

## Research Article

# Health-Related Quality of Life between Insured and Uninsured Households at Rural Communities of Southwestern Ethiopia: A Comparative Cross-Sectional Study

Serawit Lakew <sup>1</sup>, Tesfahun Mekene <sup>2</sup> and Tesfaye Feleke <sup>3</sup>

<sup>1</sup>Maternal-Reproductive Health Nursing, School of Nursing, Arba Minch University, College of Medicine and Health Sciences, Arba Minch, Ethiopia

<sup>2</sup>Health Services Management, School of Public Health, Arba Minch University, College of Medicine and Health Sciences, Arba Minch, Ethiopia

<sup>3</sup>Health Education (MPH), School of Public Health, Arba Minch University, College of Medicine and Health Sciences, Arba Minch, Ethiopia

Correspondence should be addressed to Serawit Lakew; [lserawit@yahoo.com](mailto:lserawit@yahoo.com)

Received 26 August 2022; Revised 15 November 2022; Accepted 7 December 2022; Published 9 February 2023

Academic Editor: Ayush Dogra

Copyright © 2023 Serawit Lakew et al. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

**Background.** Community-based health insurance (CBHI) is one of the strategies among others to be used for the achievement of universal health coverage (UHC) through providing financial protection to the citizens of a country. The schemes have been seen as effective in reducing out-of-pocket (OOP) payments and improving access to the healthcare services. This study tried to assess health-related quality of life between members and nonmembers of the scheme in rural southwest Ethiopia. **Study Method.** A community-based comparative cross-sectional study was conducted between the insured and uninsured populations. A standardized WHOQOL-BREF questionnaire was used. Cross-tab and frequency table analysis were done to tabulate for mono-variable and bivariable analysis. Multiple linear regressions were employed to determine associations by adjusting for potential confounders. The association decision was made after fitted assumptions and adjustments done by modeling. **Results.** About six hundred thirty-four (634) households completed the survey with a response rate of 97.2%. More than 90% of the participants were illiterate and elementary education completed and farmers. Most uninsured family members claimed that they had difficulty affording annual payments 72.5%,  $P < 0.001$ . Willingness to pay was higher for insured members of households (72.2%),  $P < 0.001$ . Being insured had experienced a higher quality of life than uninsured,  $\beta$  (95% CI), 4.15 (2.52, 5.77), and  $P < 0.001$ . Marital status other than married had lower quality of life experiences than married alone,  $\beta$  (95% CI), -6.83 (-9.75, -3.92), and  $P < 0.001$ . Male respondents were experiencing lower quality than females,  $\beta$  (95% CI), -2.49 (-4.25, -0.72), and  $P = 0.006$ . Family number of the household and quality of life had positive linear relations,  $\beta$  (95% CI), 0.87 (0.43, 1.31),  $P < 0.001$ . **Conclusions and Recommendations.** Being insured had positive implications for quality of life. Inhabitants have to be encouraged to the scheme membership.

## 1. Background

Despite incredible improvements in health since 1950, there are still several challenges that should have been easy to solve [1]. One billion people lack access to healthcare systems, and nearly one-third of the world population could not use health services due to different socioeconomic and cultural reasons [1–3]. The health service utilization rate in Africa is

low, and sub-Saharan Africa, in particular, is very low ranging from only 0.2 annual visits to 2 visits [4]. Healthcare-seekers, through out-of-pocket (OOP) spending at the time and place of treatment, defray most healthcare costs in developing countries [5, 6]. One way to enhance coverage could be through community-based health insurance (CBHI) schemes, which are local mutual aid schemes that put in place arrangements for mobilizing,

pooling, allocating, and managing, or supervising members' resources for healthcare [7, 8]. CBHI schemes have been effective in reducing OOP and improving access to healthcare services [9].

After launching the scheme in 2011, Ethiopia planned to cover a very large rural agricultural sector and reach the small and informal sectors among urban dwellers [10]. The overall objectives of the scheme coverage were to promote equitable access to sustainable quality health care, increase financial protection, and enhance social inclusion for Ethiopian families through the health sector [11]. The scheme benefit package covers all the costs of outpatient and in-patient services at health centers and hospitals [10]. But it does not cover the cost of procedures related to dentures, eyeglasses, and cosmetics [10]. The 2019 Ethiopian mini DHS result shows that 28% of households were enrolled in the community-based health insurance (CBHI) scheme [11]. Rural households (32%) were more largely enrolled than urban household dwellers (19%) [10, 11].

The Federal Ministry of Health Ethiopia 2010 estimated that the three main sources of healthcare financing in Ethiopia were local and international donors (40%), out-of-pocket (OOP) spending by clients (37%), and central and local governments (21%). The remaining two percent was covered by employers and other private insurance schemes [10, 12].

