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Men's knowledge of preconception care in Southern Ethiopia: magnitude and associated factors

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Abstract

Background

Men play a crucial role in pre-pregnancy care, which is vital for women's empowerment, maternal health outcomes and men's own health. While women are often educated about preconception care, there is a lack of knowledge and research on men's awareness of preconception care throughout the world and especially in southern Ethiopia. This information is critical to effectively promote comprehensive preconception and antenatal health services in local urban communities in Ethiopia and likely other parts of East Africa.

Objective

The study was aimed to assess the magnitude of husbands' knowledge of preconception care and associated factors of knowledge among, married men in Arba Minch town, South Ethiopia, 2024.

Methods

The study was conducted in a community setting from February 10th to March 25th, 2024. A total of 422 husbands were selected for the study using a systematic random sampling technique. The data was gathered by trained BSc- level midwives using a structured and pre-tested questionnaire. Univariate, bi-variable and multivariable binary logistic regression analyses were utilized to determine the extent of preconception knowledge and the associated predictive factors. The associative factors are described/presented using odds ratio with a 95% confidence interval. A significant association was confirmed at a p-value of less than 0.05.

Results

The study included 415 participants, with a response rate of 98.3%. Among them, 62.9% (95% CI: 58.2–67.5) were found to have knowledge about preconception care. The research showed a positive association between the wife's education (AOR = 3.23, 95%CI: 1.67, 6.23), had no habit of smoking (AOR = 1.86, 95%CI: 1.05, 3.26), adequate daily meals consumption (AOR = 2.97, 95%CI: 1.63, 5.37), and not feeling lonely (AOR = 1.81, 95%CI: 1.17, 2.82).

Conclusion

The study revealed that nearly two-thirds of husbands had knowledge of preconception care. This knowledge was positively influenced by having a more educated wife, refraining from smoking, consuming adequate daily meals, and experiencing lower levels of loneliness. These findings underscore the importance of addressing educational, lifestyle, and psychosocial factors to enhance husbands' awareness of preconception care. Interventions aiming to strengthen community-based educational and lifestyle choices tailored should prioritize these key areas to promote better preconception health outcomes.

Contributions to the Literature

- Fills a significant need in reproductive health research by assessing men's understanding of preconception care in an urban East African context with low resources.
- Illustrates that paternal health literacy is significantly influenced by the educational attainment and psychological health of spouses, highlighting the crucial impact of familial relationships and social ties.
- Indicates that beneficial health practices, including sufficient daily eating and abstaining from smoking, are directly associated with enhanced preconception health consciousness in men.
- Delivers essential population health data to facilitate the shift of preconception policies from conventional women-focused frameworks to inclusive, couple-oriented community approaches in economically disadvantaged areas.

Introduction

Preconception care involves providing health interventions to women and couples before conception to improve their health and reduce adverse pregnancy outcomes. It includes risk screening, health promotion, and interventions as part of routine health care (1). Supporting women to make well-informed and well-considered decisions about their fertility and health, preconception care could contribute to the social and economic development of the families and communities. The greatest beneficiaries of preconception care are those women and couples of child bearing age in resource constrained settings and countries (2–5).

Men in developing countries often play a crucial role as decision-makers in reproductive matters. Their involvement in decisions related to pre-pregnancy care could have a positive or negative impact on women's empowerment and potentially lead to better maternal and neonatal health outcomes – and their own improved health. Despite the benefits of men's involvement in maternal healthcare, their participation in reproductive health matters remains low globally (6–8). However, studies indicate that the health of men themselves at the time of conception plays a crucial role in pregnancy and neonatal outcomes through factors such as obesity, passive/active smoking exposure (9), poor sleeping (10), hypertension, diabetes, STIs, anxiety, and risky behaviors like alcohol consumption, drug abuse, and smoking, and maintaining healthy lifestyle (11, 12). For example, men’s [and women’s] use of alcohol during pregnancy is associated with spontaneous abortions, stillbirth, preterm delivery, and sudden infant death syndrome (13), and has frequently been shown to result in lifelong disorders in children, such as fetal alcohol spectrum disorders (14). A study by Hallyburton and Evans (2014) found that males use the Internet more frequently than females, engaging in activities like gaming and entertainment browsing, while females focus more on communication and social networking (15). Reducing paternal smoking, anxiety; treating chronic illness and genital tract infections; and reaching a normal weight might all be necessary to substantially reduce the risk of preterm birth (9, 16). [Maybe omit sentence if not directed at men]

Research indicates that only about 50% of men are aware of key pre-conception health risk factors, most of which can be addressed prior to conception, such as cigarettes, diet intake, alcohol drinking, pre-existing health status, and age, could have serious consequences on the outcome of pregnancies (17). Educating men on pre-pregnancy care can lead to better pregnancy outcomes, planned pregnancies, and improved health for female partners (18); while neglecting to involve men in maternal health programs can hinder their success and effectiveness. Promoting preconception care for men can also provide an opportunity for male disease prevention and health promotion (19). Garfield (2018) emphasizes the importance of a comprehensive approach to men's preconception health to improve their overall well-being and to support them during their transition to parenthood (20). Various factors such as age, education level, chronic illness, marriage, income, and number of children have been found to be associated with men's awareness of pre-pregnancy care(17, 21).

