

Assessment of Willingness to Pay: The Mechanism of Financial Pooling for Community-Based Health Insurance and Associated Factors among Households in Tigray Region, Northern Ethiopia, September 1-October 20, 2020

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Abstract

Dependence on out-of-pocket payment (OPP) for healthcare may lead poor households to undertake catastrophic health expenditure; millions of people suffer and die because they do not have the money to pay for healthcare. Worldwide about 44 million households face financial problems due to healthcare expenditure; more than 40% of African nations' health expenditure comes from out-of-pocket payments making a scarcity of funds for health, and low-income groups make health payments by borrowing or selling property. Therefore, an agenda for developing a system of healthcare financing is common for all nations toward universal health coverage (UHC), using the emerging concept of community-based health insurance (CBHI) as a potential strategy to achieve universal health coverage in developing countries by discussing the problem of healthcare financing in low-income countries (LIC), helping to raise revenue, and narrowing the financial gaps of health sectors providing universal health coverage. Despite great efforts to improve accessibility to modern healthcare services in the past two decades, utilization of healthcare services in Ethiopia has remained very low. However, the functions of pooling funds and organizing them are critical for countries' progress toward UHC.

Objective: This study aimed to assess willingness to pay, explore the mechanism of financial pooling for community-based health insurance, and identify factors associated with households in the Tigray Region, Northern Ethiopia, in 2020.

Method: A community-based, quantitative and qualitative cross-sectional study was conducted from September to October 2020 in Tigray, Ethiopia. The sample size was determined using a single population proportion formula. Multi-stage cluster sampling was used to select 845 study participants and 10 KII and 4FGDs were selected using a purposive sampling technique. Data were collected using an interviewer-administered questionnaire that was managed and analyzed using Epi-data Version 3.5.1 and SPSS Version 21. The interview guide used Atlas-ti software for qualitative data.

Results: Based on 845 households surveyed, more than half of respondents, 483 (57.2%), were female. The majority of the respondents, 743 (87.9%), knew the current premium and registration fee of community-based health insurance (CBHI), with more than 90 percent, 790 (93.5%), planning to renew/enroll their membership in CBHI, with the mean premium per household head they were willing to pay being 396 ETB (SD=±216) and 310 ETB (SD=±115) per household annually for urban and rural, respectively. In addition, six out of ten (62%) urban dwellers and five out of ten (52%) rural dwellers wanted to pay an additional amount of money to the current governmental premium threshold (which is 240 ETB for rural and 350 ETB for urban).

Conclusion: Community-based health insurance is an effective means of increasing the utilization of healthcare services and providing a scheme for member households with a pool mechanism situated at the district level, enabling districts to own the scheme, a decentralized health system, and decentralized decisions, ensuring equity. To alleviate deficits and make CBHI increases in the annual premium and enrollment of the community to CBHI sustainable, budget subsidization by the government to reverse the ruin, increased community awareness, and continuing the current pooling mechanism at the district level, but establishing or revising a department at the health office that controls the process of CBHI, are recommended.

Keywords: Community-based health insurance; Healthcare utilization; Healthcare financing universal health coverage; Financial pooling

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Abbreviation

ANC: Ante-Natal Care; CBHI: Community-Based Health Insurance; ETB: Ethiopian Birr; EPSA: Ethiopian Pharmaceutical Supply Agency; FGD: Focus Group Discussion; HEP: Health Extension Programme; HEW: Health Extension Workers; KII: Key Informant Interview; LIC: Low Income Country; MOU: Memorandum of Understanding; OOP: Out of Pocket; OPP: Out of Pocket Payment; SD: Standard Deviation; UHC: Universal Health Coverage; USD: United States Dollar; WIP: Willingness to Pay

Background

Globally, approximately 44 million households (more than 150 million people) face financial problems due to healthcare expenditure [1]. In the majority of African countries, more than 40% of the total health expenditure is by out-of-pocket payment (OPP), which results in a scarcity of funds for health [2]. More than 90% of healthcare financing problems have been reported in sub-Saharan African countries, where resources are limited [3,4]. The economic burden of direct payments worsens among people in lower income groups because healthcare demands out-of-pocket payments by borrowing or selling property [5,6]. As a result, developing healthcare financing systems is a common agenda and key area for health system actions toward universal health coverage (UHC) [3] for all countries [3,4-7]. Community-Based Health Insurance (CBHI) is an emerging concept for providing financial protection to healthcare financing problems in low-income countries that involves the mobilization of resources for the health sector (revenue raising), accumulation and management of prepaid financial resources (pooling), and allocation of pooled funds (purchasing) [3,8]. Among others, South Korea, Ghana, and Rwanda are the best examples of lessons learned from developing countries, while South Korea is often cited as a success story for its rapid achievement of universal health coverage through community-based health insurance [1,3]. However, in most African countries, healthcare financing covers almost exclusively the formal sector and achieves no more than 10 percent of population coverage [3,9].

Pooling arrangements and their potential to contribute to progress toward UHC have received much less attention. However, the function of pooling and the different ways in which countries organize this is critical for their progress toward UHC [10,11]. According to evidence from [13], fragmentation in pooling is a particular challenge for UHC objectives. Pools are fragmented when barriers exist in the redistribution of prepaid funds. This results in inefficiency in the healthcare system, as it typically implies duplication (or multiplication) in the number of agencies required to manage pools (and, usually, purchasing as well) [11,12]. Low adherence rates, limited resource mobilization, and poor sustainability have been the challenges to in effective implementation of the CBHI scheme in some sub-Saharan African countries [9].

