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Comparison of Health Service Utilization and Determinants between Insured Women and Uninsured Women in the Sidama Region, Southern Ethiopia: A Multilevel Analysis

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Abstract

Background: In Ethiopia, the community-based health insurance (CBHI) initiative was established to address financial risk protection and enhance healthcare accessibility, particularly for vulnerable populations like women.

Aim: This study compared healthcare utilization and determinants between insured women and uninsured women in the Central Zone of Sidama Region, Ethiopia.

Methods: From January 19th to February 20th, 2024, a community-based comparative cross-sectional design was employed to collect data from 1,280 women (640 CBHI members and 640 non-members) utilizing the multistage sampling technique. Data collection involved structured face-to-face interviews conducted using the KOBO Tool, focusing on healthcare utilization and related factors.

Findings: The analysis result revealed that CBHI membership was associated with a 77% higher frequency of health facility visits compared to non-members (APR = 1.77, 95% CI: 1.52 to 2.06). Key factors associated with health facility visits among CBHI members were age (APR = 1.01, 95% CI: 1.01-1.02), woman's educational level (APR = 1.3, 95% CI: 1.09-1.54), rural area of residence (APR = 0.73, 95% CI: 0.58-0.93), increased satisfaction with health services (APR = 1.04, 95% CI: 1.03-1.04), longer waiting times (APR = 0.68, 95% CI: 0.55-0.84), higher community-level literacy (APR = 1.75, 95% CI: 1.45-2.12), and lower community-level poverty (APR = 1.33, 95% CI: 1.08-1.64) were associated with frequent healthcare visits.

Whereas for non-CBHI members women age (APR = 1.02, 95% CI: 1.01–1.03), rural area (APR = 0.63, 95% CI: 0.46–0.87), and lower community-level poverty (APR = 2.36, 95% CI: 1.64–3.39) and waiting times (APR = 0.39, 95% CI: 0.30–0.49) were associated with frequency health facility visits.

Conclusions: The study's findings provide valuable insights. Addressing challenges related to rural areas, waiting times, educational levels, community-level literacy, and poverty could enhance healthcare access and utilization, ultimately leading to improved health outcomes, especially among women.

Keywords: Community-based health Insurance; Healthcare; Utilization; Determinants; Negative binomial; Multilevel; Women; Ethiopia

Background

Access to healthcare is a basic human right important for human well-being. This right is embedded in various multilateral treaties, including the Universal Declaration of Human Rights and the International Covenant on Economic, Social, and Cultural Rights [1,2]. The right to healthcare includes essential components like availability, accessibility, acceptability, and quality, all vital for ensuring universal health coverage [2]. Availing quality health services should be safe, effective, people-centered, timely, equitable, integrated, and efficient [3].

Despite international efforts to improve healthcare access, many developing nations face barriers to achieving the goal of universal health coverage. The barriers include insufficient health infrastructure, shortage of trained workforce, and financial constraints [4]. Inadequate healthcare infrastructure includes a lack of well-equipped healthcare facilities and essential medicines, which hinders access to basic healthcare services. Additionally, a shortage of trained workforce amplified particularly in rural and underserved areas, further, this could exacerbate the problem [5].

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Additionally, literature has identified several determinants of healthcare service utilization. These include socio-demographic factors such as gender, area of residence, marital status, literacy level, occupational status, family size, presence of children under five and elders in the household [6]. Likewise, economic factors, such as the average monthly income of households, also play a significant role in healthcare utilization [7].

Besides, healthcare access-related factors, such as the nearest health institution, time taken to reach health institution, presence of road for transportation, and availability of ambulance services are also important predictors of healthcare utilization [8]. Moreover, health perception and healthcare need-related factors, such as the presence of chronic illness in the household and attitude towards the CBHI scheme, have been identified as significant determinants that could affect healthcare utilization in a community [9].

On the other hand, financial constraints can also play a significant barrier to healthcare access and utilization. In many low-income countries, out-of-pocket payments often lead to financial burdens, affecting the need for sustainable healthcare financing mechanisms [10]. High costs of healthcare services, including consultation fees, diagnostic tests, and drugs can inhibit people from seeking timely health attention, leading to delayed diagnosis and care for health conditions [11].

The Sustainable Development Goals, particularly Goal 3, aimed to ensure healthy lives and promote well-being for all, targeting universal health coverage by 2030 [12]. As nations strive to expand healthcare coverage, they face structural challenges that impede progress. Community-based solutions, such as community-based health insurance (CBHI), have emerged as an alternative option to improve healthcare accessibility and affordability among the poorer segment of the population [13]. Hence, the CBHI scheme aimed to pool and generate financial resources to share risks among community members, consequently reducing the financial burden of health costs and improving access to essential health services in targeted communities [14].

Studies have revealed that CBHI membership can improve health service utilization. For instance, a study conducted in Ethiopia depicted that households enrolled in CBHI increased their health service utilization by 6.9 percentage points compared to non-CBHI members [15]. Another study done in the East Wallaga Zone of Oromia region, Ethiopia, showed that 60.5% of insured households used health services in the previous six months, compared to 45.9% of non-insured households [16].

On the other hand, successful implementation of CBHIs requires tackling challenges such as low enrollment rates, improving healthcare delivery, and ensuring its long-term sustainability [17]. Factors like lack of awareness about the benefits of CBHI, loss of trust in the scheme's management, and unaffordability of premiums can lead to low enrollment rates [14]. Therefore, ensuring the long-term viability of the CBHI program requires sustainable funding sources, an efficient management system, members' trust, and continuous monitoring and evaluation of the program to overcome emerging challenges [17].

For example, research in Ethiopia has identified the influence of socio-demographic and economic factors on CBHI enrollment and healthcare utilization, emphasizing the need to address the CBHI scheme to better serve the needs of women in the Sidama region [18]. Women often face unique barriers in seeking healthcare services, such as limited decision-making power, financial dependence, and constraints, as well as cultural norms that prioritize men's healthcare needs [19]. Understanding these specific barriers faced by women in the Sidama region is vital to designing targeted measures so as to improve access to healthcare.

In addition, in the southern part of Ethiopia, a substantial knowledge gap exists in the current research on healthcare utilization among community-based health insurance (CBHI) members. This gap is particularly pronounced in the methodologies used, as most studies rely on conventional regression models that fail to capture variations across different analytical levels, such as individual versus community levels [20,21]. This limitation hinders our understanding. of how factors at various levels interact to influence healthcare utilization among CBHI members and restrict the identification of detailed relationships between variables.

Another critical knowledge gap concerns the perspectives of women within households. Existing studies have primarily focused on the household level, inadvertently marginalizing women's experiences and views related to gender dynamics in healthcare utilization among CBHI members [22]. This oversight has resulted in a lack of information about how gender-specific factors affect healthcare utilization patterns among women of the CBHI members [23].

