district South Ethiopia 39.2%¹⁶, 95% confidence level, 5% margin of error (absolute level of precision). Thus, $n = (Z_{\alpha/2})^2 \frac{p(1-p)}{d^2} = 1.96^2 \times 0.392 \times 0.608 / (0.05)^2 = 367$. The final sample size was 606 after considering a 10% non-response rate and a design effect of 1.5.

Sampling procedures

A multistage sampling technique was used in this study. Six⁶ kebeles were selected from twenty kebeles using a lottery method, kebele one¹ from urban and five (Debresina Asmare, Digo Kanta, Ded Eyesus, Arusimesasabiya and Gena memcha) from rural areas. The sample size for each kebele was allocated proportionally based on the number of males with an infant under one year of age. A list of males with < under one year of age was identified using a list of households in each kebele. Each sample was selected based on the sampling interval (1675, total number of husbands with an under one year age infant/606). A simple random sampling (lottery) technique was used to select the first sample and to select if more than one husband under one year of age of infant within a household.

Study variables

Dependent variables Male involvement in infant care.

Independent variables

Socio demographic characteristics Age, residence, male educational status, education status of mother, average monthly family income, family size and number of infant.

Child related factor Age of infant, sex of infant, birth order.

Health service related factor of infant care Mass media, discussion on infant care with partners and others.

Individual factors Knowledge and attitude of male towards involvement in infant care.

Operational definition

Infant Children whose age less than one year.

Male Men who has a spouse, by means of formal marriage or informal union and living together.

Male involvement Men are involved in home-based activities regarding infant care, like feeding, diapering, changing clothes, playing, holding, and bathing. Male involvement is considered if the male is involved in half or more infant care-related activities.

Adequate knowledge Participants who answered correctly greater than or equal to the mean of knowledge of male involvement-related questions in infant care. Knowledge was assessed using a scale of 0 to 1. The correct response was given a score of one¹ for involvement and an incorrect answer of zero (0) for non-involvement.

Favorable attitude Participants who answered correctly greater than or equal to the mean of attitude-related male involvement questions of infant care. Eleven Likert scale items with a range of (1 = strong disagree) to (strongly agree = 5) were used to assess males' attitudes regarding their engagement in infant care practices.

Data collection tool

A pretested structured interviewer-administered questionnaire was used to collect data. The questionnaire was adapted from reviewed literature^{16,17} with modification and contextualized into a local setting. The questionnaire was first prepared in English, translated into Amharic, and again re-translated to English to maintain consistency in translation by language experts. The questionnaire included information about participants' socioeconomic characteristics, male involvement in newborn care-related questions, and male partner knowledge and attitude towards infant care-related questionnaires.

Quality control

The questionnaire was translated from English to Amharic and back to English to ensure consistency. The data collectors (6 diploma nurses) and supervisors (2 MSc midwives) received training on the study's purpose and data collection process. A pretest was conducted before the actual period of data collection using 5% of the total sample size to correct any ambiguity. The questionnaires were checked for completeness and consistency. Supervisors and researchers supervise the data collection process closely. Any difficulties during data collection were considered and corrected accordingly. Finally, rejecting observations with more than 10% missing data was considered to handle missed data. Senior experts evaluated the questionnaire's content validity. The reliability of the questionnaire was tested using Cronbach's alpha (0.76), a measure of internal consistency.

Data analysis

The consistency and completeness of the questionnaires were checked manually first. Then, data were entered into Epi data 4.6 for data and analyzed using SPSS version 25. Summary statistics used to describe the data. Bivariate logistic regression was carried out to determine the relationship between the independent factors and the outcome variable. Then, multivariate logistic regression was performed for variables with a p-value < 0.25 in a bivariate logistic regression to determine significant relationships between the dependent and independent variables. Statistical significance was determined using a 95% confidence interval (CI) and a p-value less than 0.05. Model fitness was checked using the Hosmer and Lemeshow goodness of fit test ($P = 0.065$). Multicollinearity was checked using the variance inflation factor ($VIF = 1.3-3.8$). The study followed a STROBE statement reporting checklist of cross-sectional studies¹⁸.