A couple of systematic reviews elsewhere tried to assess the impact of insurance to influence health services utilization and financial load, though contradicting results were reported [13–16]. Some reported a reduction in OOP payment and others had no impact on OOP, health services utilization, and the health status of the family [15, 16].

Long ago, the Ethiopian former HSDP was planning and implementing to bring UHC to Ethiopian inhabitants through the strengthening of primary health care, development of the essential health services package (EHSP), and introduction of health services extension program [17, 18]. Ethiopian HSDP IV envisioned HSTP I and II implementing CBHI as one of the pillars of UHC in Ethiopia [19–21]. Health-related quality is one of the outcome measurements of HSTP Ethiopia program implementations [19, 21]. This comparative study, therefore, tried to assess the quality of life between insured and uninsured populations in rural communities. The output could be an input to the sector to determine their achievement regarding quality.

## 2. Methods and Materials

**2.1. Study Design and Setting.** A community-based comparative cross-sectional study was conducted to assess health-related quality of life among CBHI member households and nonmembers in the Arba Minch Zuria district (HDSS site), south Ethiopia, from November to December 2021. Arba Minch Zuria District is located in Gamo Zone in the southwest of Ethiopia, which is located in the Great Rift Valley, 445 KMS south of Addis Ababa [22]. The Demographic Survey Surveillance (DSS) sites of Arba Minch Zuria District included 9 kebeles based on stratified classification of the climatic zone, urbanization, and distance from Arba Minch Town. Accordingly, eight of the kebeles

are rural and one semiurban. Based on an agroecologic zone, two of them are highlands, four of them are lowlands and the rest three are midlands. The population of the site is in Gatse 9990 (16.7%), Kolla Shelle 8787 (14.7%), Zigity Mechie 8292, Laka 6625 (11.1%), Shelle Mella 6408 (10.7%), Kolla Shara 5775 (9.6%), Zeyesie Dembile 5632 (9.4%), Chano Chalba 5497 (9.2%), and Ganta Meyechie 2869 (4.8%), with a summarized total of 59,875 populations and 12,537 households with 4.8 fertility rate [23]. The health infrastructure of the district includes five health centers and fifteen health posts of the government, and fifteen medium- and lower-level private clinics [24]. The district has more than 70% percent of CBHI member households [25].

**2.2. Sample Size and Sampling Procedure.** To calculate the sample size, two population proportion formulas were used and calculated by OpenEpi online. A former Ethiopian study was used for the three domains [26]. A sample size of 652 was used as the final sample size after consideration of the design effect and contingency. This study was conducted using a cluster sampling technique. Arba Minch University Health Demography Surveillance Survey site occupies nine (9) kebeles. All nine kebeles were included in the study. Each kebele had a proportional allocation of samples for CBHI members and nonmembers. Before two days household census was done in the kebele by the data collectors to develop a sampling frame for eligible households. Finally, a systematic sampling technique was employed for the selection of households in each kebele. The household head was selected for the interview Figure 1.

**2.3. Measurement.** Face-to-face interviews were carried out with the 652 households who were either members or nonmembers of CBHI. The WHOQOL-BREF questionnaire developed by the World Health Organization as a short form of the WHOQOL-100 Amharic version is a cross-cultural instrument. As WHOQOL-BREF does not impose a great burden on the respondent, it is seen as the most useful instrument to assess QOL [27]. The WHOQOL-BREF is a 26-item instrument consisting of four domains: physical health (7 items), psychological health (6 items), social relationships (3 items), and environmental health (8 items); it also contains QOL and general health items. Response to each of the question was scored as a five point ordinal scale, where 5 was high score and 1 low. The scores were then transformed linearly to 4–20 and then to a 0–100-scale [27, 28]. The physical health category contains questions about daily activity, mobility, functional capability, energy, sleep, and pain. The psychological domain measures included self-image, negative thoughts, positive attitudes, self-esteem, mentality, learning ability, memory concentration, religion, and mental status. The social relationships domain contained questions on personal relationships, social support, and sex life. The environmental health domain covered issues related to financial resources, safety, health, and social services, the living physical environment, opportunities to acquire new skills and knowledge, recreation, the general environment (noise, air pollution, and so on), and transportation [29].