These gaps underscored the need for future research that incorporates sophisticated methodologies and perspectives, especially those related to gender differences and their impact on healthcare access and utilization behaviors. Therefore, this study investigated healthcare utilization and determinants between insured & uninsured women in the Sidama region, Ethiopia.

By addressing the knowledge gap on health service utilization determinants among CBHI members and non-member women in the Sidama region, studies aimed to contribute to universal health coverage and the Sustainable Development Goals [24]. Further, the findings will guide the development of targeted interventions to enhance healthcare access and quality for women in the Sidama region, ultimately leading to improved health outcomes for women and their families. Policymakers and program managers can also use the findings to design effective interventions that address the unique needs and barriers faced by women in accessing healthcare services, thereby contributing to the overall well-being of the population in the Sidama region.

Methods

Study area

The study was conducted in the Central Zone of Sidama region, Ethiopia. The Central Sidama Zone consists of six districts and one town administration, with a total population of 956,967 (2016 EFY) [25]. The study sites, Dale Woreda and Yirgalem City administration are located approximately 45 km south of the regional capital, Hawassa, and 320 of Addis Ababa, the capital of Ethiopia [26].

The community-based health insurance (CBHI) program was originally introduced in Ethiopia in 2011 at 13 sites, with Yirgalem

City being one of them [27]. Yirgalem Hospital is known for being the home in addition to the Arbaminch Hospital where an innovative healthcare financing program was initiated as well it was one the first modern health institutions established in the region [28]. Determining the factors influencing healthcare utilization among CBHI members is made possible by the decision to assess the program in this particular area, with a focus on women. As so, this study offers important perspectives and insightful lessons for future work.

Study design and period

A community-based comparative cross-sectional study design was employed between January 19th and February 20th, 2024.

Source and study population

The study population was women aged 18 years and older residing in Dale Woreda and Yirgalem city administration in Sidama region, Ethiopia, both CBHI members and non-members. For the exposed group, women 18 years and older who are enrolled in CBHI were selected from *kebeles* within Dale Woreda and Yirgalem city administration. Meanwhile, for the unexposed group, women 18 years and older who were not enrolled in CBHI were selected from different households but from the same *kebeles* of Dale Woreda and Yirgalem City administration.

Inclusion and exclusion criteria

Participants' eligibility criteria include women aged 18 years and older who were both enrolled in CBHI and not enrolled. In households with polygamous marriages or where the mother was deceased and the father resides with a daughter aged 18+, the interview respondent was decided by the husband (household head). Households that have begun contributing premiums to CBHI but are not yet able to utilize health services were also considered non-members.

Sample size determination

The sample size was obtained using OpenEpi, Version 3.05.07, by considering a study conducted on "Community-based health insurance service utilization and associated factors in Addis Ababa, Ethiopia" [29]. The sample size calculation for this study was based on the following assumptions of the two population proportions; these were a 95% confidence interval, 80% power, a 1:1 ratio of exposed to unexposed, an outcome proportion of 67.35% among the unexposed group, and 55.58% among the exposed group, a design effect of 2, and a 10% non-response rate. Considering these assumptions, the maximum required sample size obtained for this particular study was 1,280 study participants (women), consisting of 640 CBHI members and 640 non-members.

Sampling procedure

A multi-stage sampling technique was applied to obtain the desired sample size. The estimated sample was proportionally allocated to Dale Woreda and Yirgalem city administration. Then, a total of 14 *kebeles* were drawn from Dale woreda (one urban and eight rural kebeles) and Yirgalem city administration (two urban and three rural) using a simple random technique. The total number of non-member households from each *kebele* was either obtained from the respective *kebele* or recorded in a separate sheet as non-members to CBHI in case of list absence. There was a total of 8,646 non-CBHI member households in the 14 *kebeles* at the time of data collection.

During the second stage, from the total number of 7,472 CBHI member households, 640 CBHI members were randomly selected from the CBHI registry. Similarly, 640 non-member households were randomly selected from each *kebele* until these number was obtained from the list. Data collectors contacted study participants (women) for the final interview.

When a woman was absent at home during data collection, data collectors made a maximum of three visits to the household before dropping the woman from the interview. When selected households lacked study participants drawn by simple random technique, women from the next household were included. If the selected household has an eligible participant, the interview continued.

Study variables

The outcome variable of interest is the frequency of health services utilization among women who were either CBHI members or non-members. Health services utilization was measured as the number of outpatient and inpatient healthcare visits made in the previous twelve months to a health facility. This was reported by the study participants at the time of the interview. Outpatient visits include trips to a health post, health center, clinics, or hospital for health care, while inpatient visits refer to overnight health center or hospital stays for healthcare and medical treatment [30].

The independent individuals and community-level variables were age, marital status, family size, religion, area of residence, household head, level of education, membership status, wealth index, distance to healthcare facility, decision-making at household, waiting times at healthcare facility, satisfaction level, community level women autonomy, community level women literacy, and community level women poverty.

Data source

The data sources for this study were women aged 18 years and above, households of CBHI members, and non-members at the time of data collection from the study areas. The details of the study variables measurement are provided in Supplementary File 1.

Data collection tool and procedure

The data collection tool was adapted from previous studies conducted elsewhere [16,20,31-41] and the questionnaire was provided as Supplementray File 2. In addition, before the data collection, the study team conducted a pilot test. From the pilot test, we identified and rectified some coding errors, labeling errors, and enhanced certain questions and responses.

Additionally, we incorporated the revisions, and feedback from supervisors, data collectors, and study participants to improve the quality of the study tools. Twenty-eight data collectors, who held bachelor's degrees, were trained and conducted face-to-face interviews using the ODK mobile application. Furthermore, the data collection process was supervised by five experienced supervisors, all of whom held master's degrees in public health. The collected data were then exported to Stata version 17 for further analysis.

To ensure data quality the study team (principal investigator, supervisors, and data collectors) implemented several quality control measures. These measures were training and pre-testing of

data collectors, re-interviews, and daily data checks to identify and correct any errors, such as issues with labeling, incomplete answers, or formatting of some questions. Consequently, these steps helped to maintain and improve the quality of this study work.

Statistical methods

Before conducting data analysis, variable recoding, computations, and categorizations were performed. Consequently, for categorical variables, summary measures were expressed as absolute frequencies and percentages. In contrast, for continuous variables, the mean with standard deviation (SD) was used as a descriptive measure [42].

The wealth index was computed using principal component analysis (PCA) as a combined indicator of living standards. It was based on 42 questions related to ownership of selected household assets like house ownership, construction materials, number of rooms, agricultural land size, presence of livestock, cooking fuel types, and possession of improved sanitation and water facilities [43].

To estimate the adjusted prevalence ratios with 95% confidence intervals (CIs) for the associations with the outcome of interest, a multilevel negative binomial model was used. This model was preferred over multilevel poison regression as there was overdispersion observed with the data where variance was greater than the mean [44].