Ethical approval and consent to participate

Ethical clearance was obtained from an ethical review of Debre Markos University, College of Medicine and Health Science (Ref.No.HSC/RCS/142/11/15). A permission letter was secured from the Bibugn Woreda administration. Then, a Letter of cooperation was written to each selected kebele. Verbal informed consent was obtained from each participant. Participants were assured that their participation was voluntary and had every right to withdraw or refuse to give information at any time. The study was conducted in accordance with the Helsinki Declaration.

Result

Socio-demographic characteristics and health service related issues of the study participants

Out of the total participants, 602 study participants responded to the questionnaires, making a response rate of 99%. Among those, 166 (27.6%) of participants were between 25 and 29 years, with a mean age of 32.4 years (SD 6.9). Nearly two-thirds (65.9%) of participants reported that they did not attend formal education, and 360 (59.8%) were farmers in occupation. Three hundred ninety-two (65.5%) of the participants resided in rural areas. Nearly three-fourth (74.3%) of participants had two to three-family-size (Table 1).

Variable	Categories	Frequency	Percentage
Age	15–19	45	7.5
	20–24	276	45.8
	25–29	166	27.6
	30–34	88	14.6
	≥35	27	4.5
Resident	Urban	210	34.9
	Rural	392	65.1
Education of Male	No formal education	397	65.9
	Primary and above	205	34.1
Education of suppose	No formal education	448	74.4
	Primary and above	154	25.6
Occupation	Government employee	72	12.0
	Private employee	78	13.0
	Farmer	360	59.8
	Merchant	92	15.2
Family size	1–3	447	74.3
	4–6	142	23.5
	≥7	13	2.2
Family average monthly income	< 1500	371	61.6
	1500–3000	140	23.3
	> 3000	91	15.1

Table 1. Socio-demographic characteristics of the study participants in Bibugn district of Ethiopia 2023, ($N = 602$).

Variable	Categories	Frequency	Present
Age of infant	0–1month	86	14.3
	2–3 month	223	37
	≥ 3month	293	48.7
Sex of infant	Male	270	44.9
	Female	332	55.1
Birth order	1st order	356	49.1
	2nd order	151	20.8
	3rd order	95	13.1
Number of infant	1 Child	167	27.7
	2 Child	294	48.8
	≥ 3Child	141	23.5

Table 2. Infant related factors characteristics of the study participants in Bibugn district of Ethiopia,2023, ($N = 602$).

Infant related factor of the study participants

About 332(55.1%) of participants had female infants, and nearly half, 293(48.7%) of the infants were greater than three months of age. More than 2/3 of participants, 406 (67.4%), were second ordered and above in birth. One hundred forty-two participants (23.5%) had greater than three family members (Table 2).

Male involvement infant care

This study reported that 254 (42.2%) 95% CI = 38.2–45.8) males were involved in infant care, while more than half of the study participants, 348 (57.8%), were not involved (Fig. 1).

Nearly half, 293(48.7%), males participated in supporting the infant's mother. Less than half, 294 (48.8%), males were involved or participated in taking the in-infant clinic for immunization, and 286 (47.5%) males also participated in asking questions about care plans, treatments, or equipment (Table 3).

Knowledge and health related factors of male towards infant care

The study reported that more than half of 323 (53.7%) study participants had adequate knowledge of infant care (Fig. 2).