In Ethiopia, the average time for the first antenatal care (ANC) visit is five months (22), which is considered late for addressing pregnancy risk factors (23), some of which are father/husband-influenced. Therefore, preventive interventions are crucial. In 2024, Ethiopia is in the fourth year of implementation of its five year Health Sector Transformation Plan (HSTP II, which is going to end in 2025. It focuses on high impact interventions of Reproductive, Maternal, Neonatal, Child, Adolescent and Youth Health (RMNCAYH) including a pilot women’s preconception initiative (24). This research paper explores the basis for an expansion of that preconception programmatic initiative to include greater paternal involvement.

As part of the Health Sector Transformation Plan, The National Preconception Care (PCC) guideline emphasizes making PCC services accessible to all segments of the population, including sexually active men. One of its priority areas is addressing men's non-communicable diseases (NCDs), particularly noting the high prevalence of hypertension in males (20.6%)(25). Men however are largely left out of policy discussions, as the language often leans towards being gender-neutral or focuses mainly on women. While a primary goal of Ethiopia's health policy is to improve and support women's health, it falls short in addressing the accessibility and inclusivity of services for men(26).

Research on men’s knowledge of preconception care (PCC) is limited, presenting an opportunity for innovative studies. Both men and women play a role in improving preconception health. Despite the lack of research in Ethiopia, understanding men’s awareness of PCC is crucial for developing comprehensive programs and policies to improve men’s preconception health. Therefore, the Aims of this research project is 1) to assess the magnitude of husband’s knowledge of preconception care and 2) to identify the factors associated with PCC knowledge, among, married men in Arba Minch town, south Ethiopia, 2024.

Methods

Design, period, and setting

The study was carried out in Arba Minch Town, Southern Ethiopia, from 10 February to 25 March 2024. Arba Minch is situated about 505 kilometers from Addis Ababa and serves as the administrative capital for Gamo zone in the South Ethiopia region. The town comprises 15 kebeles [lowest administrative unit] and has a total population of 140,314 individuals in 2024 local town report [unpublished data]. This population includes 68,876 males and 70,437 females and approximately 5777 were pregnant women; unmarred pregnant women accounted 19.4%. The potential study sample included all married males residing in Arba Minch town for a period of at least 6 months; participants older than 65 years were excluded

Sample Size Calculation and Sampling Technique

The sample size for the study was calculated using the single population proportion formula, assuming a 50% proportion of men with pregnant partners due to the lack of prior studies in Ethiopia. A 5% margin of error, 95% confidence interval, and 10% non-response rate were also factored in. Based on these parameters, the required sample size was 384, and after adjusting for non-responses, the final sample size was approximately 422 husbands' surveys. A randomized study sample for the entire Arba Minch town, consisting of fifteen kebeles, was selected to be surveyed. The number of households in each kebele was taken from the 2024 work plan of the town health office. The sample size for each kebele was determined proportionally based on the number of households within each kebele. Systematic sampling technique was used to reach the study unit in the kebeles. The sampling interval in each kebele was calculated by dividing the total number of households in the specific kebele by the allocated sample size (e.g., 4855/422), resulting in the need for every twelfth household to be surveyed. The first house was randomly selected in one location, and every 12th house in all kebeles was surveyed with the assistance of health extension workers. In cases where there was no husband or only a woman living in the selected house, a nearby house was surveyed.

Study Variables

Dependent variable

- Men’s knowledge of preconception health.

Independent variables

- Socio-demographic factor including: [Paternal and maternal] Age, Education status, Occupation, Religion, Number of children
- Self-reported Chronic illness including: Paternal Hypertension, diabetes, renal disease, heart disease, thyroid disease, syphilis, HIV, hepatitis, Chronic hypertension, Diabetes Mellitus, STI, Asthma, Epilepsy,

- Psychological factors include: Paternal Fatigue, Loneliness, Generalized anxiety disorder
- Self-reported assessment of the importance of preconception care for men's health, and the presence of a reproductive plan
- Husband self-reported involvement in reproductive matters including family planning choice and reproductive health checkups
- Health behaviors including: paternal daily meal frequency, sleep duration, non-vigorous exercise per week, Drinking Alcohol, and Smoking, and Self-reported health status:
- Internet access

Operational Definitions

Preconception health Knowledge: The husband's knowledge level of preconception care (PCC) was assessed using 13 specific questions. These items included: (1) whether men should be screened for medical conditions such as hypertension, diabetes, asthma, and epilepsy before conception; (2) the importance of screening men for familial diseases prior to conception; (3) whether healthcare providers should discuss preconception health care with men; (4) if it is beneficial for men to engage in physical activity with their spouse before pregnancy; (5) whether couples should be screened for infectious diseases like HIV, HBV, syphilis, and gonorrhea before conceiving; (6) the advisability of delaying pregnancy by 2 to 4 years between births; (7) whether men should encourage their spouses to receive vaccinations before conception; (8) the potential harm of exposure to cigarette smoke on a developing baby; (9) the importance of couples discussing reproductive plans before conception; (10) whether couples should visit healthcare providers before pregnancy; (11) the impact of environmental factors on pregnancy outcomes; (12) the effect of untreated health conditions on a couple's ability to conceive a healthy baby; and (13) whether women planning to conceive should take folic acid supplements to prevent birth defects. Each question had only one correct answer, and one point was given for each correct response, while incorrect responses received zero points. The total score was calculated by adding up the points from all questions, resulting in a score ranging from 0 to 13 points. Respondents who scored 50% or higher for the correct answers were considered to have "adequate knowledge," while those who scored below 50% were classified as having "inadequate knowledge."(17, 27, 28).