The government of Ethiopia has introduced community-based health insurance (CBHI) as a strategy for reducing catastrophic financial shocks in our country, and it has been piloted in 13 selected districts in Amhara, Oromia, Southern Nations, Nationalities, and Peoples (SNNP), and Tigray [11,12]. Community-based health insurance benefit packages are available for all services in health centers and hospitals, excluding tooth implantation and eyeglasses, with a provider payment mechanism making an effort to remove financial risk through the expansion of CBHI [14-16]. According to the Health Sector Financing Reform (HSFR) project report, the overall enrollment was 48% [12]. However, evidence has shown that utilization of the scheme was affected by different socio demographic, economic, and health-related factors, including the study region in Tigray, northern Ethiopia [12,13]. Understanding the CBHI pooling setup and the community's willingness to pay (WTP), determining the amount of money, and exploring facilitators and barriers while implementing the scheme are necessary for policy makers to redesign and reform options, and to expand the program regionally. Therefore, the objective of this study was to assess the CBHI pooling setup, WTP for CBHI, and associated factors among rural and urban households in the Tigray region of Northern Ethiopia.

Methods

A community-based, quantitative and qualitative cross-sectional study design was employed from September 1 to October 20, 2020 in an urban-rural community of selected districts in Tigray Region, which is located in northern Ethiopia, hosting seven zones (one special zone), 93 districts (71 rural and 22 urban) with 814 kebeles (the smallest administrative unit) and a total projected population of 6,960,000 (CSA 2007 census projected for 2015), with 90% overall health service coverage of the region [15,16].

All urban-rural households in the districts that had (not yet) established the CBHI scheme were the source population, whereas the study population comprised sampled households in the selected districts. Household heads that had lived for more than six months in the kebele and who were ≥ 18 years of age were included in the study. Respondents who were working in the formal sector or unable to participate in the interview due to health conditions were excluded from the study. Respondents working as focal persons of CBHI in regional health bureaus, district health offices, and health insurance agencies, zonal coordinators, district and kebele administrators, representatives of the kebele's cabinet, and health extension workers were eligible for the qualitative study.

The sample size was calculated using a single-population proportion formula with the assumption of proportion of willingness to pay (WTP) for CBHI ($p=80\%$) in Fogera District, Ethiopia [17] using the 95% confidence interval ($Z=1.96$) and a 4% margin of error. After considering a design effect of 2 and adding

10% for a potential non-response rate, the final sample size was 845 households. For the qualitative part, 10 KI and 4 FGD were interviewed with key actors of health insurance representatives at each selected district and kebele.

A multistage sampling technique was used to select the study participants. To reach the final sample size, the first 14 districts out of the seven zones were selected using cluster sampling and then 2 kebeles from each district using simple random sampling, and finally the households' proportion to size was sampled using systematic random sampling from each kebele. In the first stage of sampling, 28 kebeles from 14 districts were randomly selected from the region. In the second stage, households were selected from these by systematic random sampling and probability proportionate to size (PPS), for which a purposive sampling technique was used.

The dependent variables are willingness to pay and the financial pooling mechanism for CBHI. Willingness to pay means the maximum (non-zero) amount that households are willing to pay for the insurance scheme, elicited through a double-bound contingent valuation method specifically by applying a bidding game. Independent variables, such as socio demographic characteristics (age, sex, marital status, educational status, family size, religion, and ethnicity), economic factors (wealth index and occupation), environmental factors (distance from health institution in walking time), health and health-related factors (health condition of illness, chronic illness and disability, medical treatment for the recent episode, healthcare cost of the recent treatment, perceived quality of the healthcare service in the area), and knowledge-related factors (awareness of CBHI and social trust) were independent variables in the study (Figure 1).

The wealth index questionnaire was adapted from the Ethiopian Health Insurance Agency for the number and types of consumer goods owned, housing characteristics, and availability of basic amenities for residents. From these, scores were derived using principal component analysis and classified into five quintiles. Quantitative data were collected from selected CBHI members and non-member households using pre-tested interviewer-administered structured questionnaires adopted from other studies conducted in similar areas. The survey questionnaires were developed to elucidate information on the basic demographic and socioeconomic characteristics of the households, incidence

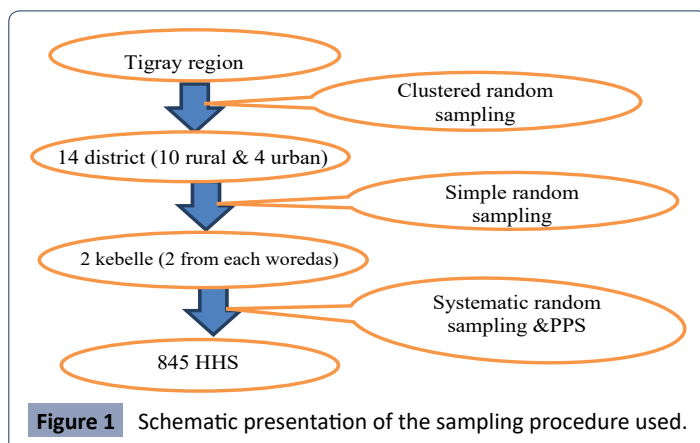
of illness, and subsequent choice of health providers, and the amounts and sources of money used to finance healthcare services for illness for themselves and family members. The survey questionnaire was administered in Tigrigna, the working language of the state which most study area residents adequately listened to and spoke. Fifteen trained data collection teams were used for data collection, and each team comprised three data collectors and one field supervisor. Supervisors spot-checked the quality of data collection and ensured the questionnaires were completed daily. The qualitative study respondents purposively selected included board members and general congress, the Agency of CBHI, the Zonal Administration, the Woreda Health Office, the Woreda Administration, and the Regional Health Bureau. Ten key informant interviews were conducted in each woreda with four focus group discussions, one in each of the selected woredas, with eight participants in each group.

An effort was made to include participants with a range of characteristics in order to obtain a broad representation of CBHI management and budget administration. Data were gathered using a prepared FGD guide that was introduced to the participants, describing the objective of the study, and was followed by open questions centering on the CBHI and the sum of money made available for the purpose of the scheme. Trained moderators facilitated all FGDs, with discussion notes taken and audio recordings made.

Contingent valuation was used to elicit WTP for oneself, for other members of the household, and also for altruism (for poor and impoverished people in the community) using only the bidding game technique (Dong et al. 2005). Three iterations were used in the bidding game depending on the answer to the starting bid. The final response was a continuous quantitative amount that indicated respondents' maximum WTP. A brief introductory explanation and scenario regarding health insurance was provided to the respondents before determining their WTP for the scheme. The concept of CBHI and its attributes were explained before starting the bidding game.