Before conducting a multilevel analysis, the need was examined by employing a random intercept model of a multilevel-negative binomial model. This model also generated the Intraclass Correlation Coefficient (ICC) by ensuring the necessity of a multilevel model. As the ICC value exceeded 5%, the multilevel analysis model became essential [45].

Additionally, in the multivariate analysis model, variables with p-values < 0.25 from bivariable analysis were included, along with variables supported by literature, to account for potential confounding [46]. Moreover, effect modification was evaluated by sequentially introducing interaction terms. Similarly, multicollinearity among independent variables was checked using multiple linear regression with a variance inflation factor threshold of < 5 [47].

To account for the hierarchical nature of the data and reduce potential standard error underestimation using the ordinary models, based on the preliminary analysis, a multilevel model was recommended [48]. Furthermore, to evaluate the fitness of a multilevel model, four models were assessed and evaluated.

These were; Model 0 (empty model), Model 1 (with only individual-level variables), Model 2 (with only community-level variables), and Model 3 (with both individual- and community-level variables). The summary of the models fitted in this study was described below (Tables 5 & 6). Finally, a statistically significant association was determined using adjusted prevalence ratios (APRs) with 95% CI with P < 0.05 between independent and dependent variables.

Results

The data in Table 1 describes the demographic and socioeconomic characteristics of the study respondents. It showed that 775 (60.5%) resided rurally, while 505 (39.5%) lived in urban areas. Additionally, 1143 (89.3%) identified as Protestant, with 137 (10.7%) following other religious categories. Ethnically, 1221 (95.4%) were Sidama, and 59 (4.6%) belonged to other ethnic categories. At the individual level, 726 (56.7%) had attended formal education, while 554 (45.2%) did not. Furthermore, 710 (54.8%) were autonomous women, and 579 (45.2%) were not (Table 1).

The majority of study participants were married, 1197 (93.5%), while 83 (6.5%) were from other categories. The mean age of the women was 34.69 years, while the standard deviation was 9.97 years. In addition, the mean family size of the households was 4.88 members, whereas the standard deviation was 1.44 members (Table 1).

On the other hand, 1129 (88.2%) of the households were headed by men, while 151 (11.8%) had female household heads. Regarding access to healthcare, 1030 (80.5%) of the women lived far from health facilities, and 250 (19.5%) lived near health facilities. Concerning waiting times at health facilities, 816 (63.7%) of the study participants received services waiting beyond the standard time, while 464 (36.3%) received services within the standard time (Table 1).

In terms of community characteristics, 657 (51.3%) of the women lived in literate communities, while 623 (48.7%) of the women lived in

Table 1: Sociodemographic and economic characteristics among women of CBHI members and nonmembers in the central zone of Sidama region, Ethiopia, 2024 (n=1,280).

Variables	Categories	N	%
Residence	Urban	505	39.5
	Rural	775	60.5
Recorded religion	Protestant	1143	89.3
	Others	137	10.7
Recoded ethnic group	Sidama	1221	95.4
	Others	59	4.6
Wealth index	Lowest	262	20.5
	Second	247	19.3
	Middle	276	21.6
	Fourth	300	23.4
	Highest	196	15.2
Community-level women's literacy	Illiterate	623	48.7
	Literate	657	51.3
Community-level women's autonomy	Not autonomous	633	49.5
	Autonomous	647	50.5
Recoded education	Not attended formal education	554	45.2
	Attended from education	726	56.7
Women autonomy	Un autonomous	579	45.2
	Autonomous	710	54.8
Recoded_marital_ status	Married	1197	93.5
	Others	83	6.5
Employment	Employed	760	59.4
	Not employed	520	40.6
Community-level women's poverty	High	356	27.8
	Low	924	72.2
Household head reported by women	Male	1129	88.2
	Female	151	11.8
Distance to a health facility	Near to health facility	250	19.5
	Far to a health facility	1030	80.5
Waiting times	Received in standard time	464	36.3
	Received beyond the standard time	816	63.7
Health institutions visited	Governmental health facility	450	72.8
	Private health facility	123	19.8
	Nongovernmental health facility	43	6.9
	Traditional healers	3	0.5

illiterate communities. Moreover, 647 (50.5%) of the women lived in autonomous communities, while 633 (49.5%) of the women lived in less autonomous communities. Concerning community-level poverty, 924 (72.2%) of the women were living in low-poverty communities, whereas 356 (27.8%) of the women were living in high-poverty areas (Table 1).

Table 1. Sociodemographic and economic characteristics among women of CBHI members and nonmembers in the central zone of Sidama region, Ethiopia, 2024 (n=1,280)

*In recoded religion others means Orthodox, Catholic, Muslim, and Traditional

*In recoded ethnic groups others means Amhara, Wolaita, Gurage, Siltie, and Oromo

*In recoded marital status others means Never married, living together, Divorced or Separated, and Widowed.

On the other hand, the figure below illustrates the frequency of health facility visits for member and non-member women. Accordingly, healthcare utilization among women who are CBHI members was 368 (57.5%), while utilization among women who are non-members was 253 (39.5%). Whereas, 272 members and 387 nonmembers did not visit healthcare facilities. As health facility visits increased, total healthcare visits decreased for both groups. In the "first visit" category, members made 131 visits, compared to 106 for nonmembers. The decline was sharper for non-members. For example, in the "six visits" category, members had 11 visits, whereas nonmembers had only 5. Overall, the figure indicated that members more frequently visited health facilities than nonmembers, as shown by higher visit counts across all categories (Figure 1).

Random model information

For women who were not members of community-based health insurance (CBHI), the intraclass correlation coefficient (ICC) at the *kebele* level was 0.22 (95% CI: 0.08, 0.41) (Table 2). This indicated that 22% of the total variance in the frequency of health facility visits could be explained by the clustering effect at the *kebele* level. Inconsistent with this, for CBHI members (CBHI), the ICC value at the *kebele* level was much lower, at 0.15 (95% CI: 0.06, 0.30). This implied that 15% of the total variance in the frequency of health facility visits was attributable to the clustering effect at the *kebele* level.

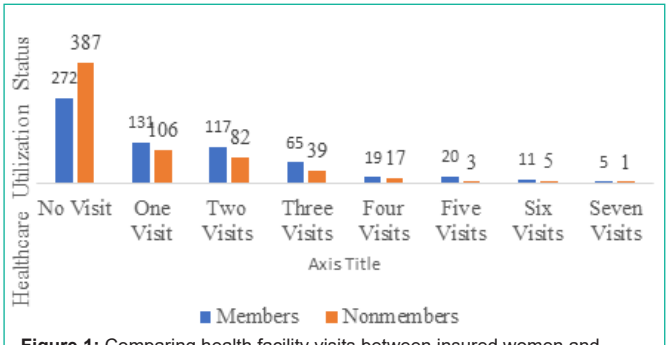

Figure 1: Comparing health facility visits between insured women and uninsured women, central Sidama zone, southern Ethiopia, 2024 (n=1,280).