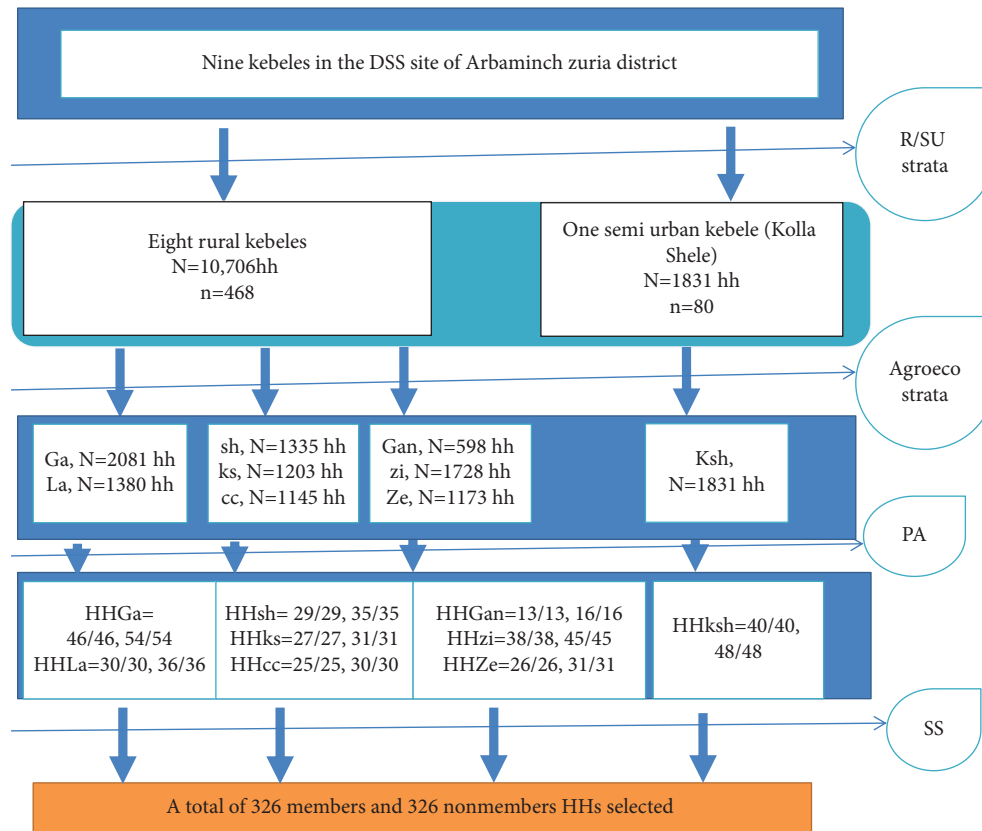


FIGURE 1: Sampling procedures in the study of HRQoL between CBHI Insured and uninsured populations at Arba Minch University HDSS site, south Ethiopia. NB: Ga = Gatse, La = Laka, sh = shele mela, ks = kola shara, cc = chano chalba, Gan = ganta mech, zi = zigiti meche, ze = zeyse dem, ksh = kola shele, PA = proportional allocation of sample, SS = systematic sampling, N = number of total households, n = number of sample households.

**2.4. Statistical Analysis.** The chi-square statistical method was used to do analyses for proportions in the basic and insurance characteristics by membership status at CBHI. The Student’s *t*-test was employed to report the difference in means of insured/uninsured to each of the domains. Simple linear regression was employed to test for associations between insured and uninsured and other independent variables for QoL. Assumptions of linear regression were checked, and no violations were observed. The normality of residuals, linearity, independence errors, and homoscedasticity were checked. Collinearity diagnosis was employed between exposure variables where VIF (<2) was not violated. Multiple linear regression modeling was applied for adjustment and decision of statistical associations. Effect modifications were checked in that there was no effect modifier and confounder. Cronbach’s alpha coefficient of 0.70 and above was accepted for internal consistency and data reliability in the pretest. For all statistical methods *P* < 0.05 was accepted as having linear associations with the HRQoL score.

**2.5. Data Quality Control.** To ensure the quality of the data, an internationally standardized WHO HRQoL questionnaire validated and reliable Amharic version was used from a previously validated and reliable tool with a Cronbach’s

alpha coefficient of more than 0.7 for each of the four domains [27–30]. The training was given to data collectors before the start of the data collection process for three days. Training included data collection tools and methodology, mock interviews, and a pretest. Even though, supervisors and central coordinators were trained together with the data collectors; orientation was given separately on how to supervise the data collectors and control filled data on the server. Moreover, a daily based check-up on the entire filled questionnaire each day was done by the data collector, supervisors on tablet, and centrally by the central coordinator on the server. The incomplete questionnaire was referred back for completion to collectors.

### 3. Results

**3.1. Baseline Characteristics.** Six hundred thirty-four (634) households were enrolled and completed the survey with an overall response rate of 97.2%. The mean age ±SD of the respondent was 38.49 years ± 11.9. The male participant was the dominant sex. More than 90% of the participants had completed elementary education only. Majorities were married (89.7%). Christian Protestantism was the dominant religion in the community (71.3%). Nearly 80% of the participants were from a farming (land or animal) background. Around two-thirds of households had either

TABLE 1: Distribution of basic characteristics of study participants by the status of health insurance in southwest Ethiopia,  $n = 634$ , October 2021.

