

Demand To Join The Community Health Insurance Scheme: A Predictive Analysis Of Individuals From Dodoma Municipality, Tanzania

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Abstract – This paper analysed factors that influence the demand to join community health insurance scheme. Using random sampling, data were collected from 130 households at Dodoma Municipality in Tanzania. Logistic regression model was used in testing the socio economic and demographic factors influencing decisions to join the health insurance scheme among the households. It was found that, age, increased levels of schooling and increased income levels of individuals influence the chances of joining CHIS. However, being a female individual and higher distance to health facility decrease the chances of joining the scheme. The analysis also suggests that the professional activity carried out, the marital status of the individuals, as well as the number of dependents in a household do not explain the decision to join Community Health Insurance Scheme. In view of the research findings, policy proposals are suggested including creating an enabling environment by putting in place a coherent legal and policy framework, financially supporting the very poor and vulnerable groups who are unable to pay premium to make the schemes more inclusive, increase in funding for health services and improvement in the quality of care, continued awareness creation of communities/ patients on the importance of joining health insurance schemes.

Keywords – Demand for Community Health Insurance, Dodoma Municipality, Multinomial logit model, Predictive analysis.

I. INTRODUCTION

1.1 Background Information

Health services improvement is important to human welfare, sustained economic and social development. It is also essential for achieving Millennium Development Goals and hence poverty reduction ([1], [2]). Different countries have reformed their health sector toward achieving universal health coverage [3]. In 1996 Tanzania government introduce Community Health Fund (CHF) as part of reform strategy, with the objectives of mobilizing financial resources from the community (in rural and urban) for the provision of health care services to its members; provision of quality, affordable

health care services through sustainable financial mechanisms and improving health care services management in the communities ([4], [5], [6], [7]). The scheme is based on the concept of risk sharing whereby members pay a small contribution on a regular basis to offset the risk of needing to pay a much larger amount in health care user fees if they fall sick. Several studies on the Community health Fund (CHF) have been done to document the importance and success of the scheme, but still there are remarkable bottlenecks in its performance, specifically in the number of people joining the scheme ([8], [9]). Various scientists examined the factors that determined the demand for community health scheme in different locality, most of them being socio-economic and

demographic characteristics ([10]), [11], [12]). So this study tried to go deeper to unfold key hidden issues behind the issues that affecting the community's demand to join the scheme. Specifically the study tries to estimate and compare the extent at which the two categories (socio-economic and demographic variables) affecting the demand for the scheme at individual level, taking an experience of Dodoma Municipality.

1.2 Theory Underlying the Study

The study considers the demand as it is described in the demand theory, that it is "ability" and "willingness" of an individual to purchase a good or service, at given price in time, while other things remained constant [13]. With that respect the study adopted and modifies the Theory of Consumer Demand for Health Insurance as advocated by John and Nyman (2003) [14], purposely to answer the two key questions, one; why should one has to buy health insurance? And two; Do he or she has the capacity to pay for the insurance? The theory holds that people purchase insurance to obtain additional income when they become ill.

In effect, insurance companies act to transfer insurance premiums from those who remain healthy to those who become ill. This additional income generates purchases of additional high-value care, often allowing sick persons to obtain life-saving care that they could not otherwise afford. Moreover, the theory shows that consumers actually prefer the risk of a large loss to incurring a smaller loss with certainty ([4], [15]). Thus, if consumers purchase insurance, it is not because they desire to avoid risk. Instead, the theory suggests consumers simply pay a premium when healthy in exchange for a claim on additional income (effected when insurance pays for the medical care) if they become ill. However, the option of joining the scheme together with the amount of premium paid is influenced by various factors [16]. Therefore, the study assumes that demographic characteristics and socio-economic factors can influence individual's perception on the scheme (quality, accessibility and affordability), of which in later stage can affect both the "willingness" to participate as well as the "ability" to pay for the scheme (Figure 1).

