Determinants of Community Based Health Insurance Program Implementation in Ebinat District, Ethiopia

Samuel Azmeraw Mengist and Eshetu Seid*

Department of Economics, College of Business and Economics, Bahir Dar University, Ethiopia

*Corresponding author

Abstract

As of literatures, the implementation of a given program is constrained by social, political, demographic and economic factors. But, to understand the extent of the constraints, the current performance of a program and shape future target area by learning from mistakes, well organized study is necessary to be undertaken. Thus, this paper is aimed to study the Determinants of Community Based Health Insurance program implementation in selected rural kebeles of Ebinat woreda. Binary logistic regression model was used to identify the factors related to the decision to be members along with factor analysis in identifying the issues associated with drop out of the scheme. The performance of the district in the membership into the health scheme has been found to be 65% and 71% in terms of renewal. After the logistic regression, sex of the household head, fatal disease, family size, disability, monthly income of the household (negatively), distance (negatively) and level of awareness(very good category) are found statistically significantly affecting the variation of the membership decision of households. Moreover, the factor analysis showed that both quality service delivery, awareness related and premium related issues are the bottlenecks for the implementation of the scheme. Based on these results, it is concluded that there are supply side and demand side factors affecting both the membership and drop out threats from health insurance scheme.

Introduction

World Health Organization declares in the Sustainable Development Goals of Goal 1, 2 and 3 all correspond to reduction of poverty and enhancement of health accessibility that all people in the world shall have to access health care services without financial hazard (World Health Organization, 2019). Many of the developing Worlds' population are still challenged with poor health sector achievement due to less health financing (Garg and Karan, 2009). Community based health insurance (CBHI) has been considered as an intermediate stage ensuring moving away from households direct payment for healthcare services to the forms of prepayment, in change to universal health coverage. Community is considered as an important in this strategy because governments are often facing two problems. First problem is governments in resource limited settings are not able to fund enough money to cover the people and second collecting premiums or taxes is not easy especially in developing country where many residents do not have regular earned income sources (Hansoo Ko, 2018). This CBHI scheme is targeted to include the larger rural and agricultural

people and the people of informal sector in the case of urban plan (FMOH, 2011; Zelelew, 2012).

Ethiopia introduced a range of health care finance reform like revenue retention and utilization. The establishment of private wing in public hospitals had systematized a fee waive system and standardizing the package of exempted service which introduced and expanded health insurance aimed at increasing the availability of resource for health as well as protecting the population from prohibitive user fees or catastrophic spending finance at the time of illness (Ethiopian Health Insurance Agency, 2015).

Greater part of the low and middle income countries are facing increasing difficulties in supporting sufficient funding for health care. The pinch of deteriorating capacity to fund health care program and service has been too severe especially to the poorest segment of population which in turn have made various stakeholders including international and national level policy makers to recommend a range of suitable remedial measures.

It is also underlined that about 44 Million people worldwide face hazardous health expense while the rest 25 Million people live in unplanned way due to direct payment of health expense. The pilot study on the performance of CBHI scheme for Ethiopia by USAID also stated that the cost needed for membership more specifically the amount of money needed during health service provision is the main factor affecting health service utilization (Ethiopian Health Insurance Agency, 2015).

Since the introduction of pilot community based health insurance in Ethiopia, more than 57 folds of CBHI districts expansion has been done from 13 districts in 2010/11 to 743 districts in 2020. CBHI contributed for the health sector improvement, mobilizes resource and enabled more than 13,544,767 people to get an opportunity for health service (Ethiopia health insurance agency, 2020). Being fascinated by the results of the 13 pilot districts primarily involved in 2010/11, the government expanded the scheme in 161 districts in 2013/14. This shows how fruitful the program is. However, the national CBHI evaluation report identified that regional insurance design features including fee variation, the socio economic and cultural diversity, the extent of community involvement and varied health utilization trends influenced the expansion of CBHI in the country. For example enrollment rate in Amhara region 60% compared to 64%in Addis Ababa and Oromia region 42 percent. (Adane Kebede *et al.,* 2014)

In a study of the determinants of enrollment in CBHI scheme using binary logistic model in western Ethiopia also stated that Ethiopia depended on foreign aid to finance 50% of health fund and out of pocket payment (OOP) to cover 34% of it. In that study, though income, premium affordability, educational attainment, and awareness are found significant, health status a very crude variable is taken to be significant too without bothering for measurement issues. Similarly, the study is restricted in that it only studies enrollment but not about sustainability issues (Fite *et al.,* 2021). The crude variable is health status. Why crude is that it includes many health issues which has to be dealt independently. For instance, disability issue and chronic illness cases are two health status variables. But, in the above study, it is taken as one variable. It is also difficult to measure health status as one variable but simple to measure chronic disease and disability using dummy variable measure.