Percentatge of male involvement in infant care

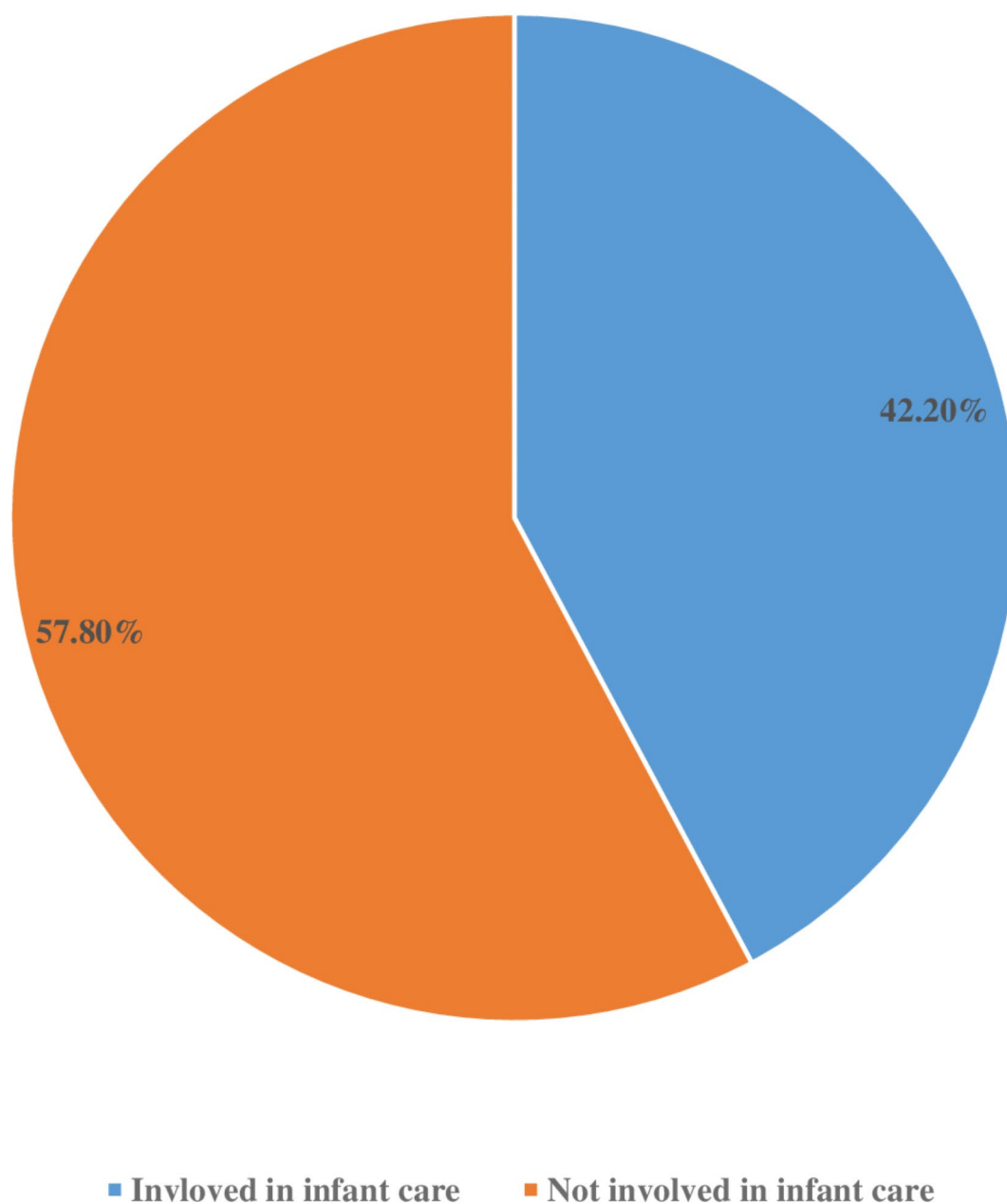


Fig. 1. Pie chart showing the perenctage male involvement in infant care at bibgen disrct of ethiopia, 2023.

Almost 2/3, 398 (66.1%) participants heard about infant care from different sources. The main source of information about infant care was health professionals, friends, and mass media, 208 (56.2%), 141 (38.3%), and 102 (27.9%), respectively. From those three hundred sixty-eight (61.3%) participants heard about infant immunization. Four hundred twenty-six (70.8%) respondents were aware of the age at which their infant began supplementary feeding. Nearly 2/3 of 394 (65.4%) of participants prepared food for their infants. For around 325 (54.) respondents communicated with their suppose about infant care newborn care, 362 (60.1%) of participants took the infant to a health facility for immunization with their suppose, and also 372 (61.8%) of participants knew the importance of taking a sick infant to a health facility with their suppose.

Variable	Categories	Frequency
Diaper	Yes	278 (46.2%)
	No	324 (53.8%)
Bath	Yes	397 (65.9%)
	No	205 (34.1%)
Feed	Yes	413 (68.6%)
	No	189 (31.4%)
Changing clothes	Yes	280 (46.5%)
	No	322 (53.5%)
Holding the infant	Yes	395 (65.6%)
	No	207 (34.4%)
Playing the infant	Yes	296 (49.2%)
	No	306 (50.8%)
Supporting the infant's mother	Yes	404 (67.1%)
	No	198 (32.9%)
Asking question about care plan of infant	Yes	286 (47.5%)
	No	316 (52.5%)
Attending maternal conference to get information about infant care	Yes	334 (55.5%)
	No	268 (44.5%)
Taking infant to clinic during infant sick	Yes	330 (54.8%)
	No	272 (45.2%)
Taking infant to clinic for immunization	Yes	294 (48.8%)
	No	308 (51.2%)

Table 3. Male involvement of infant care in Bibugn district of Ethiopia 2023 ($n = 602$).