Table 2: The intraclass correlation coefficient among women of the CBHI members and nonmembers in the central Sidama zone, Sidama region, Ethiopia (n=1,280).

Level		ICC	Std. Err	(95% confidence interval)
Kebele level	Members	0.15	0.06	0.07, 0.30
	Nonmembers	0.22	0.08	0.10, 0.41

This substantial difference in the ICC values between the two groups indicated that CBHI membership was associated with a reduction in the unexplained variance in the frequency of health facility visits at the *kebele* level. The relatively narrow confidence intervals, coupled with the standard errors, revealed a reasonably precise estimation of the ICC, necessitating the rationale for employing a multilevel analysis The multilevel negative binomial analysis identified several determinants associated with the frequency of healthcare utilization among women (640) CBHI members (Table 3). Several individual- and community-level variables were significantly associated with healthcare visits.

Firstly, age emerged as a crucial determinant of healthcare utilization. Specifically, the study found a positive association between age and the frequency of healthcare visits, with an adjusted prevalence ratio (APR) of 1.01 (95% CI: 1.01–1.02, p = 0.001). This indicated that for every year a woman aged, there was a corresponding 1.2% increase in the frequency of her health facility visits. Furthermore, the place of residence played a substantial role. Women residing in rural areas had a markedly lower frequency of health facility visits compared to their urban counterparts. Specifically, rural female residents exhibited a 26.3% reduction in the frequency of healthcare visits (APR: 0.74, 95% CI: 0.58–0.93, p = 0.011) (Table 3).

Additionally, education was another significant factor. Women who possessed the ability to read and write demonstrated a notably higher frequency of health facility visits compared to those who did not attend formal education. Consequently, literate women had a 30.0% higher frequency of healthcare visits (APR: 1.30, 95% CI: 1.10–1.55, p = 0.003) compared to those who did not attend formal education (Table 3). Moreover, the study highlighted the issue of waiting times at health facilities. Women who experienced waiting times beyond the standard duration showed a significant reduction in their frequency of healthcare visits. As a result, extended waiting times were associated with a 32.0% lower frequency of health facility utilization (APR: 0.68, 95% CI: 0.55-0.84, p<0.001). Interestingly, CBHI member satisfaction emerged as a positive influencer of healthcare utilization among women. Accordingly, each unit increase in member satisfaction was associated with a 4% increase in the frequency of health facility visits among CBHI member women (APR: 1.04, 95% CI: 1.031-1.04, p<0.001) (Table 3).

Community-level factors also played a significant role in shaping healthcare utilization patterns. The study found that women living in communities with higher literacy levels exhibited a substantially higher frequency of health facility visits. Specifically, women who lived in literate communities showed a 76% higher frequency of visits compared to less literate communities (APR: 1.76, 95% CI: 1.46-2.12, p<0.001) (Table 3).

Additionally, the economic status of the community emerged as an influential factor. Women residing in low-poverty communities exhibited a 33% higher frequency of health facility visits compared to those in communities with higher poverty levels (APR: 1.33, 95% CI: 1.08-1.64, p = 0.008) (Table 3).

Table 3: Determinants of frequency of healthcare utilization among women of CBHI members in the central zone of Sidama region, Ethiopia, 2024 (n=640).

Variables	Categories	CPR (95% CI)	APR (95% CI)
Age in years		**1.01 (1.005-1.02)**	**1.01 (1.005-1.02)**
Family size		1.04 (0.97- 1.11)	1.02 (0.97- 1.08)
Satisfaction		**1.04 (1.04-1.05)**	**1.04 (1.03-1.04)**
Residence	**Urban**	**1**	**1**
	Rural	**0.59 (0.45-0.77)**	**0.74 (0.58-0.93)**
Wealth index	Lowest	1	1
	Second	0.81 (0.58- 1.11)	1.10 (0.84-1.42)
	Middle	0.73 (0.58- 1.01)	0.87 (0.67-1.13)
	Fourth	1.06 (0.78-1.46)	1.02 (0.98-1.31)
	Highest	1.03 (0.76- 1.40)	1. 05 (0.82-1.34)
Community-level women's literacy	**Illiterate**	**1**	**1**
	literate	**1.84 (1.50-1.26)**	**1.76 (1.46-2.12)**
Community-level women's autonomy	Not autonomous	1	1
	Autonomous	0.90 (0.55-1.53)	1.18 (0.80-1.73)
Community-level women's poverty	**High**	**1**	**1**
	Low	**2.34 (1.85- 1.97)**	**1.33 (1.08-1.64**)
Employment	Employed	1	1
	Not employed	1.08 (0.84-1.38)	1.08 (0.88-1.31)
Distance to a health facility	Near to health facility	1	1
	Far to a health facility	0.54 (0.45-0.65)	0.97 (0.82-1.15)
Waiting times	**Within standard time**	**1**	**1**
	Beyond standard time	**0.35 (0.28-0.43)**	**0.68 (0.55-0.84**)
Household head	Male	1	1
	Female	0.91 (0.69-1.20)	0.91 (0.66-1.24)
Recoded education	**Do not read and write**	**1**	**1**
	Read and write	**1.11 (0.91-1.36)**	**1.27 (1.06-1.52)**
Recoded marital status	Married	1	1
	Other Categories	1.04 (0.73-1.47)	1.20 (0.86-1.66)
Women autonomy	Not autonomous	1	1
	Autonomous	0.98 (0.76-1.27)	0.88 (0.69-1.13)

Additionally, the multilevel analysis using a negative binomial model revealed individual and community-level factors associated with the frequency of healthcare utilization among women (640) of non-CBHI members (Table 4).

Age was a significant factor for non-CBHI members. The study found a positive association between age and frequency of health facility visits, with an APR of 1.02 (95% CI: 1.003–1.03, p = 0.015). Thus, every year a woman aged, there was a corresponding 1.5% increase in the frequency of health facility visits. Likewise, the area of residence played a substantial role for non-CBHI members. Women residing in rural areas had a markedly lower frequency of health facility visits compared to their urban counterparts. Specifically, rural woman residents exhibited a 37% reduction in health facility visits compared to urban women (APR: 0.63, 95% CI: 0.46–0.87, p = 0.005) (Table 4).

Furthermore, the study highlighted the influence of waiting times for non-CBHI members. Women who experienced waiting times beyond the standard duration showed a reduction in their frequency of health facility visits. Consequently, extended waiting times were associated with a 61% lower frequency of health facility visits (APR: 0.39, 95% CI: 0.30-0.50, p<0.001) (Table 4).