The study about the determinants of implementation of community based health insurance in Bure town by applying binary logit along with mixed research design collecting by questionnaire come up with the result that health status, service quality, awareness and community solidarity are statistically significant in affecting enrollment of the society. But, it is little significant to discuss the peoples' satisfaction and project's effectiveness in the area as an enrollment paper (Tsega Hagos Mirach *et al.,* 2019). Once again, the above paper has included health status, a very crude variable which includes disability and chronic illness. Beyond this, the study is too simplistic in that it only identifies the factors of enrollment by using quantitative data. Even though each paper achieved its exclusive objective, many of them are not interesting as they are not comprehensively studying the participation and dropping decision simultaneously.

In a study of enrollment factor determination in Simada Woreda, 89% willingness to enrollment was observed taking chronic disease, social capital, distance, and wealth status are among the variables. But this study has nothing saying about the membership factors and the bottlenecks faced in the members (Yitayew *et al.,* 2020). The study is going to use disability status and chronic illness instead of taking the crude health measure of health status.

But there were no study that documented determinants of community based health insurance implementation among active members and non-members in the study

area and there is no sufficient evidence in the district that showed the root causes of members' dropout from CBHI schemes. While the members are used to check the views about staying in the scheme alone, the members and non-members together has been used to identify the variables affecting the decision to participate in the program. The district under consideration has unique characteristics in that some kebeles are very highland residents while others are low land dwellers. On the other hand, it is tried to include new variables and modify the existing variables based on measurement and specific impact indicator variables. Therefore, the study is aimed at knowing factors that affect the determinant of community based health insurance implementation through active members on both concepts of threats and enrollment and non-participants on why they don't join.

The general objective of the study is to examine determinants of implementation of community based health insurance in Ebinat district of Amhara regional state in Ethiopia. The objectives include to assess and examine the current performance of the study area in implementing the program. To identify the determining variables affecting participation of people in community based health insurance program in the study area. To identify the determinants of performance of the program associated with the members to drop out from or persist. To examine the trends of enrollment and renewal rates over time in the study area.

Research Methodology

The research employed both quantitative and qualitative mixed research approaches along with a cross-sectional data design. Descriptive research is adopted to describe key variables as possible behaviors, attitudes, values, characteristics and helping the research to accumulate the critical knowledge and solutions to the determinants of community based health insurance scheme implementation. Moreover, sample survey design has been applied as a social science research basically. Econometric model of binary logit to identify factors of participation decision and factor analysis to deal about the stay-in of the members is used.

Data Source and Sampling Methods

Both primary and secondary sources of data have been used to get the required data using different methods. Regarding sampling method, multi-stage sampling method has been applied to select sample respondents. In the first stage, six rural kebeles has been selected purposely based on current enrollment status. More particularly, CBHI current year renewal performance above 50 percent (Worgaja, wemberoch and Taresimba) and the other three kebele below 50 percent performance (Ababikila, Mezard and Wagie) CBHI from 37 kebeles has been taken from the list of the woreda. Simply, renewal rate for the year 2020/21 is recorded in district health office. Then, that record based on percentage of coverage is taken to select the kebeles. The non-members of the scheme are also communicated from the selected kebeles and by omitting the members. The non-members are simply listed in institution level and then systematic sampling technique has been used to get the specific household. In the second stage, the numbers of households that has been included in the study is determined proportionally in accordance with the total number of households in the kebele. Inclusion into the sample requires a household to reside more than 6 months in the district and could communicate during data collection. Beyond this, peoples/households of above 18 years old and working in the rural economy are considered.

Regarding size determination, Cochran formula $n = \dfrac{t^2 pq}{d^2}$; is used to determine sample size where t=1.96, p=proportion of membership (50%) and q= proportion of non-membership (50%), and d=level of precision (5%) (Cochran, 1977).

$$n = \dfrac{1.96^2}{0.05^2}(0.5)(0.5) = 384..$$

Thus, we will have 192 members and 192 non-members have been randomly selected based on the list of households' profile of each kebele. The primary data has been collected from a sample of rural people in the district directly through semi-structural interviewer supported, pretested questionnaire which is translated into local language using experts to ensure data clarity.