Quantitative data were analyzed using Epi-data Version 3.5.1, and SPSS Version 21. Frequencies and proportions were used to describe categorical variables using cross-tabulation. Factors associated with the outcome variable with $P < 0.20$ in the bivariate analysis were included in the multivariable logistic regression, data from focus group discussions and KII were transcribed, and responses were classified into general categories identified in the discussion and interview guide using Atlas-ti software. A common theme was identified, inferences were made from each theme, and conclusions were drawn.

Ethical clearance was obtained from the IRB of the Tigray Health Research Institute. Support letters were obtained from the Tigray Regional Health Bureau, and Health Office permission was obtained from the kebeles' administration prior to conducting the study. Written consent was obtained from the respondents prior to the interview by explaining the purpose of the study as the IRB of the THRI had already accepted and approved it. The confidentiality of their information was assured using a coding system and by removing any personal identifiers. Respondents' right to refuse to answer several or all of the questions was respected.



Results

Description of study participants

Of 845 sampled respondents, more than half, 483 (57.2%), were female. A total of 810(95.9%) were Christian Orthodox, followed by 35(4.1%) Muslim/Catholic; 840 (99.4%) were Tigrayan, the majority of them, 607(72%), rural dwellers; and 267(31.6%) were between the ages of 29 and 39 years. Among them, 581 (68.8%) were married, followed by 116(13.7%) divorced/separated, 75(8.9%) single and 73(8.6%) widowed, respectively. More than half of the respondents, 500(59.2%), had family size less than or equal to five, whereas 345(40.8%) had family size greater than five.

In total, 554 (65.6%) had two or more, 169 (20%) exactly one, and 112 (14.4%) no family members of age 18 years or older currently living with them. The majority of the respondents, 385 (45.6%), have no family members younger than 5 years old, whereas 110 (13%) and 350 (41.4%) had two or more and exactly one, respectively. Similarly, of the total respondents only 89 (10.5%) had one or more family member age 65 years and older. Of the respondents, 440(52.1%) and 141(16.7%) were farmers and daily laborers, respectively followed by merchants, 93 (11%), housewives, 89 (10.5%), and others, 82 (9.7%). Looking at the educational background of respondents, 309 (36.6%), 135 (16%), 252 (29.8%), 139 (16.4%), and 10 (1.2%) were unable to read and write, could read and write, had primary school, had secondary school, and had college or above. In total, 329 (38.9%) of the respondents' wealth indices were below the median level and are poor and poorest, whereas 342 (40.5%) were above the median level and are rich and richest (Table 1).

Health and health-related characteristics

Out of the total sample size, 84 (9.9%) respondents had a history of chronic illness, and of the total respondents 250(29.5%) had at least one episode of acute illness in the last six months and almost all (92%) of them sought treatment for their recent episodes, with 136(59.4%), 70(30.6%), and 23(10%) in public health centers, hospitals, and private health facilities, respectively. Of the total participants, 611(72.3%) lived close to health centers and 234(27.7%) to hospitals (Table 2).

Awareness of head of household

The results revealed that the majority of respondents, 796 (94.2%), had heard about community-based health insurance (CBHI). Nearly two-thirds of the respondents received CBHI information from health extension workers and were aware that CBHI is not like a saving scheme; that is, they will not earn interest in their premium payment, nor will the premium be returned even if they do not use health services, but rather that the premium is a payment to finance future health costs. Besides, more than 70% of the households had information that not only the poor are members of the CBHI.

Practice of household heads toward CBHI

Of the total 845 household members covered in this survey, 433 (51.2%) were insured with the scheme through their own contributions. More than half of the surveyed households had less

Table 1. Demographic and socioeconomic characteristics of the study participants in Tigray Region, Northern Ethiopia, 2020 (N=845).

Characteristics	Number	Percentage
Sex of respondent		
Male	363	42.7
Female	482	57.3
Age of respondents		
<=29 years	172	20.3
30-39 years	267	31.6
40-49 years	171	20.2
50-59 years	112	13.3
>=60 years	123	14.6
Religion		
Orthodox	810	95.9
Muslim/Catholic	35	4.1
Ethnicity		
Tigrain	840	99.4
Amhara	5	0.6
Marital status of respondents		
Single	75	8.9
Married	581	68.8
Widowed	73	8.6
Divorced/Separated	116	13.7
Residence of the respondent		
Rural	607	71.8
Urban	238	28.2
Household/family size		
Greater than 5	345	40.8
Less than or equal to 5	500	59.2
Household having member ≥18 years old		
No having ≥18 years old	122	14.4
Having one	169	20
Having two or above	554	65.6
Household members younger than 5 years old		
No child	385	45.6
Having one child	350	41.4
Two or above	110	13
Household members older than age 65 years		
No older age	756	89.5
One or above	89	10.5
Occupation of the respondent		
Farmer	440	52.1
Housewife	89	10.5
Merchant	93	11
Daily laborer	141	16.7
Others	82	9.7
Educational status of the respondent		
Unable to read and write	309	36.6
Read and write	135	16
Primary school	252	29.8
Secondary school	139	16.4
College or above	10	1.2
Wealth Index		
Poorest (1st quintile)	164	19.4
Poor (2nd quintile)	165	19.5
Medium (3rd quintile)	174	20.6
Rich (4th quintile)	180	21.3
Richest (5th quintile)	162	19.2

Table 2. Health and health-related situations of participants in Tigray Region, Northern Ethiopia, 2020 (N=845).

Characteristics	Number	Percentage
Have history of chronic illness		
Yes	84	9.9
No	761	90.1
Encountered any illness during the last 6 months in the family		
Yes	250	29.6
No	595	70.4
Have sought and received medical care (n=250)		
Yes	229	27.1
No	21	2.5
Place where you receive treatment (n=250)		
Public health center	136	59.4
Private health facility	23	10
Public hospital	70	30.6
Nearest health facility to your home		
Hospital	234	27.7
Health center	611	72.3

than or equal to two years of enrolment. More than two-thirds of the members paid a premium at the Kebele administration office. Members were asked why they joined the CBHI scheme; around one-quarter clarified that they did not know enough about the CBHI scheme (Table 3).