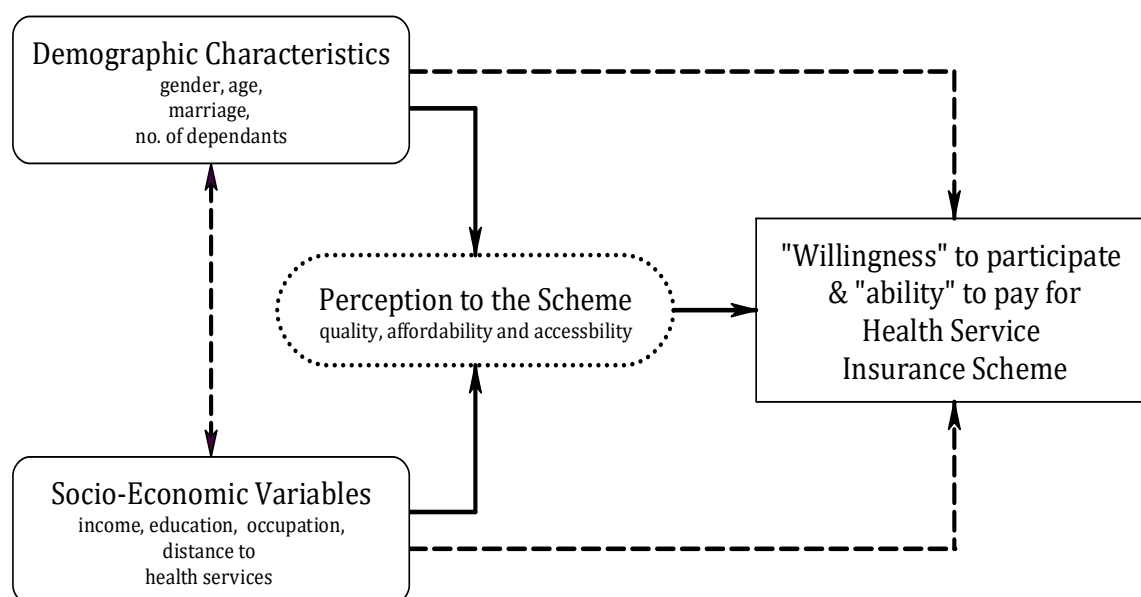


Figure 1: Conceptual Framework

II. METHODOLOGY

2.1 Study Area

The study was conducted at Makole Ward in Dodoma Municipality. Dodoma Region is in central Tanzania lies at 4° to 7° latitude South and 35° – 37° longitude east. A situational analysis on community health services conducted

in Dodoma region in 2013 found the basis for the area to be suitable for giving out the required information for the study.

2.2 Research Design and Data Collection Methods

A cross sectional design was used to gather information from representative sample of the population using interviews, focus group discussions with key informants and

complementing the information by reviewing documents at regional and country level. Qualitative data were gathered using a multiple sampling techniques, initially a stratified sampling technique was used to categorize community members who are engaged in Community Healthy Fund (CHF) and those who are not in CHF scheme, thereafter a snowball sampling was employed to get community members who are involved or engaging in CHF scheme, the choice of the technique was due to difficulty of getting community members who are involved in CHF in single point at a time, while community members who are non-members of CHF were obtained using random sampling. At the beginning it was aimed to have 80 respondents from each stratum, but due to miss information some were dropped ended having 71 from CHF members and 59 from CHF non-members, remaining with a total of 130 respondents whose information was used for analysis. Qualitative data were collected to determine in-depth information about the demand and its constraints, as well as to explore the extent of factors affecting engagement and drop-outs to the scheme. This was done through focus group discussions with key informants which included; Ward Executive Officer, Community Health Committee members and Health and Medical professionals (Doctors and Nurses) from 6 health centers in the study area.