Method of data analysis

The objective of the study is to analyze determinant of community based health insurance implementation in the case of Ebinat woreda. The dependent variable in this case is a binary response variable which takes the values of "0" or "1" based on the responses measuring the enrollment status of the respondent. The factor analysis method is also to be used to identify the key variables which affect the members' view towards persistence in

the scheme. Each item has factor loadings and extraction coefficients to decide on the influence.

The logistic regression model has been estimated to analysis binary choice dependent variable. It is represented in the model by yes/no responses measuring enrollment of the insurance program.

$$Pi = F(Yi, Zi, Hi, C,)$$

The logit distribution function for the participation in CBHI participation is specified as:

$$Pi = E(y = \frac{1}{XI} \frac{1}{1 + e^{-(B1+B2Xi)}} \quad ...(1)$$

$$Pi = \frac{1}{1 + e^{-z}} = \frac{e^z}{1 + e^z}, \quad ...(2)$$

Where:

$$Zi = \beta1 + \beta2Xi$$

Pi- is the probability of being members in CBHI

1-Pi -is the probability of being non-members in CBHI

Therefore, we can write

$$\frac{Pi}{1 - Pi} = \frac{1 + e^{zi}}{1 + e^{-zi}} = e^z \quad ...(3)$$

Now simply $\frac{Pi}{1-Pi}$ is the odds ratio

If we take the natural log of the above equation, we obtain

$$Li = \ln\frac{PHi}{1 - PHi} = Zi \quad ...(4)$$

$$= \beta1 + \beta2Xi$$

L is the log of the odds ratio, is not only linear in *X*, but also linear in the parameters.

The logit distribution function for the participation in CBHI is specified as: Thus, binary logistic regression model that is going to be employed in the study while the dependent variable is Y and independent one X is:

$$logit(Y) = \ln\frac{1}{1 - pi} = Zi = B0 + B1Xi1 + B2Xi2$$
$$+.....BnXn + Ui$$

$$Zi = B0 + B1X1 + B2X2...............BnXn + Ui$$

The dependent variable for logit analysis is binary choice dependent variable. This binary measurement includes the status of membership or not of enrollment of the respondents which attains values 0 for one who is not a member of the scheme or 1 if one is member of a scheme.

Based on literatures the following socioeconomic variables namely Age of household head (AGE), Sex (SEX), Household size (Famsize), Educational status of the household head (EDUSH), Average Income (AvY), Number of Illness Cases (Nillcases), Awareness (INFOR), Attitudes and Distance from health institution have been selected and included into the regression model.

Data Analysis and Interpretation

Descriptive Analysis

This shows the background information that selected respondents have using various statistic tools. The issues include sex, educational status, age and the like.

It is customary to see here that majority of the respondents about whom we talk is participants of the scheme. But, it is relatively close to each other.

Female respondents have a very significant share in this paper so that the whole analysis can be meaningful and inclusive. Yet, the percentage of male respondents is higher (53%) as compared to female counterparts (47%).

The proportion of the age of the sampled people is also explained by the table above. From the total samples observed, close to 50% of the respondents are aged between 35 and 45 which show the greater share of the young household head in the analysis followed by 27%

from 20 to 35 years of age. But, old age people have the smallest share in the sampled respondents.

Descriptive Statistics for Continuous Variables

From this table, it is plain to observe that the mean incomes of the households who participate in this study are 6161 ETB. On the other hand, the per-house people attributable for each respondent on average are 3 people.

The average distance that a household has to cover to get a health center is 7 kilometer keeping in mind there are households who have to cover 33 KM to access a center and there is also minimum of 0.5 km coverage for some households. The mean educational attainment by the respondents is a year and half keeping there are some who don't ever attained any class have to some who attained above secondary education class.

Performance of the district in implementing the scheme

The district of Ebinat woreda inaugurated the scheme in 2007 E.C. Since that time both the renewal rate and the number of households being member of the scheme have been escalating over time. The growth rate may be different across years.

As can be observed from the table above, the total actual renewals made in all the years equals to 92789, given the total plan of renewal of the woreda in all the years is 129445.

Thus, the performance of renewal is recorded to be 71% which is good record as compared to the plan. Similarly, the record from membership also approaches to 65% as compared with woreda plan.

The trend of renewal and Membership over time

This table shows the mean difference regarding continuous variables between the members and non-members. All the continuous variables of age, income, educational attainment, family size and distance from health center are statistically significantly different from zero at 1% level of significance. This implies that there is mean difference in income, age, educational attainment, family size and distance between those members of the scheme and non-members.