Variables	Category	Insurance status		P values
		Insured, no (%)	Uninsured no (%)	
Ages	Less or equal to 30	67 (36.8)	115 (63.2)	$P < 0.001$
	More than 30	250 (55.3)	202 (44.7)	
Sex	Female	131 (53.3)	115 (46.7)	$P > 0.05$
	Male	186 (47.9)	202 (52.1)	
Education status	Elementary	292 (51.0)	280 (49.0)	$P > 0.05$
	High school or more	25 (40.3)	37 (59.7)	
Marital status	Married	289 (50.8)	280 (49.2)	$P > 0.05$
	Others (divorced, single, and widowed)	28 (43.1)	37 (56.9)	
Religion	Protestant	237 (52.4)	215 (47.6)	$P < 0.05$
	Orthodox	80 (44.7)	99 (55.3)	
	Others (Muslim and traditional)	0	3 (100.0)	
Occupation	Agropastoral	268 (53.1)	237 (46.9)	$P < 0.05$
	Others (government, merchant, privately employed)	49 (38.0)	80 (62.0)	
Family number	Less than 5	77 (37.2)	130 (62.8)	$P < 0.001$
	5 or more	240 (56.2)	187 (43.8)	
Under 5 children	Yes	176 (48.0)	191 (52.0)	$P > 0.05$
	No	141 (52.8)	126 (47.2)	
Old age family member (50+)	Yes	116, 58.0	84, 42.0	$P < 0.05$
	No	201, 46.3	233, 53.7	

crowded ( $\geq 5$ ) family numbers (67.4%) or family members of old persons ( $\geq 50$  years), 68.5%. Based on crude association, a difference in the proportion was observed for age, religion, occupation, family number, and having an older aged family member (at  $P < 0.05$ ). Table 1.

**3.2. Status of Health Insurance.** A household head feeling of annual payment that is too high, and willingness and affordability to pay, perceived quality of public health services, perceived satisfaction with health services offered, frequent choosing health facility type, the existence of sick household members in the last one month or one year and perceived health status of the family were significantly varying between insured and uninsured household members. Willingness to pay was higher for insured members of households (72.2%),  $P < 0.001$ . Most insured households use public health facilities as usual health facilities they visited, 56.1%,  $P < 0.001$ , and preferred to visit, 54.7%,  $P < 0.05$ . A large number of household members who had a sick child in the last month were insured (58.4%),  $P < 0.005$ . Most uninsured family members claimed that they had difficulty affording annual payments, 72.5%,  $P < 0.001$ . "Poor" perceived health status of households was higher for the uninsured, 68.3%,  $P < 0.05$ . Table 2.

**3.3. Health-Related Quality of Life Domains.** After converting the raw score into 20 points and then to 100 for all four domains, the mean score of HRQoL in each of them was calculated. For the physical domain, the mean score  $\pm$ SD was  $59.55 \pm 12.48$ ; psychological domain,  $57.96 \pm 13.58$ ; the social domain,  $66.69 \pm 14.8$ ; and environmental domain,  $54.03 \pm 13.76$ . The overall mean score was  $59.56 \pm 11.08$  with a maximum score of 92.29 and a minimum score of 25.57.

The mean score was also calculated between insured and uninsured members of the household. In all domains, except the social domain, there was a difference between the means at  $P < 0.05$ . Table 3 and Figure 2.

### 3.4. Factors Associated with Health-Related Quality of Life.

The output of multiple linear regressions controlling for confounders showed insurance status, sex, education status, occupational status, and family number had an association with health-related quality of life at  $P < 0.05$ . Being insured had experienced a higher quality of life than uninsured,  $\beta$  (95%CI), 4.15 (2.52, 5.77), and  $P < 0.001$ . Marital status other than married had lower quality of life experiences than married alone,  $\beta$  (95% CI),  $-6.83$  ( $-9.75$ ,  $-3.92$ ), and  $P < 0.001$ . Male respondents were experiencing lower quality than females,  $\beta$  (95% CI),  $-2.49$  ( $-4.25$ ,  $-0.72$ ), and  $P = 0.006$ . The education status of the household head being high school or more had a better quality of life than elementary status,  $\beta$  (95%CI), 9.96 (7.19, 12.73), and  $P < 0.001$ . Occupational status other than farmer had a better quality of life experiences over that of farmers,  $\beta$  (95% CI), 3.11 (0.99, 5.22), and  $P = 0.004$ . As the family number of households increases, the quality of life also increases,  $\beta$  (95%CI), 0.87 (0.43, 1.31),  $P < 0.001$ . Moreover, respondents' age, the existence of under 5 years or 50+ years aged household members, and the distance of the household from the health facility had no association with quality of life. Table 4.