Attitude of male towards infant care

The male's overall favorable attitude towards newborn care was 260 (43.4%), whereas his unfavorable attitude was 341 (56.6%) (Fig. 3).

Factors associated with male involvement of infant care

Bivariate logistic regression revealed that residence, education of partner, suppose education, number of infants, sex of infant, birth order, family size, average monthly income, and husband knowledge and attitude were associated with male involvement in infant care. However, the male's educational status, male infant, number of infants, knowledge, and attitude of the husband remained significantly associated with male involvement in infant care in multivariable logistic regression. Males who did not attend formal education were 24% less likely to be involved in infant care compared to males who attended educational status primary school and above (AOR = 0.24, 95% CI = 0.14–0.43). Male involvement in infant care is 5.6 times higher for those with one child compared to those with two or more children (AOR = 5.66, 95% CI = 2.94–10.88).

This study revealed that males with male infants were 2.51 times more involved in infant care compared to their counterparts (AOR = 2.51, 95% CI = 1.60–3.95). Male with the first infant order were 2.70 times more likely to be involved in infant care compared to male with infants in the second and third order (AOR = 2.70, 95% CI = 1.36–5.39). Male who had adequate knowledge about infant care were 5.56 times more likely to be involved in infant care than those who had inadequate knowledge (AOR = 5.56, 95% CI = 0.12–0.28). Finally, this study found that a male with a favorable attitude towards infant care was 1.70 times more likely to be involved in infant care compared to a male with an unfavorable attitude (AOR = 1.70, 95% CI = 0.34–0.99) (Table 4).

Discussion

Male involvement in infant care is essential for creating a happy and healthy family. Engaging males as partners in infant care has a positive impact on a child's development and reduces childhood diseases. Therefore, this community-based study aimed to assess the prevalence of husband involvement and its associated factors in infant care in Ethiopia.

The study reported that the prevalence of husband involvement in infant care was 42.2% with a 95% CI (38.26–46.12). Studies in the Arsi Nagele zone, Ethiopia 39.2%¹⁶ and India 43%¹⁹ were consistent with the findings. On the other hand, the finding of this study is lower than studies in Misha woreda, Southern Ethiopia, 72.4%²⁰, Gahana 63.5%¹¹, Nepal 58.7%²¹, and Brazil (67%)⁴. This disparity could be attributed to differences in participant sociodemographic characteristics, as only 34.9% attended primary level or higher education, in contrast to the above studies, in which the majority of participants were educated. This could be because higher levels of education can lead to a greater awareness of the importance of male involvement in child care and a willingness to engage in caregiving activities. In addition, the differences in traditional male gender roles in child care among communities could be the reason for this discrepancy since men are more likely to be regarded as breadwinners in developing nations like Ethiopia than in developed ones.