Binary Logistic model Result

As the theoretical literatures along with some of the empirical evidences have forwarded, being a member of Community based health insurance scheme is a function of many other economic, social or household level factors. Following the diagnostic test results, it is observed that there is no multicollinearity problem I the data under consideration as the average value of variance inflation factor(VIF) equals 2.187 (Look in the appendix). Moreover, the heteroscedasticity value also indicated that it is statistically insignificantly different from zero, $p>Chi2=0.1017$ (Look in the appendix). The Hosmer-Lemeshow test value of chi2 (8) = 0.49; Prob > chi2 = 0.4190 from the appendix also shows that the model fits the data well. Hence, there is fine goodness of fit in the logistic regression model.

Variables like sex of the household head, income of the household and distance from health center are statistically significant at 5% level of significance. Households headed by males have higher log-odds of being a member of CBHIS as compared to female headed households by 5.3, other thing kept the same.

Similarly, a one birr rise in income of the household decreases the log-odds of being member of a health scheme by 0.001, ceterus paribus. This may be due to the intention that more wealthy people prefer to be treated in private health centers or may think that direct payment will give birth to more preferred and safe way of treatment. Unlike Megersa (2014), income level is statistically significantly negatively related here but Family size is found positively significant. As distance increase by a unit of kilometer, the log-odds of being a member of health insurance scheme decreases by an average of 0.84 units, keeping other factors constant. This may be the real case that people farther from health centers will not allow people to be well informed about the working of the scheme and less effective to farther rural areas.

On the other hand, disability, family size and fatal disease are statistically significant at 5% level of significance. This is in conformity with a study in Tigray region (Hellina, 2015) and (Fite *et al.,* 2021). To be more specific, a person having very good level of awareness are higher by 1.9 in log-odds of being member of the scheme as compared to having poor awareness and is significant at 5% level of significance. Generally, those who have very good awareness are significant at 10% level of significance as compared to poor awareness.

Table.1 Table of Summary statistics for continuous variables

Variable	Range	Minimum	Maximum	Sum	Mean
Age	52	20	72	14153	37.74
Income	74891	250	75141	231072	6161.9
Family size	8	1	9	1407	3.75
Distance	32.5	.5	33.0	2736.2	7.297
Educational attainment	4	0	4	594	1.58

Source: Own Manipulation (2022)

Table.2 Performance of Membership and Renewal

year	Membership			Renewal		
	Plan Member	Actual Member	Percent Member	Plan	Actual	Percent
2007	5200	4620	88%	0	0	0
2008	7480	5875	78%	4620	3482	75%
2009	10760	8754	81%	5420	3715	68%
2010	11010	9441	85%	18376	10412	57%
2011	13065	10277	86%	23656	12587	53%
2012	11461	1130	10%	25127	15801	63%
2013	13421	8512	63%	27342	24875	91%
2014	7999	4289	54%	24904	21917	88%
Sum	80396	52898	65%	129445	92789	71%

Source: Manipulation from Ebinat woreda health (2022)

Table.3 T-Test Statistics for Continuous variables

	T-Test Statistics			
	Test Value = 0			
	T	Df	Sig. (2-tailed)	Mean Difference
Age	69.997	374	.000	37.741
Income	13.893	374	.000	6161.941
Educational Attainment	21.545	374	.000	1.651
Family size	45.306	374	.000	3.677
Distance	19.158	374	.000	6.5440

Source: Manipulation using SPSS (2022)

Table.4 Table of Binary Logistic Regression

Membership	Coefficient	St. Err.	t-value	p-value	Marginal Effect	
Age	-.16	.165	-0.97	.332	-0.011	
Sex	5.364**	2.728	1.97	.049	0.367	
Income	-0.001**	0	-2.17	.03	-0.001	
Disability	4.086**	2.04	2.00	.045	0.280	
Fatal disease	2.715*	1.722	1.98	.045	0.186	
Awareness		.	.	.	.	
Medium	.91	2.304	0.40	.693	0.024	
Good	3.753	2.783	1.35	.178	0.400	
V. Good	1.902*	2.152	1.88	.077	0.084	
Education		.	.	.	.	
Read and write	3.922*	2.176	1.80	.071	0.046	
Primary	1.389	2.8	0.50	.62	0.118	
Secondary	.219	1.965	0.11	.911	0011	
Above	7.791	43.438	0.18	.858	0.945	
Family size	1.678**	.844	1.99	.047	0.115	
Distance	-.847**	.384	-2.20	.028	-.058	
Constant	-4.095	3.569	-1.15	.251		

Mean dependent var.	0.496	SD dependent var.	0.501
Pseudo r-squared	0.952	Number of obs.	375
Chi-square	492.439	Prob > chi2	0.000
Akaike crit. (AIC)	54.624	Bayesian crit. (BIC)	113.448

*** p<.01, ** p<.05, * p<.1*

Source: Own Stata output (2022)

Table.5 Table of Reliability test

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.727
Bartlett's Test of Sphericity	Approx. Chi-Square	1088.985
	Df	190
	Sig.	0.000
Cronbatch's Alpha	α=0.708	Items=20

Source: Own SPSS Output (2022)

A household with at least one disabled person per household have higher log-odds of being a member of a health insurance (4) as compared to household without any disability, other factors being constant.