Finally, community-level factors, particularly the poverty status of a community, emerged as a statistically significant factor for non-CBHI members. Women residing in low-poverty communities demonstrated a higher frequency of health facility visits compared to women who were residing in higher-poverty areas. Low-poverty communities showed a 2.36 times higher frequency of healthcare visits compared to their counterparts (APR: 2.36, 95% CI: 1.64-3.39, p<0.001) (Table 4).

Comparing significant variables to both CBHI members and non-members

The study meticulously examined factors influencing the frequency of healthcare utilization. Accordingly, several common significant variables were identified for both CBHI members and non-CBHI members, revealing different patterns in their healthcare utilization behaviors.

Table 4: Determinants of frequency of healthcare utilization among women of non-CBHI members in the central zone of Sidama region, Ethiopia, 2024 (n=640).

Variables	Categories	CPR (95% CI)	APR (95% CI)
Age in years		**1.03 (1.02-1.04)**	**1.013 (1.003-1.03)**
Family size		1.16 (1.06-1.26)	1.05 (0.98-1.14)
Satisfaction		**1.06 (1.05-1.07)**	**1.04 (1.03-1.05)**
Residence	**Urban**	**1**	**1**
	Rural	**0.68 (0.45-1.04)**	**0.63 (0.98-0.87)**
Wealth index	Lowest	1	1
	Second	0.65 (0.46-0.94)	1.01 (0.75-1.37)
	Middle	0.56 (0.37-0.86)	0.86 (0.61-1.23)
	Fourth	0.51 (0.36-0.71)	0.95 (0.71-1.28)
	Highest	1.85 (1.23-2.78)	1.14 (0.85-1.55)
Community-level women's literacy	Illiterate	1	1
	literate	1.66 (1.16-2.37)	1.34 (0.97-1.87)
Community-level women's autonomy	Not autonomous	1	1
	Autonomous	1.44 (0.65-3.24)	0.98 (0.69-1.38)
Community-level women's poverty	**High**	**1**	**1**
	Low	**6.92 (4.64-0.33)**	**2.36 (1.64-3.39)**
Employment	Employed	1	1
	Not employed	0.94 (0.63-1.39)	1.01 (0.71-1.42)
Distance to a health facility	Near to health facility	1	1
	Far to a health facility	0.34 (0.26-0.43)	1.01 (0.81-1.26)
Waiting times	**Within standard time**	**1**	**1**
	Beyond standard time	**0.20 (0.16-0.25)**	**0.39 (0.30-0.50)**
Household head	Male	1	1
	Female	1.44 (1.00-2.07)	0.77 (0.52-1.14)
Recoded education	Do not read and write	1	1
	Read and write	0.95 (0.72-1.24)	1.17 (0.92-1.49)
Recoded marital status	Married	1	1
	Other Categories	1.35 (0.84-2.14)	1.04 (0.66-1.64)
Women autonomy	Not autonomous	1	1
	Autonomous	1.48 (0.03-2.12)	1.26 (0.91-1.74)

Table 5: Model comparison and selection criteria among women of CBHI members in the Central Zone of Sidama Region, Ethiopia, 2024 (n=640).

Types of the models	Model selection criteria		
	LL	AIC	BIC
Null model (Model 0)	-955.28	1926.55	1962.24
Individual variables (Model 1)	-807.34	1648.68	1724.53
Community variables (Model 2)	-933. 20	1880.40	1911.63
Individuals and community variables (Model 3)	**-776.67**	**1595.35**	**1689.04**

LL: loglikelihood; AIC: Akaki Information Criteria; BIC: Bayesian Information Criteria

Table 6: Model Comparison and selection criteria among women of non-CBHI members in the central zone of Sidama region, Ethiopia, 2024 (n=640).

Types of the models	Model selection criteria		
	LL	AIC	BIC
Null model (Model0)	-735.57	1487.13	1522.82
Individual variables (Model1)	-538.58	1111.17	1187.01
Community variables (Model2)	-697.86	1409.72	1440.95
Individuals and community variables (Model3)	**-513.40**	**1084.16**	**1177.86**

Age emerged as a vital determinant for both groups, yet with subtle differences. For CBHI members, each year increase in age was associated with a 1.2% increase in healthcare visits (APR: 95% CI: 1.01–1.02, p = 0.001). Similarly, for non-CBHI members, age was associated with a slightly higher 2% increase in healthcare visits (APR: 95% CI: 1.003–1.03, p = 0.015). Although the effect was marginally stronger for non-CBHI members, the difference was minimal, suggesting that age played a comparable role in healthcare utilization for both groups.

Furthermore, the area of residence played a substantial role in shaping healthcare utilization patterns between the two groups. Rural residents in both groups experienced a reduction in health facility visits compared to their urban counterparts. However, the negative effect of rural residence was more pronounced for non-CBHI members.

Specifically, non-CBHI members residing in rural areas experienced a substantial 37% reduction in healthcare visits (APR: 95% CI: 0.46–0.87, p = 0.005), compared to a relatively smaller (26%) reduction for CBHI members in healthcare utilization among urban women (APR: 95% CI: 0.58–0.93, p = 0.011). This disparity highlighted the potential challenges faced by rural women, particularly those without CBHI coverage, in accessing healthcare services.

Moreover, waiting times at health facilities were significantly associated with healthcare utilization for both groups, albeit to varying degrees. Extended waiting times were associated with a lower frequency of health facility utilization across both groups. Notably, the negative association was substantially larger for non-CBHI members, who experienced a 61% lower frequency of health facility visits (APR: 95% CI: 0.30-0.50, p<0.001), compared to a moderate (32%) reduction for CBHI members (APR: 95% CI: 0.55-0.84, p<0.001). This stark difference suggested that CBHI membership might have served as a buffer against the deterrent effect of long waiting times.

Additionally, community poverty levels emerged as a determinant factor for both groups, with palpable differences in healthcare utilization. For instance, women residing in low-poverty communities demonstrated a higher frequency of health facility visits compared to those in higher-poverty areas. Interestingly, the positive effect of living in a low-poverty community was larger for non-CBHI members, who showed a 36% higher frequency of visits (APR: 95% CI: 1.64-3.39, p<0.001), compared to a modest 33% increase for CBHI members (APR: 95% CI: 1.08-1.64, p=0.008). This substantial difference highlighted the potential role of CBHI in mitigating the effects of community poverty on the frequency of health facility visits.

Finally, women CBHI member and non-member satisfaction emerged as significant factors for both groups, with slightly different magnitudes of healthcare utilization. Each unit increase in woman satisfaction was associated with a 4% increase in health facility visits for CBHI members (APR: 95% CI: 1.03-1.04, p<0.001) and a marginally higher 4% increase for non-CBHI members (APR: 95% CI: 1.03-1.05, p<0.001). This finding underscored the importance of healthcare user satisfaction in promoting health facility visits, regardless of CBHI membership status.