Knowledge of male towards infant care

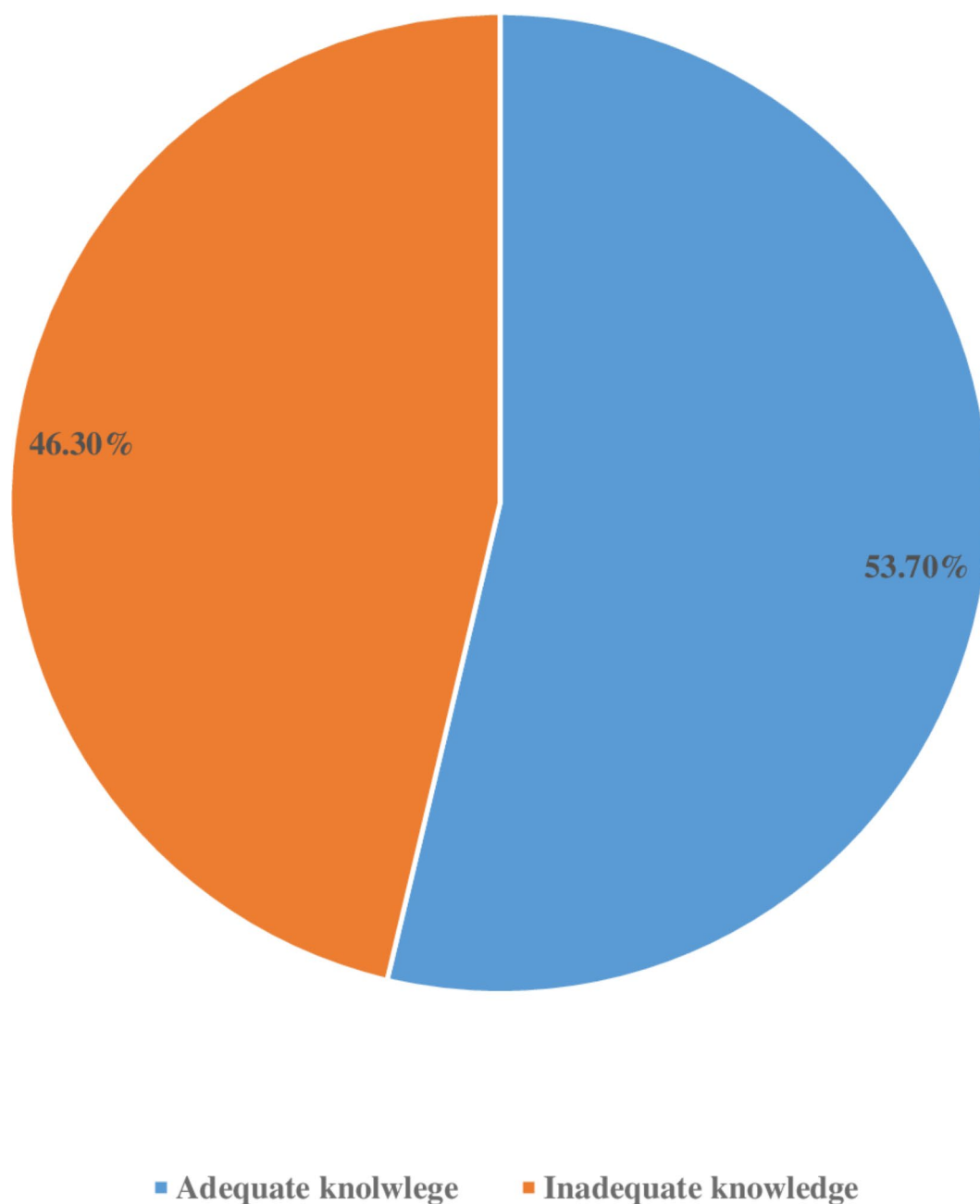


Fig. 2. Pie chart showing the percentage male knowledge towards infant care at Bibgen district of Ethiopia.

Compared to male who attend primary school education and more, this study found that husbands without a formal education were 76% less likely to be involved in infant care. This result is agreed with studies in the USA and Myanmar^{17,22}, in which more educated male are more likely to be involved in infant care. The rationale behind this is that higher levels of education can lead to improved knowledge, skills, and socio-economic status, all of which can facilitate greater engagement in infant care.