There were also questions used to assess the overall awareness of participants on men preconception health such as "have you ever heard about men's role in preconception health?" and "importance of preconception health".

Fatigue

it was measured by self- assessment, asking participants, "To what extent have you experienced fatigue in the past two weeks?" They could select from "never fatigued" (0), "occasionally fatigued" (1), and "almost always fatigued" (2). Responses of "1" and "2" were combined as "fatigued" and coded as "1", while "0" remained unchanged, resulting in a binary yes/no fatigue variable (32).

Loneliness

it was evaluated by a self-assessment of how frequently an individual reported feeling a lack of companionship and isolated from others. Response options included "Often" (2), "occasional" (1), and "never" (0); which were then grouped into "Yes" (1) and "No" (0) categories, with "often" and "occasional" responses combined into a single yes category (32).

Generalized anxiety disorder

Anxiety levels were measured using the Generalized Anxiety Disorder 7-item (GAD-7) scale (29). While the GAD-7 scale was not specifically validated for men's health, it was proven to be valid for Ethiopian university students and demonstrated reliability (α = 0.77) as a screening tool for antenatal anxiety (30). The reliability coefficient of the GAD-7 scale in our research was calculated to be 0.79. GAD-7 scores range from 0 to 21, with each item being scored from 0 (not at all) to 3 (nearly every day). In our investigation, a score of ≥ 5 was utilized as the threshold to classify married husbands as experiencing anxiety (31).

Sleep duration

it was evaluated by asking participants, "How many hours of sleep do you typically get per night on weekdays/weekends?" The options for response were "less than 6 hours" (0), "6–8 hours" (1), and "greater than 8 hours" (2). Responses "1" and "2" were combined and categorized as "adequate" (1), while "inadequate" (0) was used for less than 6 hours of sleep (32).

Cigarette smoking

it was determined by the question, "On a typical day, how many cigarettes do you smoke?" Occasional smoking was indicated as "Yes" (1), which was grouped with any amount of daily smoking, while "Never" was classified as "No" (0) in the analysis (32).

Alcohol drinking

The assessment of alcohol consumption was conducted by posing the question, "How often do you consume a beverage containing alcohol?" Individuals who indicated that they drink alcohol daily, described as "always," or those who consume it three or more times a week, referred to as "more often," were classified as "Yes" (1). Conversely, those who reported drinking less than three times per week, termed "occasional," or those who never consume alcohol, were classified as "No" (0) (32).

Adequate Minimum daily meal frequency

It was determined by asking participants, "How many meals do you typically eat in a day over the past two weeks?" Participants who reported eating at least three meals per day were coded as "Yes, adequate" (1), while those who ate fewer meals were coded as "No", inadequate (0)(33).

Self-reported physical exercise

it was assessed by answering an open ended question "how long a healthy man should do exercise per day/week." Those who reported engaging in a physical exercise for at least 150 minutes exercise per week or 30–60 minutes per day were re-coded as "adequate", whereas those who reported lower were re-coded as "inadequate" (34).

Husband participation in reproductive matters: it was self-assessed through two questions: "involvement in family planning decisions" and "attendance in reproductive health screenings", with response options for each being "Yes" and "No". The responses were then summed, with scores of 1–2 being reclassified as "Yes" (1) and the rest as "No" (0).

Data collection and data collection tool

Data was collected using Kobotoolbox using structured questionnaires prepared in English and translated to Amharic, and back to English for consistency. The tool was developed based on a review of existing literature and adapted to fit the local context (17, 27, 28, 32). The questionnaire was tested two weeks before data collection with 5% of the sample size, and necessary adjustments were made based on the test results. Regular supportive supervision and discussions took place during data collection. The principal investigator (KF) also conducted on-site checks and reviewed completed questionnaires. Four BSc holder data collectors and two MSc holder supervisors collected the data after two days training on how to use the application, and the meaning of each variable. The data collectors were clinical professionals who had experience on application based data collection.

Data processing and analysis

The data from the KoboCollect server was then exported to SPSS version 26 for analysis. First, Descriptive univariate statistics were conducted, and the findings were presented using tables, figures, and text to show the distribution of study variables. Second, bivariate analyses such were utilized to examine the relationship between the dependent preconception knowledge variable and the associated independent predictive variables, in order to select candidate variables for multivariable analysis. Third, Multivariate (logistic regressions) were used to calculate the most parsimonious model among the multiple independent study variables and the dependent outcome measure, All multivariate regression assumptions were then thoroughly examined, and no multicollinearity was found among the independent variables included in the model. The fitness of the models was evaluated using the Hosmer and Lemeshow goodness of fit test. A stepwise with reduction multivariable analysis method was conducted on variables with a p-value of less than or equal to 0.25. Variables in the multivariate analysis with a p-value of less than 0.05 were identified as predictors. Adjusted odds ratios, along with 95% confidence intervals, were calculated.

Results

Socio-demographic characteristics of study participants

Based on our sampling methodology and sample size estimates, a total of 422 individuals met the requirements for participation in this study. Out of those potential participants, 415 were considered/utilized for analysis. Three individuals declined to participate after three consecutive attempts of checking, while four were excluded because the data collector error in failing to fill in the information that determined the participants enrollment status. This resulted in a response rate of 98.3%.