Household head's knowledge of CBHI benefit packages: The majority of the households, 805(95.3%), thought regarding health and health-related expenditure that CBHI is good way of helping clients with health expenditures. In addition, approximately 80 percent, 672(79.5%), of household heads knew that CBHI covers only care within the country. Similarly, 91.8% of respondents knew that CBHI covers for both outpatient and inpatient health expenditure. On the other hand, about 324(38.3%) and 235(27.8%) of household heads did not know that CBHI does not cover medical care for cosmetic values and transportation fees, respectively. Generally, in this study, the overall knowledge status of respondents regarding what CBHI is, how it works, and its concepts and purpose was 521(61.7%) respondents.

Willingness to pay: In this study, the majority of the respondents, 743(87.9%) know the current premium and registration fee of community-based health insurance (CBHI) and 790(93.5%) plan to renew/enrolled their membership of CBHI. However, 267(36.7%) respondents felt that the premium for CBHI per household is inadequate. Hence, greater than 60%, 121(62.7%) respondents were urban communities and about 279 (52%) from rural communities suggested to increase the current premium for CBHI. The mean annual amount of money (premium) per household head they were willing to pay was 396 ETB (SD=±216) for urban and 310 ETB (SD=±115) for rural areas per household annually. Similarly, the average amount of money they were willing to pay for registration fees for CBHI was 18.9 (SD=±12.5) (in Birr).

Benefit of CBHI among households: Of the total CBHI members,

Table 3. Practice of household head toward CBHI in Tigray Region, Northern Ethiopia, 2020 (N=845).

Characteristics	Number	Percentage
Insurance status		
Insured	433	51.2
Not insured	399	47.2
Insured but not renewed	13	1.5
Length of enrollment		
Less than/equal to 2 years	241	54
Greater than 2 years	205	46
Time taken, after payment of registration fee and premium, to start utilizing health services(n=446)		
Greater than 30 days	286	64.1
Less than 30 days	160	35.9
Where do you pay the premium		
At the CBHI office	76	17
At kebele administration office	309	69.3
Official comes and collects	61	13.7
Why did you decide to enrolling CBHI (n=699)		
Illness and/or injury occurs frequently in our household	163	23.3
To finance healthcare expenditure	271	38.8
Premium is low compared to the user fee price to obtain medical treatment	224	32.04
Pressure from other family members/ community	10	1.43
Pressure from the CBHI office	31	4.43
Why did you decide not to enroll in CBHI (n=404) Number percentage		
Illness and injury does not occur frequently in our household	48	11.88
The registration fee and premiums are not affordable	77	19.06
Want to wait in order to confirm the benefits of the scheme from others	57	14.11
We do not know enough about the CBHI scheme	93	23.02
There is limited availability of health services	36	8.91
The quality of healthcare services is low	36	8.91
The benefit package does not meet our needs	31	7.67
CBHI management staff are not trustworthy	13	3.22
Waiting time to access services is longer for CBHI members	13	3.22

384(86.1%) respondents were assured that they benefitted from the CBHI. Reduced costs of healthcare for 237(61.7%) respondents were among the dominant benefits they received. Of the respondents, 62(13.9%) believed that they did not benefit from CBHI, and none of their HH members visited HFs for 41 (66.1%) respondents, paying additional costs for treatment for 17(27.4%) respondents, poor quality service for CBHI members for 14(22.6%) respondents, and delay in issuing and distribution of CBHI ID cards for 13(21%) respondents were some drawbacks of CBHI.

Level of satisfaction of respondents toward the quality of health services

Household satisfaction with the CBHI scheme was rated using 17 items, each having a 5-point scale from strongly disagree to strongly agree. During the last six months, the number of household heads visiting a health facility was 250(29.6%), of which 140(16.6%) visited health centers, 49(5.8%) both a hospital and health center, and 61(7.2%) a hospital only, respectively. Those who visited HFs more than once was 140 (56%) respondents, while only once was 110 (44%) respondents.

Household heads dissatisfied with the quality of health services showed an average 1.6 decrease compared to household heads who were satisfied, which was 58.6;24(9.6%) household heads responded they were strongly satisfied with cleanliness of the health facility while25/111(22.5%)household heads were dissatisfied with attentiveness and adequate follow up by nursing staff. Household heads who was satisfied with quality of health services was 58.6% greater as compared to household heads who were dissatisfied. Household heads who were satisfied with availability of drugs/medical supplies (56.8%) and diagnostic facilities (60.4%) increased as compared dissatisfied household heads. Household head satisfaction with confidentiality and service provider attitudes toward explaining health problems was 68.8% and 64%, respectively. Household heads who were neutral for satisfaction with waiting time and waiting time between services had a 19.8% increase as compared to household heads who were satisfied.

Household heads who were strongly dissatisfied with service provider friendliness were 11.2%, while those strongly satisfied with respect to the service provider were 8%. Similarly, 8.3% of household heads were satisfied with the members' card collection process. The overall score for household satisfaction with the CBHI scheme was 75.6 (Table 4).

Factors associated with willingness to pay

To identify the factors associated with willingness to pay, bivariate linear regression was used with the following independent variables: sex, age of household head, marital status, residence, household family size, occupation of respondent, educational status of respondent, wealth index, illness in the last six months, place receiving treatment, nearest health facility, place where you hear about CBHI, level of awareness, length of enrolment, knowledge status, overall satisfaction of health services, and cumulative perceived perception of CBHI. Variables that were associated with WTP in the bi-variable analysis (at P-value < 0.25) were included in the multivariable linear regression model. After adjusting for all other variables, 11 variables (age of household head, residence, family size, occupation of respondent, educational status of respondent, wealth index, nearest health facility, place where you hear about CBHI, level of awareness, knowledge status, and overall satisfaction with health services) were identified as factors associated with willingness to pay the CBHI schemes.