Male attitude towards infant care

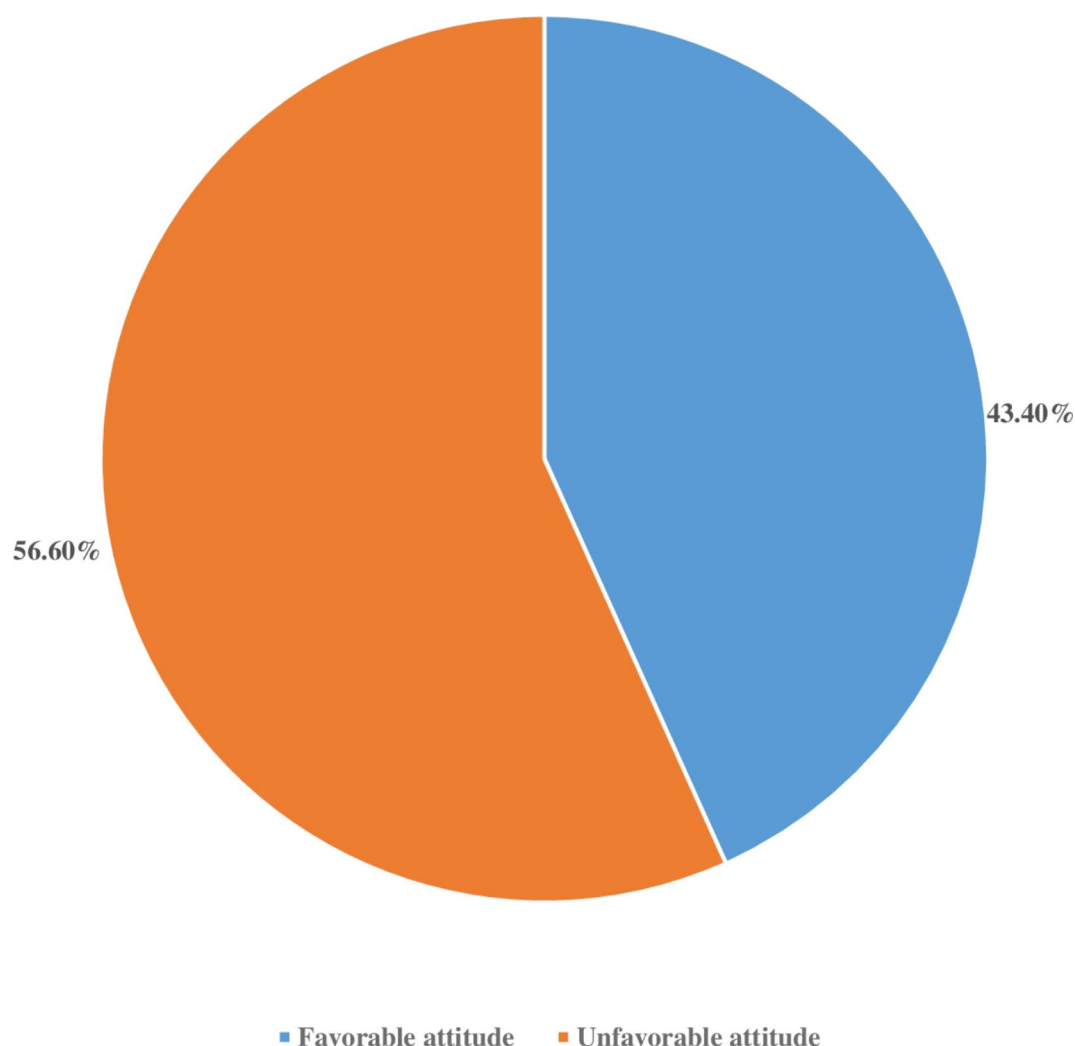


Fig. 3. Pie chart showing the perentage male attitude towards infant care at Bibgen disrct of Ethiopia.

This study revealed that male who had one infant were 5.66 times more likely to be involved in infant care compared to husbands who had two or more infants. A study in China supported this evidence²³, which showed that male who had more than one infant were less likely to be involved in infant care.

The study found that male who have male infants are 2.51 times more likely to be involved in infant care compared to their counterparts. The finding is inconsistent with a study conducted in America¹⁷, which found that male who had female infants were more likely to be involved in infant care. This discrepancy could be due to differences in socio-demographic factors among participants and study design.

According to this study, male with the first infant order were 2.70 times more likely to be involved in infant care compared to male with infants in the second and third order. Men are typically more involved with their firstborn children than with subsequent newborns, especially in the early months after delivery. This could be because firstborn infants need more attention and care, and the novelty of the experience may lead to higher involvement from fathers.

The result of the study showed that male who had adequate knowledge about infant care were 5.56 times more likely to be involved in infant care than those who had inadequate knowledge. This is because husbands with knowledge of evidence-based parenting practices, especially those related to promoting children's physical health and safety, are more likely to engage in infant care practice and contribute to positive child outcomes.

Finally, this study found that a Husband with a favorable attitude towards infant care was 1.70 times more likely to be involved in infant care compared to a husband with an unfavorable attitude. The finding is consistent with the study done in the Arcinegelie zone¹⁶. This is because males with a favorable attitude towards infant care