## 4. Discussion

Even though studies were limited to the quality of life between the two groups in Ethiopia, this comparative survey was an opportunity to observe the importance of the newly

TABLE 2: Basic characteristics of health insurance between insured and uninsured in the southwest of Ethiopia,  $n = 634$ , October 2021.

Variables	Category	Insurance status		Chi-square	P values
		Insured, no (percent)	Uninsured no (percent)		
Claiming payment of 250 Ethiopian Birrs per annum is too high	Yes	119 (43.1)	157 (56.9)	9.26	0.002
	No	198 (55.3)	160 (44.7)		
Chronic diseases in the family member	Do not exist	282 (48.6)	298 (51.4)	5.77	$P > 0.05$
	One	32 (66.7)	16 (33.3)		
	Two or more	3 (50)	3 (50)		
Perceived quality of public health services provision	Low	87 (41.6)	122 (58.4)	12.1	0.002
	Medium	201 (52.6)	181 (47.4)		
	High	29 (67.4)	14 (32.6)		
Affordability of paying a yearly payment	Very difficult	28 (27.5)	74 (72.5)	36.2	$P < 0.001$
	Difficult	148 (48.1)	160 (51.9)		
	Easy	141 (62.9)	83 (37.1)		
Satisfying health services offer	Public health facility	146 (54.7)	121 (45.3)	4.04	0.04
	Private health facility	171 (46.6)	196 (53.4)		
Usually used health facility	Public health facility	220 (56.1)	172 (43.9)	15.4	$P < 0.001$
	Private health facility	97 (40.1)	145 (59.9)		
Willingness to pay or continue annual payment	Willing to pay	304 (72.2)	117 (27.8)	247.2	$P < 0.001$
	Not willing to pay	13 (6.1)	200 (93.9)		
Household members sick in the last 1 month	Yes	125 (58.4)	89 (41.6)	9.14	0.002
	No	192 (45.7)	228 (54.3)		
Household members sick in the last 1 year	Yes	168 (56.0)	132 (44.0)	8.2	0.004
	No	149 (44.6)	185 (55.4)		
Perceived health status of the family	Poor	20 (31.7)	43 (68.3)	9.8	0.007
	Medium	143 (50.5)	140 (49.5)		
	Good	154 (53.5)	134 (46.5)		

TABLE 3: Mean QoL score between insured and uninsured for each of the domains to assess equality of the mean,  $n = 634$ , southwest Ethiopia, October 2021.

Dependent variables	$t$	Mean difference	SEM	95% CI		$P$ values	Levene's test of homogeneity	
							$F$	$P$ value
Physical domain*	3.1	3.05	0.98	1.12	4.98	0.002	1.25	0.26
Psychological domain*	4.4	4.68	1.06	2.59	6.77	$P < 0.001$	0.01	0.93
Social domain	1.86	2.19	1.17	-0.12	4.49	$P > 0.05$	0.01	0.9
Environmental domain*	5.29	5.67	1.07	3.57	7.77	$P < 0.001$	2.85	0.09

N.B. SEM = standard error of the mean, \* significant associations.

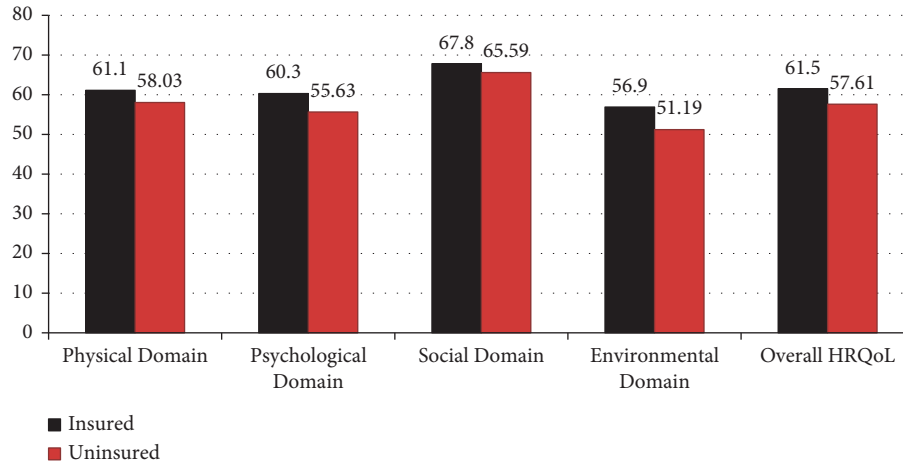


FIGURE 2: Health-related quality of life scores out of 100% for insured and uninsured households by four domains in Southwest Ethiopia,  $n = 634$ , October 2021.

TABLE 4: Factors influencing HRQoL between CBHI insured and uninsured households in southwestern Ethiopia, Nov 2021.