For a one-unit increase in age, i.e., when age increased, willingness to pay increased by 0.86 (95% CI: 0.13, 1.70, P=0.009).

Table 4. Level of satisfaction of household heads toward quality of health service in Tigray Region, Northern Ethiopia, 2020 (N=845).

Characteristics	Number	Percentage
Have you visited a health facility during the last 6 months		
Yes	250	29.6
No	595	70.4
Frequency of health facility visiting		
Once	110	44
Greater than once	140	56
Health institution/facility visited		
Only hospital	61	7.2
Both hospital and health center	49	5.8
Only health center	140	16.6
Satisfied with the service you received during your visit/stay		
Very dissatisfied	13	5.2
Dissatisfied	44	17.6
Neutral	31	12.4
Satisfied	147	58.9
Very satisfied	15	6
Satisfied with overall quality of service		
Very dissatisfied	4	1.6
Dissatisfied	39	15.6
Neutral	58	23.2
Satisfied	142	56.8
Very satisfied	7	2.8
Availability of drugs/medical supplies		
Very dissatisfied	9	3.6
Dissatisfied	57	22.8
Neutral	42	16.8
Satisfied	126	50.4
Very satisfied	16	6.4
Availability of diagnostic facilities		
Very dissatisfied	6	2.4
Dissatisfied	35	14
Neutral	58	23.2
Satisfied	129	51.6
Very satisfied	22	8.8
Cleanliness of the facility		
Very dissatisfied	5	2
Dissatisfied	26	10.4
Neutral	43	17.2
Satisfied	152	60.8
Very satisfied	24	9.6
Waiting time (from time of arrival in the health facility to seeing a health professional)		
Very dissatisfied	6	2.4
Dissatisfied	48	19.2
Neutral	42	16.8
Satisfied	145	58
Very satisfied	9	3.6
Waiting time between services (e.g. between consultation and diagnosis)		
Very dissatisfied	5	2
Dissatisfied	42	16.8

Characteristics	Number	Percentage
Neutral	57	22.8
Satisfied	120	48
Very satisfied	26	10.4
Friendliness of staff		
Very dissatisfied	8	3.2
Dissatisfied	38	15.2
Neutral	48	19.2
Satisfied	128	51.2
Very satisfied	28	11.2
Respect from healthcare providers		
Very dissatisfied	6	2.4
Dissatisfied	35	14
Neutral	51	20.4
Satisfied	138	55.2
Very satisfied	20	8
Attentiveness and adequate follow up by the nursing staff (inpatient only in hospitals)		
Very dissatisfied	8	7.2
Dissatisfied	17	15.3
Neutral	19	17.1
Satisfied	60	54.1
Very satisfied	7	6.3
Quality of food and other inpatient amenities (inpatient only in hospitals)		
Very dissatisfied	3	2.7
Dissatisfied	22	19.8
Neutral	25	22.5
Satisfied	59	53.2
Very satisfied	2	1.8
Satisfied with confidentiality		
Very dissatisfied	9	3.6
Dissatisfied	30	12
Neutral	39	15.6
Satisfied	142	56.8
Very satisfied	30	12
Satisfied with service providers' attitude toward explaining health problems		
Very dissatisfied	14	5.6
Dissatisfied	34	13.6
Neutral	42	16.8
Satisfied	137	54.8
Very satisfied	23	9.2
Satisfaction with members card collection on process (only CBHI members)		
Very dissatisfied	35	7.8
Dissatisfied	71	15.9
Neutral	58	13
Satisfied	245	54.9
Very satisfied	37	8.3
Overall satisfaction		
Satisfied	189	75.6
Neutral	52	20.8
Not satisfied	9	3.6

Changing from urban to rural regions resulted in decreased willingness to pay by 79.6% (95% CI: -118.26,-40.85, p=0.001). A

one-unit increase in family size resulted in a 5.26 point increase in willingness to pay (95% CI: 0.16, 14.71; p=0.03), merchants were 83.4 times more willing to pay than farmers (95% CI: 8.66, 175.5; p=0.05) whereas daily laborers decreased willingness to pay by 68% compared to farmers (95% CI: -119.74, 16.54; p=0.01), and changing from secondary school and above education to unable to read and write decreased by 66% the willingness to pay (95% CI: -71.06, 2.81;p= 0.007). When the wealth index increased, willingness to pay increased 2.6 times (95% CI: 0.13, 14.35; p=0.009) and 12 times (95% CI: 1.21, 20.11; p=0.001) among the rich and richest, respectively. When hospitals were the nearest health facility, willingness to pay increased 57 times (95% CI: 20.82, 94.43; p=0.01). The source of information on CBHI being through neighbours, mass media, and health professionals decreased willingness to pay by 74%, 72%, and 71%, respectively, when compared with health extension workers. Having awareness of CBHI was 49.18 times more willing to pay when compared with those not aware. Those who were knowledgeable were 2.5 times willing to pay compared with those not knowledgeable (95% CI: 0.05,10.05; p=0.03),and when compared with those not satisfied with the service given, those who were satisfied were 27 times willing to pay (95% CI: 3.36, 59.45; p=0.04) (Table 5).

Community awareness and perception

According to most key informants, community awareness and perception of CBHI have increased over time, and enrollment in the scheme has also increased. However, as the premium for the scheme is small, this affects the perception of some community's on being a member as they consider that they could not receive quality services by paying such premiums. An expert curative and rehabilitative case-team coordinator said:

"As observations, there are wrong perceptions from some members of the community who said that through this low premium, CBHI could not be as much more benefited."

Furthermore, poor interest in enrolling when they feel healthy and want to be a member when they are sick indicates poor awareness of the system; in line with this, if members of the scheme were not sick in the fiscal year, they felt compunctions for the premium they paid.