The mean age of the participants was 44.9 years, with a standard deviation of 9.7 years. Among the study participants, 357 husbands (86%) were over the age of 35. The majority of the participants, 394 (94.9%), had received at least some formal education, and 375 (90.4%) were currently employed. Additionally, more than four out of five participants (81.9%) had at least five children. Those husbands who reported having internet access were 330 (79.5%) (Table 1).

Table 1
Socio-demographic characteristics of the study participants at Arba Minch town, south Ethiopia, 2024

Variables	Frequency (n = 415)	Percent (%)
Age of participant		
>=35 year	357	86
< 35	58	14
Religion		
Protestant	188	45.3
Orthodox Tewahido	148	35.7
Muslim	59	14.2
Catholic[a]	20	4.8
Educational status of the mother		
Educated	369	88.9
Not Educated	46	11.1
Educational status of the husband		
Educated	394	94.9
Not educated	21	5.1
Occupational status of mother		
Employed	331	79.8
Unemployed	84	20.2
Occupational status of husband		
Employed	375	90.4
Un employed	40	9.6
Number of children		
>=5 children	340	81.9
< 5 children	75	18.1
Internet access		
Yes	330	79.5
No	85	20.5

Preconception care awareness, information access, reproductive health participation, health behavior, and habits of study participants

In this study, the magnitude of preconception care knowledge among husband in Arba Minch town was 62.9% (95%CI: 58.2–67.5). Over three-quarters (78.3%) of the participants were aware of preconception care, with 410 (98.8%) recognizing the importance of men's health in preconception care.

Current (PCC) health promoting and health status of married husbands in Arba Minch town, Southern Ethiopia

In this study, 62.9% of men reported having a reproductive plan, and 87% participated in family planning decisions. Additionally, 83.4% reported they had at least one episode of taking part in reproductive health check-ups preceding the data collection, and 89.2% perceived their health status as healthy or better.

The respondent’s lifestyle factors were generally good: 87.5% reported sleeping at least six hours per night; 23.9% engaged in at least 150 minutes of exercise per week; 86.7% ate at least three meals daily; 53.7% did not consume alcohol; and 84.1% of men did not smoke. The prevalence of self-reported chronic conditions was relatively low; 13.3% reporting hypertension, 10.1% with diabetes, 6.3% with sexually transmitted infections (STIs), and 4.6% with asthma. Only 1.9% reported living with infectious diseases such as HIV or Hepatitis B. However, mental health indicators showed substantial elevation: 47.5% experienced regular fatigue, 36.1% reported feelings of loneliness, and 34.7% had generalized anxiety disorder (Table 2).

Table 2
the extent of PCC health behaviors and health Status in the Arba Minch 2024

Reproductive plan		
Yes	261	62.9
No	154	37.1
Participation on family planning choice		
Yes	361	87.0
No	54	13.0
Participation on reproductive health check-ups		
Yes	346	83.4
No	69	16.6
Self-Perceived health status		
Healthy	370	89.2
Not Healthy	45	10.8
Self-Perceived sleep duration		
>=6 hours	363	87.5
< 6hours	52	12.5
Self-Perceived exercise per week		
>=150 min	99	23.9
< 150 min	316	76.1
Meal frequency per day		
>=3meal	360	86.7
< 3meal	55	13.3
Drinking Alcohol		
Daily	15	3.6
Occasionally	223	53.7
Never	177	42.7
Smoking		
Yes	66	15.9

Reproductive plan		
No	349	84.1
Chronic hypertension		
Yes	55	13.3
No	360	86.7
Diabetes Mellitus		
Yes	42	10.1
No	373	89.9
Asthma		
Yes	19	4.6
No	396	95.4
Thyroid disease		
Yes	12	2.9
No	403	97.1
Renal disease		
Yes	6	1.4
No	409	98.6
Heart disease		
Yes	5	1.2
No	410	98.8
Epilepsy		
Yes	8	1.9
No	407	98.1
Living with infectious diseases (HIV, Hepatitis B)		
Yes	8	1.9
No	411	98.1
Fatigue		
Always	197	47.5
Sometimes	140	33.7

Reproductive plan		
Never	78	18.8
Loneliness		
Yes	150	36.1
No	265	63.9
Generalized anxiety disorder		
Yes	144	34.7
No	271	65.3

PCC Awareness and Knowledge of PCC

The study data collected highlights high paternal awareness of preconception care (PCC). A notable majority, 78.3%, reported awareness of PCC; and indicated a strong recognition of its importance: 71.1% rated it as "very important,".

Regarding medical screenings, an overwhelming 96.9% of respondents agreed that men should be screened for conditions such as hypertension, diabetes, asthma, and epilepsy before conception. Similarly, 93.5% believed that screening for familial diseases is essential prior to conception. The role of healthcare providers in discussing preconception health care with men was supported by 89.2% of participants.

Physical activity was also recognized as beneficial, with 91.3% agreeing that men should engage in exercise with their spouses before pregnancy. Additionally, 93.0% supported the idea that couples should be screened for infectious diseases prior to conception. The consensus on delaying pregnancy between two to four years before the next birth was strong, with 92.0% in favor of this approach

Vaccinations were deemed important by 88.0% of respondents who believed men should encourage their spouses to receive them before conception. Concerns about environmental factors affecting pregnancy outcomes were prevalent, with 69.2% acknowledging potential risks to fetal health. Furthermore, a significant majority (74.5%) recognized that untreated health illnesses could increase risks related to conceiving a healthy baby. Opinions on folic acid supplementation varied; while 28.7% supported its use by women planning to get pregnant, a considerable portion (44.3%) felt it was only necessary during pregnancy itself.