Model fitness selection procedure

Four models were fitted and evaluated using log-likelihood, AIC, and BIC for comparison. a null model, a model with individual variables, a model with community variables, and a model containing both individual and community-level variables. These criteria were used to select the best-fit model [51]. Based on the provided Table 5, which shows model comparison and selection criteria for women who were CBHI members in the Central Zone of Sidama Region, Ethiopia, in 2024, the results were interpreted as follows:

The null model (Model 0) served as a baseline, without any predictor variables. It demonstrated the poorest fit among all models presented, with the highest (least negative) log-likelihood (LL) of -955.28, and the highest Akaike Information Criterion (AIC) and Bayesian Information Criterion (BIC) values of 1926.55 and 1962.24, respectively.

In contrast, the individual variable model (Model 1) showed a substantial improvement over the null model. This model, which included only individual-level variables, has relatively lower LL (-807.34), lower AIC (1648.68), and lower BIC (1724.53) values. Consequently, this suggested that individual-level factors played a significant role in explaining healthcare utilization among CBHI members.

Furthermore, Model 2 included only community-level variables. While it showed some improvement over the null model (LL = -933.20, AIC = 1880.40, BIC = 1911.63), it didn't perform as well as the individual variable model. Therefore, this indicated that community-level factors alone didn't explain as much of the variation in healthcare utilization as individual factors do.

Notably, the combined individual and community variables model (Model 3) showed the best fit among all models. It has the lowest (most negative) LL (-776.67) and the lowest AIC (1595.35) and BIC (1689.04) values. Thus, this revealed that considering both individual and community-level factors provided the most comprehensive explanation of healthcare utilization patterns among CBHI members.

The model comparison suggested that both individual and community-level factors were important in explaining healthcare utilization among CBHI members. However, individual factors appeared to have a stronger influence, as evidenced by the better performance of Model 1 compared to Model 2.

Additionally, the best-fitting model (Model 3) incorporated both individual and community variables, indicating that a multi-level approach considering both individual characteristics and community context provided the most comprehensive understanding of healthcare utilization patterns among women CBHI members.

In conclusion, the superiority of the combined model (Model 3) supported the study's conclusion that healthcare utilization among CBHI members was associated with a complex interplay of individual, community, and health system factors. This multi-level approach provided a better understanding of healthcare utilization patterns and could inform more comprehensive strategies to improve healthcare access and utilization among CBHI members.

The below table reflects a comparison of different models used to analyze factors associated with non-community-based health insurance (non-CBHI) members among women in the Central Sidama Zone of Sidama Region, Ethiopia (Table 6). The models were evaluated based on three criteria. Namely, log-likelihood (LL), Akaike information criterion (AIC), and Bayesian information criterion (BIC) [52]. Based on Table 6, which displayed model comparison and selection criteria for non-CBHI member women in the Central Zone of Sidama Region, Ethiopia, in 2024, the results were analyzed and interpreted as follows:

The null model (Model 0) served as a baseline without any predictor variables. Consequently, the model indicated the worst fit with the highest (least negative) log-likelihood (LL) of -735.57 and the highest Akaike Information Criterion (AIC) and Bayesian Information Criterion (BIC) values of 1487.13 and 1522.82, respectively. In contrast, the individual variable model (Model 1) fits substantially better than the null model, with a lower LL (-538.5831), AIC (1111.17), and BIC (1187.01). This improvement implied that individual factors significantly influence healthcare utilization among women who are non-CBHI members.

Similarly, the community variables model (Model 2) outperformed the null model. However, this model has worse metrics than Model 1, suggesting that community factors alone do not explain as much variation as individual variables. Furthermore, the combined model (Model 3) demonstrated the best fit, with the lowest LL (-513.40), AIC (1084.16), and BIC (1177.86). Therefore, a multi-level approach including individual and community determinants provided the most comprehensive perspective on healthcare utilization patterns. In conclusion, the superior performance of Model 3 supported adopting an integrated framework considering individual, community, and health system influences. This application of a multi-level approach provided a more nuanced understanding of healthcare utilization patterns and their associated factors among non-CBHI members.

Discussion

The study conducted in central Sidama Zone, Ethiopia, among 1,280 women (640 CBHI members and 640 nonmembers) indicated that the frequency of healthcare utilization revealed relatively higher healthcare utilization among CBHI members (368 (57.5%) compared to non-members (253 (39.5%). Accordingly, CBHI membership was associated with a 77.34% higher frequency of health facility visits compared to non-members.

This trend aligned with other studies observed across Ethiopia, where CBHI membership was consistently associated with increased healthcare use. For example, a study in Woreta town, south Gondar zone, found that health service utilization rates were 50.5% for CBHI scheme members and 29.3% for non-members [53]. Similarly, another study in north-west Ethiopia reported healthcare utilization rates of 35% for CBHI members and 22% for non-members [53].

Another study in the Berek district, Oromia region, found that the CBHI utilization rate was 49.8% among informal workers, with the majority having acquired knowledge about CBHI from medical experts. This suggests that CBHI membership is associated with increased healthcare utilization, particularly among vulnerable groups as this eases the financial burden of acquiring healthcare [54].

There were similar trends beyond Ethiopia. For example, in Burkina Faso, healthcare utilization was 40% higher as compared to non-members, while the differential effect on utilization of inpatient care between insured and non-insured groups was insignificant [33]. Likewise, in Senegal, insured individuals use health care more frequently than non-insured ones [55].

Similarly, in Bangladesh, a study found that healthcare utilization was higher among CBHI members (50.7%) compared to non-members (39.4%) [56]. A study from India also revealed that there were significant differences in the average number of healthcare visits between insured and uninsured members [57].

Additionally, in Rwanda, where CBHI coverage was nearly universal, insured households were twice as likely to use health services when compared to uninsured households [58,59]. Moreover, a study from Kenya depicted that insured members utilized higher hospitalization care compared to non-insured individuals [60].

The higher frequency of health facility visits among CBHI members underscored the importance of expanding affordable financial risk protection mechanisms [61,62]. This is because community-based health insurance schemes could provide financial protection to members, reduce out-of-pocket expenses, and increase access to healthcare services [63].

The study conducted in the central Sidama zone of Ethiopia further highlighted various individual and community-level factors that influenced healthcare utilization among women. According to this study, age was positively associated with healthcare utilization, indicating a 1.2% increase in healthcare visits for each additional year of age. Similarly, research in Sri Lanka demonstrated that older adults exhibited higher healthcare utilization rates, particularly for chronic conditions, due to increased health awareness and the necessity for regular medical attention [64]. In Nigeria, a study indicated that older adults sought more healthcare services, reflecting a similar trend [65,66]. Additionally, research in India showed that older women were more inclined to utilize maternal health services due to greater health awareness [67].