CBHI coverage and sustainability: All key informants agreed that CBHI coverage in their respective districts increased from year to year, ranging from 52% during Ramma to 92% during Mokoni. In 2012, E.C. shows huge inter-district coverage differences of CBHI and sustainability problems due to gaps in community mobilization for enrollment. Campaign mobilization focuses on coverage rather than convincing the community of the aim of the scheme. In a pilot district, CBHI coverage was increased, providing aid such as wheat for enrolment, which affected community sustainability in the scheme of some key informants:

Due to that wrong way, some community members considered enrolment to CBHI as a benefit of to the government not as a benefit of themselves" (District CBHI coordinator).

Most key informants of the districts confirmed that they faced budget discrepancies/deficits due to incomparable premium payment amounts, and low coverage of the CBHI enrolment and

Table 5. Factors associated with willingness to pay of household heads toward CBHI in Tigray Region, Northern Ethiopia, 2020 (N=845).

Characteristics	Bivariate Analysis			Multivariate Analysis		
	B	95%CI	P-Value	B adjusted	95%CI	P-Value
Sex of household head						
Male	17.01	(-4.84, 38.87)	0.13			NS
Female	1					
Age of household head	0.64	(-0.12,1.40)	0.09	0.86	(0.13,1.70)	0.009
Religion						
Orthodox	-28.13	(-88.32,26.85)	0.32			NS
Muslim/Catholic	1					
Marital status of household head						
Single	1					
Married	1.56	(-22.17,25.29)	0.13			NS
Widowed	2.64	(-37.99,43.28)	0.89			NS
Divorced/separated	-28.49	(-60.51,3.53)	0.08			NS
Residence of household head						
Rural	-86.29	(-109.7,-62.85)	0	-79.57	(-118.26,-40.85)	0.001
Urban	1					
Household/family size	6.75	(0.68,12.81)	0.03	5.26	(0.16,14.71)	0.02
Household members ≥18 years old	-2.55	(-11.19,6.09)	0.56			NS
Household members younger than 5 years old	-7.54	(-22.66,7.57)	0.33			NS
Household members older than age 65 years	-1.48	(-28.32,25.35)	0.91			NS
Occupation of respondents						
Farmer	1					
Housewife	14.19	(-20.62,49.01)	0.42			NS
Merchant	50.29	(15.29,85.31)	0.01	83.44	(8.66,175.52)	0.05
Daily laborer	-37.5	(-66.64,-8.36)	0.01	-68.14	(-119.74,16.54)	0.01
Others*(petty traders, unemployed students)	35.66	(-1.48,72.81)	0.6			NS
Educational status of respondent						
Unable to read and write	-15.51	(-38.07,7.04)	0.18	-34.13	(-71.06,2.81)	0.007
Read and write	10.39	(-18.95,39.73)	0.49			NS
Primary school	7.71	(-15.94,31.35)	0.52			NS
Secondary school	1					
Wealth Index						
Poorest (1st quintile)	1					
Poor (2nd quintile)	0.81	(-26.57,28.19)	0.95			NS
Medium (3rd quintile)	3.28	(-23.65,30.21)	0.81			NS
Rich (4th quintile)	-38.51	(-64.50,-12.53)	0	2.6	(0.13,14.35)	0.009
Richest (5th quintile)	37.28	(9.81,64.74)	0.01	12.01	(1.21,20.11)	0.001
Have history of chronic illness						
Yes	-17.35	(-54.56,19.85)	0.36			NS
No	1					
Encountered any illness during the last 6 months in the family						
Yes	14.43	(-9.38,38.23)	0.23			NS
No	1					
Have sought and received medical care						
Yes	-3.65	(-79.39,72.09)	0.92			NS
No	1					

Characteristics	Bivariate Analysis				Multivariate Analysis			
Place where you receive treatment								
Public health center	-16.98	(-46.58,12.62)	0.26					NS
Private health facility	123.44	(59.51,187.38)	0.001					NS
Public hospital	1							
Nearest health facility to your home								
Hospital	72.82	(49.09,96.55)	0.001		57.62	(20.82,94.43)	0.01	
Health center	1				1			
Place where you obtain information/hear about CBHI (N=796)								
Neighbors/friends	-42.22	(-75.00,-9.45)		0.01	-74.84	(-129.15,-20.52)		0.007
CBHI officials in public meeting	-10.86	(-32.92,-11.19)		0.33				NS
House to house awareness creation campaign	-27.21	(-6.72,-61.13)		0.12				NS
Mass media: TV, radio	-88.75	(-125.45,-52.04)		0.001	-72.96	(-128.67,-17.24)		0.01
Professionals in health facilities	-28.53	(-53.69,-3.36)		0.03	-71.37	(-107.91,-34.83)		0.001
Health extension workers	1							
Level of awareness								
Aware	38.15	(14.65, 61.65)		0.001	49.18	(12.59,85.77)		0.009
Not aware	1							
Length of enrollment								
Less than/equal to 2 years	-23.51	(-56.83,9.81)	0.17					NS
Greater than 2 years	1							
Time taken, after payment of registration fee and premium, to start utilizing health services								
Greater than 30 days	0.72	(-34.03,35.47)	0.98					NS
Less than 30 days	1							
Knowledge status								
Knowledgeable	1.8	(0.24,20.64)	0.06		2.5	(0.05,10.05)	0.03	
Not knowledgeable	1							
Benefited from the CBHI scheme								
Yes	-25.09	(-74.62,24.42)	0.32					NS
No	1							
Overall satisfaction of health service								
Satisfied	24.64	(10.14,73.45)	0.23		27.32	(3.36,59.45)	0.04	
Not satisfied	1							
Cumulative perceived perception of CBHI								
High	-19.72	(-41.65,2.21)	0.09					NS
Low	1							

continuous market inflation are among other reasons. In addition, one participant explained that most members of the scheme were households who repeatedly got sick, and those who had no history of illness were not members: .

“Most member of CBHI scheme is those who usually get sick and those who did not usually get sick are not” (district curative and rehabilitative case team coordinator).