Overall, the PCC knowledge index indicated that 62.9% of participants had a good understanding of PCC principles, while 37.1% exhibited poor awareness (Table 3).

Table 3
Preconception care awareness and knowledge of study participants in Southern Ethiopia 2024

Variables	Frequency (n = 415)	Percent (%)
PCC awareness		
Yes	323	78.3
No	92	21.7
How do you rate importance of Men PCC assessment?		
Very important	295	71.1
Important	115	27.7
Less important	5	1.2
Should men be screened for medical conditions like hypertension, diabetes, asthma, and epilepsy before conception?		
No	6	1.4
For women only	7	1.7
Yes	402	96.9
Is it important for men to be screened for familial diseases before conception?		
No	19	4.6
Only necessary for women	8	1.9
Yes	388	93.5
Should healthcare providers discuss preconception health care with men?		
No	37	8.9
Only women need to receive	8	1.9
Yes	370	89.2
Is it beneficial for men to exercise and engage in physical activity with their wife **before pregnancy?**		
No	28	6.7
Important in pregnancy	8	1.9
Yes	379	91.3
Should couples be screened for infectious diseases like HIV, HBV, syphilis, and gonorrhea before conceiving?		

Variables	Frequency (n = 415)	Percent (%)
No	17	4.1
Only after conception	12	2.9
Yes	386	93.0
Is it advisable to delay pregnancy between 2 to 4 years before the next birth?		
No	22	5.3
Only less than a year	11	2.7
Yes	382	92.0
Should men encourage their spouses to get vaccinations before conception?		
Not important	39	9.4
Necessary after conception	11	2.7
Yes	365	88.0
Can exposure to cigarette smoke harm a developing baby?		
No effect	24	5.8
Little effect	19	4.6
It can harm fetus	372	89.6
Is it important for couples to discuss reproductive plans before conception?		
No	35	8.4
Only After conception	10	2.4
Yes	370	89.2
Should couples visit healthcare providers before pregnancy?		
No	17	4.1
Only needed for women	12	2.9
Yes	386	93.0
Do environmental factors affect pregnancy outcomes?		
No	52	12.5
Little impact	76	18.3

Variables	Frequency (n = 415)	Percent (%)
It can risk the fetus	287	69.2
Can untreated health illnesses impact a couple's ability to conceive a healthy baby?		
Do not influence outcome	42	10.1
Little impact	64	15.4
It increase risks	309	74.5
Should women planning to get pregnant take folic acid supplements?		
No	112	27.0
Only during pregnancy	184	44.3
Yes	119	28.7
Overall PCC knowledge index		
Adequate (7 or more)	261	62. 9
Inadequate (6 or less)	154	37.1

Study Aim 2: Factors associated with husband’s knowledge of PCC in urban district

All the potential independent measures were first assessed bivariately for their association with husband’s PCC knowledge. Significant variables included: Socio-demographic variables, such as both husband and wife occupation and education levels; Behavioral health variables, such as adequate daily meals, smoking status; and mental health variables, such as loneliness, and generalized anxiety disorder approached significance (Table 4).

Table 4
Bivariable outputs: Factors influencing husband's knowledge of PCC in urban district of southern Ethiopia 2024

Variables		Men PCC Knowledge		95% CI	P-value
		Yes (261)	No (154)	Crude Odds Ratio	
Loneliness	No	183	82	**2.06(1.36–3.11)**	**0.001**
	Yes Ref	78	72		
Adequate Daily meal	Yes	237	123	**2.48(1.40–4.42)**	**0.002**
	No Ref	24	31		
Smoking	No	229	120	**2.02(1.19–3.44)**	**0.009**
	Yes Ref	32	34		
Wife Education	Educated	244	125	**3.33(1.76–6.29)**	**0.000**
	Not-educated Ref	17	29		
Husband Education	Educated	254	140	**3.62(1.43–9.20)**	**0.007**
	Not-educated Ref	7	14		
Husband Occupation	Employed	242	133	**2.01(1.04–3.87)**	**0.037**
	Not-employed Ref	19	21		
Wife occupation	Employed	218	113	**1.83(1.13–2.98)**	**0.014**
	Not-employed Ref	43	41		
Access to internet	Yes	209	121	1.09(0.67–1.79)	0.714
	No Ref	52	33		
Self-reported daily sleep duration	>=6hours	231	132	1.28(0.71–2.31)	0.407

Variables		Men PCC Knowledge		95% CI	P-value
		Yes (261)	No (154)	Crude Odds Ratio	
	< 6hours Ref	30	22		
Self-reported physical exercise per week	>=150min	67	32	1.31(0.81–2.12)	0.259
	< 150 min	194	122		
History of child with birth defect	Yes	11	9	0.70(0.28–1.75)	0.456
	No Ref	250	145		
History of child loss	Yes	47	29	0.94(0.56–1.58)	0.834
	No Ref	214	125		
Number of children	>=5	214	47	1.01(0.60–1.69)	0.964
	< 5	126	28		
Pregnancy planning	Yes	102	52	1.25(0.83–1.90)	0.279
	No	159	102		
Self-reported Alcohol intake	>=3 times/week	11	4	1.65(0.516–5.27)	0.398
	< 3 times/week	250	150		
Self-reported Chronic Hypertension	Yes	34	21	0.94(0.52–1.70)	0.860
	No	227	133		
Self-reported Diabetes Mellitus	Yes	27	15	1.06(0.55–2.07)	0.844
	No	234	139		
Self-reported Asthma	Yes	12	7	1.01(0.39–2.62)	0.980
	No	249	147		
Self-reported Syphilis	Yes	17	9	1.12(0.48–2.58)	0.786