Variables	Numbers (%)	Un-standardized $\beta$ (95% CI)	Standardized $\beta$	$P$ values
<i>Insurance status</i>				
Uninsured	317 (50%)	0 <sup>a</sup>		
Insured	317 (50%)	4.15 (2.52, 5.77)	-0.19	$P < 0.001^*$
<i>Marital status</i>				
Married	569 (89.7)	0 <sup>a</sup>		
Others <sup>a</sup>	65 (10.3)	-6.83 (-9.75, -3.92)	-0.19	$P < 0.001^*$
<i>Sex of respondent</i>				
Female	246 (38.8)	0 <sup>a</sup>		
Male	388 (61.2)	-2.49 (-4.25, -0.72)	-0.11	0.006*
<i>Education of respondent</i>				
Elementary	572 (90.2)	0 <sup>a</sup>		
High school or more	62 (9.8)	9.96 (7.19, 12.73)	0.27	$P < 0.001^*$
<i>Occupation</i>				
Farmer	505 (79.7)	0 <sup>a</sup>		
Others <sup>b</sup>	129 (20.3)	3.11 (0.99, 5.22)	0.11	0.004*
Age of respondent	634 (100%)	-0.03 (-0.12, 0.05)	-0.03	0.48
Number of family members	634 (100%)	0.87 (0.43, 1.31)	0.15	$P < 0.001^*$
<i>Under 5 children</i>				
Yes	367 (57.9)	0 <sup>a</sup>		
No	267 (42.1)	0.04 (-1.84, 1.77)	0.002	0.967
<i>Household member 50+</i>				
Yes	200 (31.5)	0 <sup>a</sup>		
No	434 (68.5)	1.26 (-0.68, 3.2)	0.05	0.20
Distance from household to health facility	634 (100%)	1.32 (-0.35, 2.99)	0.34	0.12

\* (indicates statistical significance at  $P$  value  $< 0.05$ ); 0<sup>a</sup> (indicates a reference category for the categorical predictor variables); others<sup>a</sup> (single, divorced, and widowed); others<sup>b</sup> (merchant or employed with private or government); and blank space (not applicable).

established health insurance system at the population level by the government which they planned its expansion up to 80% by 2020 [10, 31].

In this study, being a member of community-based health insurance (CBHI) had a positive influence on health-related quality of life. Most significant differences exist between insured and uninsured members in physical, psychological, and environmental dimensions. The social domain was similar between the two groups. This was consistent with a single Ethiopian study in the past [26]. Minimized OOP payment due to insurance perhaps loosens high healthcare expenditure tensions among the populations of Ethiopia living with the burden of all types of diseases, such as infectious or noninfectious [32, 33]. Moreover, insurance could have been seen as an opportunity to get all available health services with little cost as compared to the former high out-of-pocket cost [10, 12, 31].

Contrary to a study in Portugal [34], marital status is married, and the female household head was associated with quality of life positively. The possibility of this relation could have been due to decreased household OOP expenditure in Ethiopia where the burdens of infectious or noninfectious diseases were overwhelming [32, 33]. Women household heads, usually accompanying health care of the household members in Ethiopia, had probably felt minimizations due to the emergence of insurance as they reported as compared to men who were passing most of their time on the farm.

In this study, the higher educational status of the household head had an association with quality of life. Since literacy is related to a person's higher capacity to obtain, process, and understand basic health information and services needed to make appropriate health decisions, the importance of living healthy and insurance, and the ability to identify comparative advantages of expenditure between being insured and uninsured could have been the possible reason for positive relations [35]. Another cross-cultural data analysis of the multicenter observed the existence of a positive association with QoL and the sequentially increasing hierarchy of education status [36].

A strong association was observed between the increasing quality of life and the increasing number of family members. This could be due to more benefits for large family sizes, but all others had equal yearly contributions to the scheme [12, 37]. Households with large family sizes probably had high OOP expenditure compared to small ones before the emergence of insurance [10, 31]. The emergence of insurance could have loosened the paying burden thereby satisfaction had been maximized comparatively [15, 16].

**4.1. Limitations of the Study.** Because of the observational nature of the study design, some systematic errors, such as recall and social desirability biases could have not been completely avoided. Such as the response of the respondents for some baseline characteristics, health facility-related information, and W.H.O HRQoL questions. Respondents' understanding capability and response to some HRQoL scale questions could be prone to some information biases

since majorities were illiterate or elementary for educational status, though local language translations were used. Because of the cross-sectional nature of the study design, the temporal relationship between HRQoL and membership status in the scheme could have not been established in this study.

## 5. Conclusions and Recommendations

Being a member of CBHI had positive implications for quality of life. Family number, sex, education, occupation, and marital status were associated with HRQoL. No significant difference was observed between the insured and uninsured for social domain quality of life. Inhabitants have to be encouraged to the scheme membership. A health sector and inhabitants inclusive qualitative survey is recommended to be done by concerned bodies to supplement the finding for a better intervention plan as part of community services by the concerned bodies. The social domain has to be given due emphasis to the scheme members by the concerned bodies in the community.