On the other hand, increased healthcare demand, even for health check-ups, from the community increases the budget

deficit for CBHI. Poor preparedness of health facilities was also mentioned as a reason for problems with CBHI. Furthermore, most participants confirmed that less focus from different levels of leaders affected the sustainability of the scheme:

“Even as a region, when should work more to make it more sustainable, we are always good in starting programmers but we are poor to make programme become sustainable”(cluster CBHI head).

Health facilities’ preparedness and service quality: Most

participants declared that health facilities tried their best to avail drugs and supplies adequately to satisfy the community. However, because of the absence of drugs and supplies in the market and the Ethiopian Pharmaceutical Supply Agency (EPSA), clients are referred to private health facilities and this creates dissatisfaction, even if they withdraw from the scheme. On the other hand, some clients want to be referred to private health facilities as they thought better treatments can be found there, which is costly. Ruin of CBHI is highly increased up to 100,000 birr for the reimbursement of individuals. Furthermore, due to a lack of preparedness, CBHI is becoming a source for the lack of good governance in some health facilities, increasing community dissatisfaction:

“If we failed prepare the community will engulf us for our failure” (district CBHI coordinator).

According to reflections from some participants, increasing health service utilization following CBHI implementation is negatively affected by the rude character of health service providers:

“When clients repeatedly visit health facilities, some health professionals are not happy by the workload due to CBHI and even showed a rude character for clients for their repeated visit” (district curative and rehabilitative case team coordinator).

Some participants explained the contribution of CBHI to improving service quality through proper referral linkage because due to CBHI the health facilities utilize the health tier system properly. Thus, self-referral to higher levels of health facilities decreased as clients did not want to cover half the payment for the service they obtained, preventing unnecessary workload in higher health facilities and underutilizing lower-level health facilities.

Some participants mentioned a public-private partnership as a mechanism to prevent ruins in the CBHI. Furthermore, informants noted that regulation of exaggerated drug and supply costs in private health facilities should be practiced, and that such measures are the responsibility of the functional state:

“We are regulating private health facilities for their quality service provision, having expired drugs, and practicing other unpermitted procedures, why do not we regulate them on the cost of the services they asked? Nothing! We can regulate them” (cluster CBHI coordinator).

Challenges: Participants indicated resource-related challenges in the implementation of CBHI. Most participants underlined the structural challenges of CBHI. Even if the implementation among districts is not standardized, some districts have a CBHI coordinator, while others do not, and responsibility is given to curative and rehabilitative case team coordinators.

Most informants explained that the scheme had adequate human power and budget limitations. Furthermore, negligence in allocating an administrative budget to the scheme was mentioned. Some participants reflected their grievances about the poor ownership of CBHI by different bodies at each level of management. Thus, for most informants, especially those directly involved in the scheme, these challenges were described as the cause of their dissatisfaction with the scheme:

“Though CBHI is a basic scheme to help the community, giving a due focus as of its importance has remained low” (Cluster CBHI coordinator).

“The focus given for CBHI by managers in each level is not satisfactory, and I feel sorry and even I think I will leave my job if I get another better opportunity” (district CBHI coordinator).

Due to inadequate human power, premium collection and utilization are negatively affected. Furthermore, this also affects health extension workers performing other routine activities because of their engagement in collecting revenues. Additionally, according to the informants, revenue extravagancy is also in place because of the absence of responsible bodies in each kebele:

Theoretically, in kebele during the collection of revenue, above 2000 birr should not be wait in the hands of the collectors; it should be deposited to the nearby bank account, but in practice, it is common to get, up to 80,000 birr in the hands of the revenue collectors. Therefore, our revenue collection is not immune from extravagancy, (district curative and rehabilitative case team coordinator).

Another challenge faced by the informants was the restructuring of districts. As districts are separated into different administrative units, this delays the start of the scheme among newly emerging districts and is challenging for the continuity of the scheme.

Recommendations/the way forward

For better CBHI implementation, a robust and effective pooling system is critically important. One of the specific objectives of this study was to identify where the pooling system for CBHI should be situated, as a number of newly emerged districts have been created for administrative purposes in the current Tigray. As a result, 86% (n=24) of the key informants recommended that the pool for CBHI should be situated at the district level. Participants described their arguments regarding this issue: situating the pool at the district level enables districts to own the scheme, decentralizes the health system and decisions, and ensures equity.

However, among the participants, three preferred the pool to be situated at a regional level. Their argument was based on the importance of focusing on the scheme at the regional level and sharing responsibilities. Additionally, they also need to lead the program through experience sharing to achieve a balanced performance among districts, which they considered would be better if handled by the region. However, one participant preferred it to be situated in both districts and regions. His argument was that this would solve the problems of delay during signing the MOU among district health offices and hospitals. Accordingly, he noted that districts should make agreements with health centers and hospitals within the region. Thus, partial pooling in both districts and regions is an option.

Furthermore, almost all participants recommended revising the structure of CBHI and that adequate human power should be employed. Adequate budget allocation for the scheme was also recommended by most informants. In line with this, more than 80% (n=23) of the participants recommended raising premiums due to the existence of market inflation in the cost of drugs and supplies.

On the other hand, three participants agreed on increasing the premium but they had concern with the community's ability to pay, even though they reflected that members of the CBHI scheme could fail to renew their membership. Furthermore, one participant indicated his preference for the total involvement of the community, even with the current premium, before rushing to increase it. However, media coverage was also recommended to improve community awareness. The participants also recommended budget subsidization from the government to reverse the ruins. However, from the reflection of the participants, other methods of resource mobilization are poor on the ground.