Similarly, when one more child is added to a family, the log-odds of being a member of the health scheme increases by 1.67, other factors being the same. Similarly, households having fatal disease like HIV/AIDS, sugar, diabetes etc. have higher tendency (log-odds of 2.7) to be a member of community based health insurance scheme, other things being the same statistically significant at 10% level of significance. But, issues like age of the household head, educational attainment of the respondent (above secondary school and read write) and attitude of the respondents are found statistically not affecting the decision of participating in community based health insurance scheme.

Factor Analysis Result

From the above Econometric analysis, we have observed the factors which determine people to be attracted to the scheme or not. It is done based on the idea that it includes both members and non-members of the scheme along with the basic determinant variables. But, it do not show the factors associated with sustainability of the members to go ahead with the program. More formally, the above binary logistic regression does not answer the question of the threats members have to drop out of the scheme. In the case when there is record of people dropped out of the scheme, it was possible to model another binary logit by taking those dropped and not-dropped out from the program and the associated pushing factors of leaving out. In such cases, to identify many of the associated factors of implementation of health insurance scheme, factor analysis (factor reduction) method is used. This factor reduction is aimed at reducing the numerous factors and making into groups so that it will be easier for one to identify different group of economic, health and other variables.

As is depicted clearly, since KMO is more than 0.6, we have enough sample size so that it is possible to conduct factor reduction analysis to identify different categories of an issue. Moreover, we have statistically significant at 1% level of significance Sphericity (0.000) and again Cronbatch's Alpha value (0.008) shows that the items are interrelated to each other and the internal consistency is fine. All of this statistical figures allow us to perform factor reduction objected at identifying the different groups of issues that determine the implementation of a project/program/scheme.

Based on the values of coefficients of Component matrix, the items which helped generate such a numerical expression of the variation of CBHIS could be categorized into 4 groups. The grouping is done by observing similarity and higher values of the component coefficients of items. This means though values may be the same, it cannot be taken to group items unless the coefficient value is large enough (>0.3). Based on this, items like I am well informed, community leader can be trusted, community member can be trusted, I am satisfied with the scheme, no trust on management of the scheme and managers have higher and similar coefficient outputs in the first component. And thus, can be grouped as one collection of items. The usual nomenclature for this group may be related with information disbursement and awareness. Then, social capital and awareness related factors will be the name for this group.

Recommendation

In general, the key objective of the paper was to identify issues associated with implementation of community based health insurance scheme in Ebinat district. The issue of implementation comprises three distinct things. The first is answering what are the factors that determine one to be a member of this health scheme.

The next issue is identifying the problems or threats related with persisting/sustaining or dropping out of the health insurance scheme. The last is estimating the current performance of the district in succeeding the program. These three points were respectively the specific objectives of this paper.

Moreover, variables like sex of the household head, income of the household and distance from health center are statistically significant at 1% level of significance.

When we have a look at the determinants of enrollment, disability, family size and level of awareness for very good category are statistically significant at different level of significance. To be more specific, a person having very good level of awareness are higher in log-odds of being member of the scheme as compared to having poor awareness and is significant at 5% level of significance. As well, people with disability and chronic disease are making differences towards membership

Thus, the performance of renewal is recorded to be 71% which is good record as compared to the plan. Similarly, the record from membership also approaches to 65% as compared with woreda plan.

Based on the values, items like I am well informed, community leader can be trusted, community member can be trusted, I am satisfied with the scheme, no trust on management of the scheme and managers have higher and similar coefficient outputs in the first component.

The specific items are elongated appointment, no the required medicine, quality of service provision and it is good for the rich have almost similar and enough value. Thus, the most probable name will be one related with quality of service, service quality related factors.

The third grouping comprises items premium is unaffordable, and payment period should be updated. Thus items can be represented by premium related factors. The last grouping is made by taking items of like it is good to pool resources of the poor, the scheme

should be for the poor and it protects households from expenditure which is income/economy related issue.

In the process, geographic difference has been taken as exogenous in this paper, especially between rural and urban areas. Thus, comparison can be done across different woreda-kebele urban areas with rural areas.

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