## Abbreviations

CBHI:	Community-based health insurance
HDSS:	Health and Demographic Surveillance Survey
HRQoL:	Health-related quality of life
HSTP:	Health sector transformation plan
IRB:	Institutional Review Board
QoL:	Quality of life
OOP:	Out-of-pocket
SHI:	Social health insurance
UHC:	Universal health coverage
WHOQOL-	World Health Organization Quality of Life
BREF:	Biomedical Research and Educational Facility.

## Data Availability

Data analysed in this study are all included in the manuscript for publication.

## Ethical Approval

An ethical issue of this survey was in-line with principles under the Declarations of Helsinki. Since it was not a human subject study, the participants were informed orally and written consent was signed between the researcher and participant. Moreover, the study protocol was approved by the Institutional Review Board (IRB) of the College of Medicine and Health Sciences, Arba Minch University. A letter of permission was obtained from Arba Minch surrounding district administration Health Office and a letter of cooperation was also written to the study village. Purpose of the survey was oriented to the participants and administrations of the villages. Study participants were informed about the right to refuse participation or terminate their involvement at any point during the interview. The information collected was kept confidential.

## Consent

Consent was not applicable for this study.

## Conflicts of Interest

The authors declare that there are no conflicts of interest.

## Authors' Contributions

SL developed design, performed the statistical analysis and sequence alignment, and drafted the manuscript. TM participated in design development, performed the statistical analysis, and participated in drafting the manuscript. TF coordinated the study, developed design and statistical analysis, and participated in manuscript draft development. The final approval of this manuscript was declared by all the authors.

## Acknowledgments

Arbaminch University Health and Demographic Surveillance Survey funded the data collection and entry of this project. The publication was not funded.