Discussion

This study aimed to assess WTP for CBHI, pooling mechanisms, and associated factors among households in Tigray Region, Northeast Ethiopia. This study revealed that six out of ten (62%) urban dwellers and five out of ten (52%) rural dwellers wanted to pay an additional amount to the current governmental premium threshold (which is 240 ETB for rural and 350 ETB for urban). As an average amount of premiums, households were willing to pay per annum per household 396 ETB (10.7 USD) and 310 ETB (8.4 USD) (October 2020 exchange rate) for urban and rural dwellers, respectively. This current finding is higher than the study findings in Fogera district (187.4 ETB) [18] and Adama district (211 ETB) [19], but lower than the studies in Ecuador[20] and other parts of Ethiopia [21,22] which showed WTP an average of US\$30, US\$16, and US\$11.12 per year, respectively. This could be due to differences in the elicitation methods of the initial bids and changes in the value of money over time, area, design, and participants. Nevertheless, it is far from the 34 USD (30 USD-40 USD) recommended by the WHO in 2001 to deliver essential healthcare in low-income countries like Ethiopia. Based on the 2014 report, the mean medical expenditure was 28.65 USD per capita in Ethiopia. A study conducted in Gondar indicated that the median total cost incurred by patients was more than 22.25 USD per visit.

The results of this study revealed that age of the household head is significantly associated with willingness to pay for CBHI, and a similar finding in Namibia and Tanzania showed that the age of respondents affects their interest in and WTP for the scheme. This might be because as the age of individuals increases their income status also increases, or because as the age of individuals increases their health status will be decreased. This result is consistent with a study conducted in Nigeria which indicated that rural residents were less likely to have WTP. This implies that raising awareness is needed, especially in rural areas, and care must be taken to fix the premium paid by different population groups, which suggests that premiums should be adjusted for income and that there should be exemptions and subsidies for the poor to increase their willingness. Study participants who had few family members were less likely to pay for the scheme than their counterparts. This result is supported by studies conducted in other parts of Ethiopia Nigeria, China and India which might be because households with lower family sizes may consider covering the cost of medical care for their families by OOP. Again, this study's results show that merchants were more likely to be willing to pay than farmers, which is consistent with studies

conducted in other parts of Ethiopia. This might be a result of their level of earnings and ability to afford high medical expenses, given that families who are farmers (who are most often exposed to poverty) are less willing to pay than merchants in the private sector; policymakers must be aware that the poorest can be excluded from such a scheme and either subsidize or lower their premiums. The educational level of the respondents was found to be another factor that increased the premium they were willing to pay for the CBHI scheme, which is consistent with studies conducted in Nigeria, Cameroon and Burkina Faso. Educated household heads have better knowledge about the advantage of making regular insurance payments to avoid the risk of catastrophic medical expenditures at the time of illness, and might also have better income, access to media, and easily understand the benefits of participating in the health insurance scheme.

The wealth status of families was positively and significantly associated with WTP, which is similar to other studies conducted in other parts of Ethiopia Fogera district Nigeria China and India. A possible explanation might be that wealthier people have more WTP than the poor, which might be due to fear of high asset losses if unexpected events could occur, implying that the government should implement a co-payment system to enable poor households to meet their requirements. Households that are closer to hospitals are more willing to pay than those near health centers; this is an issue of quality health services, so the government should work more to equip health centers with medical equipment and drugs. A study conducted in Conakry and Guinea showed that poor quality of care in healthcare services is one of the main causes of low and even declining enrolment in CBHI.

HEW are more successful in disseminating information to the community regarding CBHI than other methods such as mass media and friends, which may be because a number of identified successes were achieved by the HEP (family planning, immunization, ANC, malaria, TB, HIV, and community satisfaction) in the first five years of implementation. Service utilization, improved knowledge and care seeking, increased latrine construction and utilization, enhanced reporting of disease outbreaks, a high level of community satisfaction and HEWs as the primary source of information have increased. Respondents' awareness of the CBHI scheme has a positive and significant association with their WTP for CBHI. This finding is consistent with those of studies conducted in Nigeria Cameroon and Myanmar. This may be due to the catastrophic effects of health problems and the benefits of joining insurance schemes earlier. This implies that intensive awareness creation and trust-building programs are required in the community, particularly for those who do not have formal education and those who have not been insured before. One qualitative participant indicated that:

"The community awareness and perception on CBHI has been increased from time to time. Thus, the interest of enrolling to the scheme is increased. However, there are some perceptions which hinder the enrollment of the community like they considered the scheme as the issue of the poor and they don't consider getting quality service through the seated premium [21,22]."

The study indicates that the knowledge of respondents regarding CBHI is significantly associated with willingness to pay, which shows that each level of government sectors, in collaboration with CBHI programmers, is more aware of the community about CBHI benefit packages and their premiums. The level of satisfaction with health service delivery affects willingness to pay for CBHI. In 2005, the World Health Assembly called on all countries to move toward universal health coverage, especially developing countries with huge inequalities in health service delivery. Therefore, CBHI enhances universal health coverage (UHC) if client satisfaction is met.

Limitations

Some district CBHI focal persons were not available during the data collection period, and data were collected from their representatives, which may have its own drawbacks for decisions which could, in turn, affect the pooling mechanism of CBHI.

Conclusion

The average amount of money households were willing to pay per annum per household for CBHI of urban dwellers was 396 ETB (10.7 USD at October 2020 exchange rate) and of rural dwellers was 310 ETB (8.4 USD at October 2020 exchange rate). Age of the household head, residence, family size, occupation of the respondent, educational status, wealth index, nearest health facility, place where they obtained information about CBHI, level of awareness, knowledge status, and overall satisfaction with health services were identified as independent factors associated with willingness to pay for the CBHI schemes. Regarding the

pooling mechanism, this should be located at district level. Participants described their arguments regarding this issue: situating the pool at the district level enables districts to own the scheme, decentralizes the health system, makes decentralizes decisions, and ensures equity. To alleviate deficits or to make CBHI sustainable, factors include increasing the annual premium and enrollment of the community to CBHI, budget subsidization from the government to reverse the ruin, increase community-based awareness creation activities, and continue with the current pooling mechanism at the district level, but establish or revise a department at the health office that controls the process of CBHI. Newly emerged districts should create their own pool in their respective district.

Conflicts of Interest

The authors declare that they have no any conflicts of interest.

Authors Contributions

All authors conceived the study, performed the analysis, and participated in designing the data collection tools, data management, and writing of the manuscript. The authors agree to be accountable for all aspects of the work related to its integrity. All authors have read and approved the manuscript.

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