Furthermore, a study in Kenya found that older adults utilized more healthcare services, particularly for chronic diseases [68]. The positive relationship that was found between older age and an increased frequency of healthcare visits aligned with evidence that health often deteriorates with age [69,70].

This pointed out that health problems become worse as the age of the woman increases, calling for the importance of providing accessible healthcare for aging women to meet their growing health needs [71]. For example, older women may require frequent health facility visits due to chronic health conditions, which can be managed through primary care services [72].

Similarly, the study discovered that older women may have had a higher perceived need for healthcare services due to their increased vulnerability to health issues, leading to frequent and more regular health facility visits [73]. Consequently, the positive association between age and healthcare utilization in Ethiopia aligned with findings from Sri Lanka, Nigeria, India, and Kenya, suggesting that older individuals are more likely to seek medical attention due to health concerns.

The study also revealed that women residing in rural areas had a 26.3% lower frequency of health facility visits compared to their urban counterparts. The urban-rural dichotomy is a common issue in many countries. For instance, in Nigeria, rural women faced significant barriers to healthcare access, such as transportation challenges and fewer available services, which resulted in lower healthcare utilization [74,75]. Similarly, a study in Bangladesh identified that rural populations had limited access to healthcare facilities, exacerbating health disparities [76]. Similar findings from China highlighted that rural residents had lower healthcare utilization compared to their urban counterparts, primarily due to socioeconomic factors and healthcare infrastructure disparities [77].

Additionally, a study from Ghana also found that rural residents utilized fewer healthcare services due to distance and a lack of transportation [78]. In Ethiopia, another study identified that rural households were less likely to seek modern healthcare compared to urban households [79]. Thus, findings from Ethiopia and other countries reflect a broader trend where rural residents encounter challenges that hinder their access to healthcare use [80]. The evidence from Nigeria, Bangladesh, China, and Ghana supports the notion that urban-rural disparities significantly influence healthcare utilization, highlighting the need for targeted interventions in rural areas.

Moreover, the study found that literate women had a 30% higher frequency of health facility visits compared to those without formal education. This association is consistent with a study from Bangladesh, which indicated that educated women sought maternal healthcare due to enhanced health literacy [81]. In South Africa, a study revealed that higher educational attainment was associated with increased healthcare utilization, as educated individuals were more likely to understand and navigate the healthcare system [82]. In Finland, high healthcare utilization across educational levels was attributed to universal healthcare access and public health campaigns targeting all demographics [83].

In Ethiopia, a study indicated that maternal education influenced healthcare utilization for childhood illnesses, with educated mothers being more likely to seek care for their children [84]. Additionally, a study in Indonesia showed that education was a significant predictor of healthcare utilization among women, with higher education levels associated with increased healthcare utilization [85]. Therefore, the positive association between education and healthcare utilization in Ethiopia is consistent with findings from Bangladesh, South Africa, Indonesia, and other developing nations, suggesting that education enhances health literacy and encourages proactive health-seeking behavior.

This is because literacy could empower women to better understand their health needs and seek healthcare use Likewise, literacy may have also improved women's ability to communicate with healthcare providers, which could lead to better healthcare outcomes [86]. Conversely, a study in India found that despite higher education levels, cultural barriers still impacted women's healthcare-seeking behavior which could be due to different socio-cultural context [87].

Additionally, the study also indicated that extended waiting time at healthcare facilities was associated with a 32% reduction in health facility visits. Longer waiting times are a recognized barrier to healthcare access worldwide [88]. For example, a study in the United States revealed that patients often delayed or avoided necessary care due to long wait times, particularly in emergency departments [89].

Another study from Taiwan revealed that waiting times significantly impacted healthcare utilization, with longer waits resulting in decreased outpatient and inpatient utilization [90]. Additionally, a study in Ghana highlighted that long waiting times deterred patients from seeking healthcare, particularly in rural areas [91].

In Ethiopia, another study depicted that longer waiting times contributed to low healthcare utilization, especially among rural populations [92]. Therefore, long waiting times could lead to frustration and dissatisfaction among patients, reducing their likelihood of seeking healthcare [93]. This could be particularly problematic for women, who may have had limited time due to their responsibilities at home and in the community [94].

Consequently, the negative impact of longer waiting times on healthcare utilization in Ethiopia mirrors findings from the United States, Taiwan, Ghana, and other developing nations, underscoring the importance of establishing efficient healthcare delivery systems. Conversely, research in India found that efficient scheduling systems in hospitals reduced waiting times, leading to higher patient satisfaction and utilization rates. This suggests that system improvements can enhance patient satisfaction and encourage higher healthcare utilization rates [95].

The study also revealed that higher member satisfaction was associated with increased health facility visits, with a 4% increase in visits for each unit increase in healthcare satisfaction. Satisfaction with healthcare services influences utilization globally [96]. For instance, in Australia, higher patient satisfaction was linked to increased follow-up visits and preventive healthcare utilization [97]. A study conducted in China highlighted that patient satisfaction was a critical determinant of healthcare utilization [98]. Additionally, a study in South Africa found that high satisfaction levels among patients led to increased healthcare utilization, particularly in chronic disease management [99,100].

In Ethiopia, research indicated that satisfaction with healthcare services positively influenced the likelihood of seeking healthcare, particularly among women [101]. Thus, the positive relationship

between member satisfaction and healthcare utilization in Ethiopia aligned with findings from Australia, China, and South Africa, suggesting that satisfied patients are more likely to seek care.

However, a study in the UK indicated that patient satisfaction varied significantly across different healthcare services, impacting overall healthcare utilization. The challenges faced in the UK highlight that, while satisfaction is crucial, systemic issues can affect overall healthcare utilization [102].

Moreover, the study found that women in communities with higher literacy levels exhibited a 76% higher frequency of healthcare visits. This was consistent with studies in India and Nigeria that demonstrated positive associations between community-level educational attainment and maternal healthcare utilization [103]. The impact of community literacy on healthcare utilization was also evident in South Africa, where higher literacy rates in communities are associated with increased health-seeking behaviors [104]. In Sri Lanka, community literacy significantly influenced healthcare utilization, with more educated communities demonstrating better health outcomes [105].

Community literacy rates were associated with better healthcare utilization among women's communities, demonstrating better health outcomes [106]. In Ethiopia, a study found that communities with higher literacy levels had significantly better healthcare utilization rates, particularly for maternal and child health services [107]. Therefore, the findings from Ethiopia reflect a broader trend where community literacy enhances individual healthcare-seeking behaviors.

The evidence from South Africa, Sri Lanka, Kenya, and other developing nations supports the notion that educated communities foster better health outcomes, while the situation in the United States indicates that systemic factors can overshadow the influence of literacy on healthcare utilization. In contrast, the United States has seen disparities in healthcare access and utilization that are less influenced by community literacy due to a more complex healthcare system where insurance status often plays a more significant role [108].