Variables		Men PCC Knowledge		95% CI	P-value
		Yes (261)	No (154)	Crude Odds Ratio	
	No	244	145		
Self-reported Fatigue	Fatigued	211	126		
	Non-fatigued	50	28	1.06(0.63–1.78)	0.806
Generalized anxiety disorder	Yes	82	62		
	No	179	92	1.47 (0.97–2.22)	0.068
Husband’s age	>=35 years	228	129	1.33(0.76–2.35)	0.309
	< 35 years	33	25		

Multivariate Results

Factors influencing husband’s knowledge of PCC in urban district of southern Ethiopia 2024

The final multivariate logistic model showed four independent factors positively associated with enhanced husband’s/men’s knowledge of PCC in urban district – two demographic factor - husbands who were married to educated women were more than three times more likely to be knowledgeable about preconception care compared to husbands married to uneducated women (AOR = 3.23, 95%CI: 1.67, 6.23) and individuals who consumed at three meals daily showed almost three times higher likelihood of having preconception care knowledge compared to those who had less than three meals per day (AOR = 2.97, 95%CI: 1.63, 5.37). In addition, one behavioral factor -husbands who had no habit of smoking were almost 2 times more likely to possess a higher level of preconception care knowledge compared to husbands who had smoking habit (AOR = 1.86, 95%CI: 1.05, 3.26); and one mental health variable - Participants who reported not feeling lonely were almost two times more likely to knowledgeable about preconception care compared to those who did experience loneliness (AOR = 1.81, 95%CI: 1.17, 2.82)(See Table 5).

Table 5
Identified Factors associated with husband's knowledge of PCC in urban district of southern Ethiopia 2024

Variables		Men PCC Knowledge		95%Confidence Interval	P-value
		Yes (261)	No (154)	Adjusted Odds Ratio	
Wife Education	Educated	244	125	3.23 (1.67–6.23)	0.000
	Not-educated Ref	17	29	1	
Adequate Daily meal	Yes	237	123	2.97(1.63–5.37)	0.000
	No Ref	24	31	1	
Smoking	No	229	120	1.86 (1.05–3.26)	0.031
	Yes Ref	32	34	1	
Loneliness	No	183	82	1.81(1.17–2.82)	0.008
	Yes Ref	78	72	1	
The full logistic model explained 12.6% (Nagelkerke *R2*) of the variance in husband preconception care knowledge and correctly classified 68% of cases overall. It has a significant predication performance (X^2= 40.15; *df = 4;p < 0.001)* and is a good fit (since Hosmer and Lemeshow Test could not reject the hypothesis of model appropriateness, Chi-square is 2.15 and *p = 0.912*.)					

Discussion

In low-income countries like Ethiopia, where there are high rates of negative reproductive outcomes for mothers and newborns, it is crucial to prioritize preconception health. This research, carried out in Arba Minch Town in Southern Ethiopia, aimed to determine 1) the magnitude of married men's knowledge of preconception health; 2) the factors that positively influenced PCC knowledge.

Our study revealed that 62.9% of the representative sample of married men participants in Southern Ethiopia urban townships exhibited a knowledge of preconception care (Aim 1). This level of PCC knowledge is generally consistent with the results reported by other studies (17, 27, 41). For example, Al-Akour et al. (2015), showing that over 58% of male participants acknowledged the significance of a woman's health before conception for the health of her child (17), and Ishak et al. (2021) documented that just over half of male participants had knowledge about preconception care for women (27).

A person's health knowledge is a crucial first step for performing desired health behaviors. Men are often unwilling and lack motivation to engage with health-related information, while women are more interested and active in seeking such information (42). Women also exhibit higher health consciousness

compared to men. Men appear more skeptical towards nutrition education messages, impacting daily meal frequency (43, 44). It is important for public health promotion and interventions to address the gender gap in health information behavior to ensure better health outcomes for both men and women.

Furthermore, in this study, a significant proportion of men (62.9%) indicated they had a reproductive plan. This is consistent with findings from previous literature, which emphasize the importance of planning in improving reproductive health outcomes.(45). For instance, studies have shown that couples who engage in reproductive planning are more likely to achieve desired health outcomes for both parents and children(46). Additionally, 87% of participants reported involvement in family planning decisions, echoing research that highlights the positive impact of male engagement in family planning on overall reproductive health(47).

The data also revealed that more than three fourth of men participated in reproductive health check-ups, which aligns with recommendations from health authorities advocating for regular health assessments as a means to enhance reproductive outcomes(48).

Mental health indicators such as experiencing regular fatigue, feelings of loneliness, and generalized anxiety disorder in this study were high. These mental health challenges are critical to address as they can significantly impact reproductive health and family planning decisions(47).

Overall, the findings suggest that while many men are aware of and engaged in PCC, there remain areas for improvement in lifestyle choices and mental health support to optimize reproductive outcomes.

The final multivariate logistic regression model identified four independent factors that were positively associated with husbands' knowledge of preconception care (PCC) in an urban district. These factors spanned demographic, behavioral, and mental health domains, underscoring the multifaceted nature of determinants that influence men's awareness of PCC. Husbands with educated wives, adequate daily meals, non-smoking habits, and a sense of social connectedness were more likely to have enhanced knowledge of PCC. Below are detailed interpretation and implication of this key factors.