## References

- [1] A. Shah, "Global health overview; Social, political, economic, and environmental issues that affect us all," 2011, <http://www.globalissues.org/article/588/global-health-overview>.
- [2] J. T. Young, *Health in the Developing World: Health Status and Healthcare Utilization in Matlab*, University of Colorado at Boulder, Bangladesh. Colorado, USA, 2004.
- [3] World Health Organization, "The world health report," 2000, [http://www.who.int/whr/2000/%20en/whr00\\_en.pdf](http://www.who.int/whr/2000/%20en/whr00_en.pdf).
- [4] I. Bonfrer, E. Poel, M. Grimm, and E. Doorslaer, *Does Health Care Utilization Match Needs in Africa? Challenging Conventional Needs Measurement*, Erasmus University, Rotterdam, 2012.
- [5] S. Selvaraj and A. Karan, "Why publicly-financed health insurance schemes are ineffective in providing financial risk protection," *Economic and Political Weekly*, vol. 47, no. 11, p. 61, 2012.
- [6] Bank World, "How we classify countries and people—and why it matters," *BMJ Global Health*, vol. 7, no. 6, Article ID e009704, 2009.
- [7] D. M. Dror and S. Jambhekar, *Microinsurance Business Processes Handbook*, Springer, Singapore, 2016.
- [8] D. M. Dror, *Health microinsurance programs in developing countries*, Elsevier, Tharamani Chennai, 2014.
- [9] S. Tabor, "Community-based health insurance and social protection policy," *Social Protection Discussion Paper Series*, The World Bank, Washington D.C, 2005.
- [10] Systems for Improved Access to Pharmaceuticals and Services, "Ethiopian national health insurance scale-up assessment on medicines financing, use, and benefits management: findings, implications, and Recommendations," *Submitted to the USAID by the Systems for Improved Access to Pharmaceuticals and Services (SIAPS) Program*, Management Sciences for Health, Arlington, VA, 2016.
- [11] Ethiopian Public Health Institute(Ephi) [Ethiopia] and Icf, *Ethiopia Mini Demographic and Health Survey*EPHI and ICF, Rockville, Maryland, USA, 2021.
- [12] A. D. Mebratie, R. Sparrow, Z. Yilma, G. Alemu, and A. S. Bedi, "Enrollment in Ethiopia's community-based health insurance scheme," *World Development*, vol. 74, pp. 58–76, 2015.
- [13] E. Spaan, J. Mathijssen, N. Tromp, F. McBain, and R. Baltussen, "The impact of health insurance in Africa and Asia: a systematic review," *Bulletin of the World Health Organization*, vol. 90, no. 9, pp. 685–692, 2012.
- [14] Q. Meng, B. Yuan, L. Jia et al., "Expanding health insurance coverage in vulnerable groups: a systematic review of options," *Health Policy and Planning*, vol. 26, no. 2, pp. 93–104, 2011.
- [15] A. Acharya, S. Vellakkal, F. Taylor et al., "The impact of health insurance schemes for the informal sector in low- and middle-income countries: a systematic review," *The World Bank Research Observer*, vol. 28, no. 2, pp. 236–266, 2013.
- [16] B. Ekman, "Community-based health insurance in low-income countries: a systematic review of the evidence," *Health Policy and Planning*, vol. 19, no. 5, pp. 249–270, 2004.
- [17] R. G. Wamai, "Reviewing Ethiopia's health system development," *Population (mil)*, vol. 75, 2004.
- [18] Annual Performance Report of Hsdp-III, "Federal Ministry of Health," 2020, <https://e-library.moh.gov.et/library/wp-content/uploads/2021/07/Annual-Performance-Report-2007.pdf>.
- [19] FAOLEX Database, "Ethiopian health sector transformation plan II of 2019-2024," 2020, <https://fp2030.org/sites/default/files/HSTP-II.pdf>.
- [20] FAOLEX Database, "Ethiopian health sector development programme (HSDP) IV," 2021, <http://tucghe.org/HSDP%20IV.pdf>.
- [21] FAOLEX Database, "Ethiopian Health Sector Transformation Plan I," 2016, <http://Users/user/Dropbox/PC/Desktop/Proposal%20PhD/Ethiopia-Health-Sector-Transformation-plan%20I.pdf>.
- [22] C. S. Peoples, "Nations and nationalities region," *The Round Table*, vol. 2, no. 1, 2007.
- [23] A. M. Zuria, *Demographic Survey Surveillance and Aids Mortality Surveillance*, Arba Minch University, Ethiopia, 2015.
- [24] S. Gamo and G. Zone, "Arba Minch Zuria Woreda Health Office Report," *Plos one*, vol. 15, no. 6, Article ID e0221670, 2020.
- [25] G. Zone, "Health Department and Health Insurance Offices Oral Report," *Journal of dental education*, vol. 81, 2020.
- [26] T. Gebru and K. Lentiro, "The impact of community-based health insurance on health-related quality of life and associated factors in Ethiopia: a comparative cross-sectional study," *Health and Quality of Life Outcomes*, vol. 16, no. 1, p. 110, 2018.
- [27] S. M. Skevington and C. Tucker, "Designing response scales for cross-cultural use in health care: data from the development of the UK WHOQOL," *British Journal of Medical Psychology*, vol. 72, no. 1, pp. 51–61, 1999.
- [28] A. Harper and M. Power, *WHOQOL User Manual*, World Health Organization, Edinburgh, 1999.
- [29] S. Nejat, A. Montazeri, K. Holakouie Naieni, K. Mohammad, and S. R. Majdzadeh, "The world health organization quality of life (WHOQOLBREF) questionnaire: translation and validation study of the Iranian version," *Journal of School of Public Health and Institute of Public Health Research*, vol. 4, pp. 1–12, 2006.
- [30] K. Reba, B. W. Birhane, and H. Gutema, "Validity and reliability of the Amharic version of the world health



organization's quality of life questionnaire (WHOQOL-BREF) in patients with diagnosed type 2 diabetes in felege hiwot referral hospital, Ethiopia," *Journal of Diabetes Research*, vol. 2019, Article ID 3513159, 6 pages, 2019.

- [31] Ussaid, "Ethiopia health sector financing reform/health finance and governance project, year one – annual performance report," *Health Finance & Governance Project*, Abt Associates, Inc, Bethesda, MD, 2014.
- [32] A. Misganaw, D. H. Mariam, A. Ali, and T. Araya, "Epidemiology of major non-communicable diseases in Ethiopia: a systematic review," *Journal of Health, Population and Nutrition*, vol. 32, no. 1, pp. 1–13, 2014.
- [33] A. Misganaw, T. N. Haregu, K. Deribe et al., "National mortality burden due to communicable, non-communicable, and other diseases in Ethiopia, 1990-2015: findings from the Global Burden of Disease Study 2015," *Population Health Metrics*, vol. 15, no. 1, p. 29, 2017.
- [34] O. Preto and F. Chen, "Quality of life and chronic disease in patients receiving primary health care," in *Proceedings of the EpSBS, 2nd International Conference on Health and Health Psychology*, Beijing China, May 2016.
- [35] Institute of Medicine, *Health Literacy: A Prescription to End Confusion*, National Academies Press, Washington D. C, 2004.
- [36] S. M. Skevington, "Qualities of life, educational level and human development: an international investigation of health," *Social Psychiatry and Psychiatric Epidemiology*, vol. 45, no. 10, pp. 999–1009, 2010.
- [37] S. Feleke, H. Zelelew, and T. Ashagari, "Ethiopia's community-based health insurance: a step on the road to universal health coverage," *USAID Health Finance and Governance*, vol. 20, no. 1, 2020.