Finally, the study indicated that women in low-poverty communities had a 33% higher frequency of health facility visits compared to those in higher-poverty communities. This reveals that socioeconomic status significantly influences healthcare utilization worldwide [109]. For instance, in Brazil, a study showed that individuals in wealthier neighborhoods had better access to healthcare services [110]. In addition, findings from China indicated that higher per-capita household expenditure was positively associated with healthcare utilization, particularly among low-socioeconomic groups [111].

Furthermore, a study in Ghana revealed that economic status significantly influenced healthcare access, with poorer households facing substantial barriers to healthcare utilization [112]. In Ethiopia, a study found that households in the highest wealth quintile were three times more likely to seek healthcare in hospitals compared to those in the lowest quintile, highlighting the impact of economic status on healthcare utilization [113].

Consequently, the positive association between community-level socio-economic status and healthcare utilization in Ethiopia is consistent with findings from Brazil, China, Ghana, and other developing nations, suggesting that economic stability enhances access to healthcare services. Conversely, in Sweden, while socioeconomic status influenced healthcare access, the universal healthcare system mitigated many disparities, leading to more equitable healthcare utilization across different economic strata. The situation in Sweden illustrates that, while economic factors are important, systemic healthcare policies can reduce disparities and promote equitable access [114].

Limitations of the Study

This study has several notable limitations. Firstly, its cross-sectional design restricts causal inferences [115] about the relationship between healthcare utilization determinants and community-based health insurance (CBHI) membership. The reliance on self-reported data may introduce response bias, thereby compromising the accuracy of reported healthcare utilization and associated factors.

Additionally, the study's focus is limited to the Sidama National Regional State, which may affect the generalizability of the findings to other contexts. Moreover, concentrating exclusively on women may overlook the influence of male decision-makers and broader family dynamics on healthcare utilization.

While various individual and community-level factors were examined, potential unmeasured socio-cultural influences may also play a role [116]in healthcare utilization The data collection was confined to a specific timeframe, possibly missing seasonal variations in health-seeking behaviors. Despite a high response rate, non-response bias is a concern, as individuals who declined to participate might differ systematically from those who did [117].

Finally, the study's quantitative approach may have overlooked qualitative insights [118] that could provide a more detailed understanding of participants' experiences with healthcare utilization. Acknowledging these limitations is essential for refining future research methodologies and deepening the understanding of factors contributing to healthcare utilization. Therefore, the extent of these limitations might have been undervalued or overvalued, and as such, the association of these determinants with healthcare utilization might have been underestimated or overestimated.

Conclusion

The Central Sidama Zone of Ethiopia conducted a study that revealed significant disparities in healthcare utilization between community-based health insurance (CBHI) members and non-members. Women of CBHI members showed substantially higher healthcare utilization rates (57.5%) compared to women of non-CBHI members (39.5%), a trend consistent with findings from other Ethiopian and other countries. This pattern revealed the relevance of CBHI schemes in improving healthcare access, particularly for vulnerable groups such as women.

The study also demonstrated a complex web of individual and community-level determinants influencing healthcare utilization, including age, educational level, place of residence, healthcare satisfaction, community-level poverty, community-level literacy,

and waiting times. Despite the positive association with CBHI membership, overall healthcare utilization in Ethiopia is persistently below international standards, reminding us of the need for continued efforts to address both individual and community-level barriers to healthcare access.

These findings provided valuable evidence complementing the role of community-based health insurance in improving healthcare utilization. They also emphasized the importance of developing tailored interventions to tackle the specific challenges different communities face in accessing healthcare services, ultimately working towards more equitable and comprehensive healthcare coverage among women in Ethiopia.

Recommendations

Based on the findings of this study; while considering the limitations of the cross-sectional study design, the following recommendations were made to improve healthcare access and utilization among women in Ethiopia:

To address the barriers of rural-urban disparities, implement targeted interventions to improve healthcare access in rural areas. Additionally, develop community-wide education programs to enhance literacy rates, focusing on women, as higher community literacy is strongly associated with increased healthcare utilization. Furthermore, expand and improve community-based health insurance (CBHI) schemes to boost healthcare utilization among members.

However, consider local contexts when designing and implementing interventions, as CBHI effectiveness varies across regions in Ethiopia. Consequently, reduce waiting times at healthcare facilities through efficiency measures, as long waits discourage utilization, especially for women with limited time.

In addition, develop targeted healthcare services for older women, who demonstrate higher healthcare needs and utilization rates. Similarly, in collaboration with stakeholders, implement poverty reduction strategies at the community level, as lower poverty is correlated with higher healthcare utilization.

Finally, conduct longitudinal research to understand regional variations in CBHI effectiveness and healthcare utilization to inform policy decisions. Subsequently, develop comprehensive health education programs focusing on preventive care and early intervention, targeting women and their families. Therefore, these recommendations aim to improve healthcare access and utilization in Sidama, Ethiopia, while leveraging the positive impact of community-level education and insurance schemes.

Declaration

Ethics approval and consent to participate

This study was conducted following and in compliance with the Declaration of Helsinki and its later amendments, which provide ethical guidelines for medical research involving human study participants. Accordingly, ethical approval was received from the Institutional Review Board (IRB) of Hawassa University College of Medicine and Health Sciences, and informed consent was secured from each study participant.

Confidentiality and privacy were ensured, and a support letter from the regional health bureau was obtained to protect participant rights and well-being. To safeguard the confidentiality and privacy of study participants, the following approach was employed: Participants were thoroughly informed about the study's objective and assured that their responses would remain confidential and anonymous. Informed written consent was obtained using a consent form approved by the Institutional Review Board (IRB) committee.

The consent form detailed essential information, including the study title, the data collector's guide, the study's purpose, the approximate interview duration, and a guarantee of confidentiality and anonymity. This form was thoroughly documented by the interviewer, ensuring a comprehensive record of the consent process. Furthermore, a support letter was obtained to provide additional safeguards for the participants' rights and well-being. This letter added an extra layer of oversight and assurances regarding the study's confidentiality.

In summary, the combination of IRB approval, informed consent, and other measures rigorously ensured the protection of participants' privacy. This comprehensive approach ensured confidentiality and anonymity were prioritized throughout this research process.

Author contributions

Kare Chawicha Debessa: Conceptualization; Data curation; Formal analysis; Funding acquisition; Investigation; Methodology; Project administration; Resources; Software; Supervision; Validation; Writing-original draft; Writing-review & editing.

Keneni Gutema Negeri: Formal analysis; Investigation; Methodology; Project administration; Supervision; Validation; Writing-original draft; Writing-review & editing.

Mesay Hailu Dangisso: Formal analysis; Investigation; Methodology; Supervision; Software; Validation; Writing-original draft; Writing-review & editing.

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Availability of data and materials

The datasets utilized for this study are available within the manuscript as a supplemental file 3.

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