Education has been well-established as a significant determinant of health literacy and knowledge(59). In this study, both husband and wife education levels were significantly associated with Men PCC Knowledge. However, in the final model, only the wife's education remained a significant predictor. This outcome suggests that the influence of a husband's education may be diminished when controlling for other factors more directly linked to the husband's knowledge, whereas the wife's education exerts a broader, more consistent influence on knowledge acquisition through its impact on family health dynamics and shared decision-making. This finding may be explained by the central role women often play in family health-related decision-making (60) and information-sharing practices (61). Educated women are more likely to seek out health-related information (62, 63). This dynamic may contribute to men's increased awareness of PCC, as observed in this study. While the study identified a significant relationship between wife's education and men's PCC knowledge, it does not imply that wife's education is more important than husband's education. Rather, it highlights the potential for educational

interventions targeting women to indirectly influence men's health literacy (64). Collaborative health promotion strategies that encourage shared decision-making and knowledge transfer within families may further enhance men's involvement in preconception care and broader family health planning (65).

Although husband education was associated with Men PCC Knowledge in bivariable analyses, its exclusion from the final model can be due to a significant amount of variance for the husband's education is explained by the wife's education, leading to redundancy in the model. The multicollinearity diagnostics indicate potential overlap between husband and wife education levels. If they are correlated, the model may prioritize the variable (wife education) that contributes more uniquely to the explanation of variance in Men PCC Knowledge.

In this study, the husband and wife's occupation also showed a significant association in the bivariate analysis, indicating that being employed may play a role in knowledge acquisition. The relationship between occupation and health knowledge is well-documented. Employment status can influence access to resources, including education and health information, which in turn affects knowledge acquisition.

Adequate nutrition is crucial for overall health, including reproductive health. Studies have shown that individuals who consume sufficient meal frequency are more likely to have better health outcomes and greater knowledge about health-related issues, including preconception health(50, 51). This is in agreement with the current study, where husbands who consumed at adequate meals daily showed a nearly three-times higher likelihood of having preconception care knowledge compared to those who had less than three meals per day. For instance, a study in Ethiopia highlighted that economic status and access to nutritious foods significantly influence health practices and knowledge among caregivers, which can extend to men's understanding of reproductive health(51). Sufficient meal consumption can positively influence preconception health by promoting better sperm quality and enhancing health knowledge among husbands (52). While this effect may be less pronounced in highly educated populations who have access to diverse health information sources, it underscores the importance of integrating nutrition education into public health strategies. Therefore, raising awareness about the importance of nutrition in preconception health through partnerships with local health organizations and community leaders is essential. Including nutrition counseling in antenatal care services and conducting nutritional assessments as part of routine screenings for men planning to become fathers can lead to healthier families and communities.

Non-smokers are often more health-conscious and proactive about their well-being, including perhaps preconception health(74), speculatively giving them a better access to health education resources and healthcare services, leading to increased awareness of preconception health guidelines.

Mental health issues were noticeably high among the men. Non loneliness or social engagement was associated with enhanced PCC knowledge. This study revealed that participants who reported not feeling lonely exhibited approximately two times more knowledge of preconception care compared to those who encountered loneliness. Individuals who are not lonely may be more socially engaged, which

can provide opportunities to access health information and resources through interactions with friends, family, and community members implicating better health literacy (55, 56). In addition, people who are not lonely often have stronger support systems, which can facilitate access to healthcare services and health education programs (57). Not feeling lonely is associated with better mental well-being, which can positively impact cognitive function and the ability to process and retain health-related information and it may also be linked to greater motivation to learn about health topics such as preconception healthcare (56, 58).

The study’s findings reveal the multifaceted nature of factors that shape men’s knowledge of preconception care. Wife’s education, sufficient meal consumption, non-smoking habits, and absence of loneliness each play a distinct role in enhancing men’s PCC knowledge. Addressing these factors through targeted educational campaigns, nutrition programs, smoking cessation initiatives, and strategies to reduce social isolation can improve men’s engagement in preconception care. These findings have significant implications for clinical practice and public health policies aimed at promoting family health and reproductive outcomes.

This study acknowledges several limitations that may influence the interpretation of its findings. Firstly, the reliance on self-reported data introduces the potential for biases such as recall bias and social desirability bias, which could affect the accuracy of participants' responses regarding their knowledge and practices. Despite efforts to address some of these limitations (especially the social desirability)—such as using clear language in the survey, pre-testing the instrument, random participation of sample from each small administrative units, and training data collectors—these measures may not fully eliminate the risks of bias or data collection errors. Secondly, while the survey items assessing preconception care knowledge demonstrated strong internal consistency, these items have not been previously validated within the Ethiopian context. This lack of prior validation raises concerns about the generalizability of the measured variables and the potential for positive respondent bias. Thirdly, the study's focus on married men may introduce sample selection bias, limiting the generalizability of the findings to broader populations, particularly younger, single men who are also relevant stakeholders in preconception health, especially considering partners of single pregnant women. However, to assess the credibility of our findings despite these limitations, we conducted a robustness analysis using socio-demographic variables such as age, number of children, husband's education, and occupation. The results of this analysis indicated that the key variables remained stable, suggesting that the main findings are likely robust to the potential biases introduced by these factors. While the study's primary focus on married men, while exclusion of the perspectives and knowledge of partners of single pregnant women, a potentially significant group, this limitation is somewhat mitigated by the robustness of our findings. While no significant difference was observed in men's preconception care knowledge by the number of children, occupation, education, and the relatively older age of the participants, potentially reflecting cultural norms around men's engagement in health, may still limit the applicability of findings to younger men. These limitations should be carefully considered when interpreting the study's results and highlight areas for future research.