Variable	Categories	Husband involvement in infant care		COR (95%CI)	AOR (95%CI)	P- value
		Yes	No			
Resident	Urban	32 (5.31%)	165 (2.74%)	1	1	1
	Rural	222 (3.68%)	183 (3.03%)	6.26 (4.09–9.58)	1.3 (0.56–3.00)	0.55
Education of suppose	Not attend formal education	230 (3.82%)	218 (3.62%)	1	1	1
	Primary school and above	24 (3.98%)	130 (2.15%)	0.2 (0.11–0.28)	1.13 (0.48–2.82)	0.75
Education of partner	Not attend formal education	228 (3.78%)	169 (2.80%)	9.26 (0.07–0.17)	0.24 (0.14–0.43)	0.001**
	Primary school and above	26 (4.81%)	179 (2.97%)	1	1	1
Number of infant	1	89(1.46%)	52(8.80%)	10.2 (5.88–17.70)	5.66 (2.94–10.88)	0.001*
	2	141 (2.34%)	153 (2.5%)	5.49 (1.23–2.80)	1.51 (0.92–2.48)	0.11
	≥ 3	24 (4.15%)	143 (2.39%)	1	1	1
Sex of infant	Male	172 (2.85%)	160 (2.65%)	2.47 (1.76–3.45)	2.51 (1.60–3.95)	0.001**
	Female	82(1.36%)	188(3.12%)	1	1	1
Birth ordered	1st order	78 (1.29%)	73 (1.21%)	4 (2.23–7.21)	2.70 (1.36–5.39)	0.005*
	2nd order	250 (4.15%)	106 (1.76%)	8.85 (5.14–15.22)	0.70 (0.24–2.07)	0.53
	3rd order and above	20 (3.3%)	75 (1.24%)	1	1	1
Family size	1–3	12 (0.19%)	1 (0.016%)	1	1	1
	4–6	90 (1.49%)	52 (0.86%)	0.14 (0.88–54.86)	1.9 (0.20–18.39)	0.57
	≥ 7	152 (2.52%)	295 (4.9%)	0.04 (3.00–18.80)	2.4 (0.21–26.89)	0.48
Average family monthly income	< 1500	197 (3.27%)	145 (2.40%)	8.06 (0.07–0.22)	0.51 (0.24–1.07)	0.08
	1500–3000	39 (6.8%)	104 (1.79%)	2.23 (0.23–0.84)	1.14 (0.52–2.54)	0.74
	> 3000	16 (2.65%)	95 (1.57%)	1	1	1
Knowledge	Adequate knowledge	201 (3.33%)	122 (2.02%)	7.14 (0.10–0.21)	5.56 (0.12–0.28)	0.001*
	Inadequate knowledge	53 (8.80%)	226 (3.75%)	1	1	1
Attitude	Favorable attitude	66 (1.09%)	50 (0.83%)	2.10 (0.32–0.72)	1.70 (0.34–0.99)	0.04*
	Unfavorable attitude	188 (3.12%)	298 (4.95%)			

Table 4. Multi-variable logistic regression showed factors associated with male involvement of infant care in Bibugn district, East Gojjam Zone, Amhara, Ethiopia 2023 ($n = 602$). * = Significant at p -value < 0.05 , &1 = Reference.

were more likely to be involved in infant care. After all, positive attitudes foster a nurturing environment that promotes healthy development and caregiving practices.

Strength and limitation of the study

Because this is a community-based study, the findings are highly inferable for the study area. The study's cross-sectional design is viewed as a limitation. The study was also susceptible to interviewer and recall bias. Furthermore, Socially desirable bias may be a limitation of this study.

Conclusion

The study reported that less than half (50%) of male were involved in caring for their infants. Factors related to male involvement in infant care were the husband's educational status, having a male infant, the number of infants, having adequate knowledge, and a favorable attitude towards infant care. Therefore, efforts to improve husbands' educational background, level of knowledge, and attitude towards infant care to encourage their involvement in infant care should be taken into account.

Overall, this study has the potential to be a very useful reference for midwifery care and education planners in low-income countries to promote male involvement in maternal and newborn care to reduce infant mortality and morbidity.

Data availability

All data included in the study can be obtained from the corresponding author at keralemante2010@gmail.com.

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Author contributions

Bisaw, T conceptualized the proposal, searched the literature, trained data collectors, and wrote the results and discussion sections. Bisaw, T also drafted the first manuscript. Bishaw KA, Bishaw T and Degu G contributed to the design of the study, data interpretation, and analysis. Bishaw, KA critically reviewed and edited the manuscript. All authors read and approved the final manuscript.

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Declarations

Competing interests

The authors declare no competing interests.

Additional information

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Correspondence and requests for materials should be addressed to K.A.B.

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