The findings of this study have significant implications for public health, particularly in advancing preconception care (PCC) awareness and practices.

Implications for Aim 1: With PCC awareness at a relatively low 79%, and only 63% of individuals having a reproductive health plan, there is a clear need for broader community education. To address this gap, targeted educational programs should be developed to enhance the general public's understanding of preconception care, particularly focusing on men as active participants in family health. Raising awareness about the importance of PCC for both partners is crucial for fostering healthier family planning practices. These educational initiatives should be integrated into existing public health campaigns to maximize outreach and impact.

Implications for Aim 2: The positive correlation between education and increased knowledge of PCC underscores the need for tailored interventions that cater to individuals with varying levels of health literacy. Public health campaigns should promote smoking cessation and other healthy behaviors while emphasizing the importance of preconception health for both men and women. Moreover, community-based nutrition initiatives are essential to promote healthier eating habits among women of reproductive age, which is a key component of preconception care. Mental health is another important aspect of PCC, with the study highlighting the need for increased awareness and services to support mental well-being. To address this, mental health services should be incorporated into PCC education and service delivery, offering support for individuals who may experience feelings of isolation or stress related to family planning.

The integration of preconception health into the Ethiopian Health Sector Transformation Plan II is vital for aligning national strategies with local needs, ensuring that preconception health outcomes are systematically improved across the country.

To further advance PCC knowledge and practices, we recommend involving community leaders and organizations in program development to ensure cultural relevance and broader acceptance. Clear metrics for evaluating the effectiveness of educational interventions should be established, enabling the tracking of progress toward public health goals. Additionally, longitudinal studies are recommended to assess the long-term impact of these programs on health outcomes. Collaboration with key stakeholders, including governmental and non-governmental organizations, will improve the reach and sustainability of health education initiatives.

Based on the study's findings, a future research priority could be to explore how targeted interventions for different social classes, particularly those from lower socioeconomic backgrounds, can improve PCC knowledge and practices. Future research could also examine the effectiveness of integrating mental health support and behavior change interventions (such as smoking cessation) into PCC programs. By focusing on both knowledge enhancement and behavioral change, these studies could provide valuable insights into developing comprehensive PCC programs that meet the diverse needs of the population.

Conclusion

The finding that 62.9% of participants demonstrated knowledge of preconception care is encouraging, suggesting a heightened awareness of this critical health area but also much room for even greater community awareness. The findings of this study underscore the critical role that specific psychosocial and educational factors play in shaping Men PCC Knowledge.

A man with emotional stability and strong social connections is better equipped to build meaningful preconception care (PCC) knowledge, creating a stable foundation for improved reproductive outcomes. Strengthening these connections through initiatives like men's health clubs, fatherhood peer networks, or inclusive counseling sessions can empower men with the knowledge and confidence to actively participate in PCC and family health.

Good nutrition nourishes both the body and the mind, enhancing men's ability to absorb and apply health education. Sustained efforts to promote dietary adequacy, such as through health awareness campaigns or community-based nutrition sessions, can nurture a receptive mindset in men, planting the seeds of awareness for better reproductive outcomes.

Avoiding smoking not only supports better physical health but also clears the way for sharper focus and judgment. Programs aimed at smoking cessation, framed as essential for family well-being, can help men make informed decisions about their role in PCC, ensuring they contribute effectively to family health.

Education, particularly for women, acts as a guiding light for families, helping to align both partners on shared health goals. Access to education for both men and women fosters strong collective decision-making, illuminating the path to better PCC knowledge and healthier families. By prioritizing education, social connection, nutrition, and smoking cessation, these recommendations offer a clear, actionable approach to empowering men in their reproductive health roles.

Abbreviations

AOR
Adjusted Odds Ratio
STI
Sexually transmitted infections
CI
Confidence Interval
HIV
Human Immunodeficiency Virus
OR
Odds Ratio
PCC
Preconception Care
PI

Principal Investigator
SPSS
Statistical Package for Health sciences

Declarations

Data Availability

The dataset produced or examined in the present study is not accessible to the public as the papers utilizing this dataset have not yet been published. However, interested individuals may obtain the dataset from the corresponding authors upon making a reasonable request.

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Authors Contributions

The study was conceptualized by K.F and M.K. throughout the study processes, supervision was provided by S.L, H.G, H.A, and K.A. K.F conducted the investigation and formal analysis of the data, with support from E.W. The original draft of the manuscript was prepared by K.F, M.K, and EW. All authors participated in reviewing and editing the manuscript. The final manuscript was read and approved by all authors.

Ethics approval and consent to participate

The research received approval from the institutional research ethical review board at Arba Minch University College of Medicine and Health Sciences, following the Declaration of Helsinki. Prior to data collection, an official letter of permission was acquired from the Kebele administration. Study

participants were briefed on the study's objectives before obtaining written informed consent. Data confidentiality was maintained through coding, and all procedures adhered to both international and local ethical research standards.

Consent for publication

Not applicable

Clinical trial number

Not applicable.’

Competing interests

The authors have no conflicts of interest to declare.

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