2.3 Data Analysis

Multiple Logistic Regression model was used to test the hypothesis that demographic and socio-economic factors do not influence household members' demand to join community health insurance scheme (i.e. $H_0 \neq 0$). Moreover, the descriptive analysis was used to substantiate the information between the variables across the two groups (members and non-members of CHF). The model was chosen as it has the capacity to allow the prediction of a discrete outcome, such as group membership, from a set of variables that may be continuous, discrete, dichotomous, or a mix of any of these [17]. Furthermore, the model can deal with the predictors that are in any form, that is, logistic regression makes no assumption about the distribution of the independent variables [18].

2.4 Model Specification

In this section, researchers model the relation between explained variable with all explanatory factors using the following approach; at first, the two categories of variables (socio-economic and demographic variables) were simultaneously regressed; and second, the two categories regressed separately. In all models, we assume that the membership status for the i th community member, are

independent and identically distributed. With that regard, we adopt and modify the work of Green (1997) [17], so we have the following equation:-

$$\begin{aligned} P_i^* &= \alpha + \beta X_i + \gamma D_i + \mu_i \\ P_i &= 1 \text{ if } P_i^* > 0 \\ P_i &= 0, \text{ otherwise} \end{aligned} \quad [1]$$

Equation [1], estimate the determinant for an individual to join the CHF scheme. P_i^* is the latent variable affected by X_i and D_i . Therefore, P_i represents the probability of individual i to join CHF scheme (member or non-member of CHF), X_i represents a vector of socio-economic variables and D_i represent the vector of demographic characteristics that influence the decision of an individual i to demand for health insurance under CHF scheme (such variables include; X_i = income, occupation, education, and distance to the nearest health facility, while D_i = gender, age, marriage, and number of dependants), α represents the parameters to be estimated, μ_i represents a residual term, β captures the effect of socio-economic variables, and γ is captures the effect of demographic characteristics.

III. FINDINGS AND DISCUSSION

3.1 Description and Distribution of the Variables Specified in the Model

In this study, the willingness and ability to join the scheme is the key issues to determine the demand. Hence, membership of CHF scheme is considered as the explained variable, the variable was considered as the dummy giving the value of 1 for CHF members and 0 for non-members of CHF. Moreover, the study having a series of explanatory variables, which containing continuous and discontinuous (dummy) values as follows;

Gender and CHF Membership: the study considered this variable as the dummy, giving the value of 1 for male respondents and 0 for female respondents (Table 1). In this study gender is referred to the economic, social and cultural attributes and opportunities associated with being male or female at a particular point in time [2]. It was observed that among interviewed people —both males and females members of CHF were many (96 [73.8%]) than those of non-members (34 [26.2%]) (Figure 2).

Marriage and CHF Membership: in this variable this study tried to track the effect of marriage versus those who are not in marriage (singles, divorced, widower, and separated) on demand for CHF scheme. Generally the

interviewed people involved more respondents who are in marriage than those are not in-marriage, 62.3% and 37.7%, respectively (Table 1). Moreover, the interviewed respondents involved many people who are in-marriage and

joined CHF scheme (71[88.7%]) compared to only 25 (50%) of those who are the member of the scheme and are not in-marriage (Figure 3).

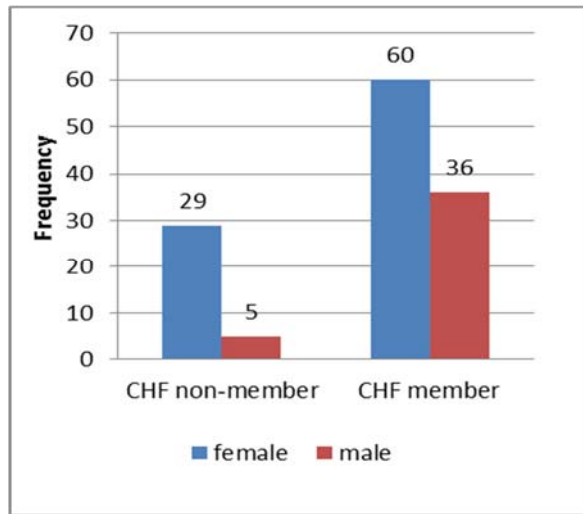


Figure 2: Membership vs. Gender

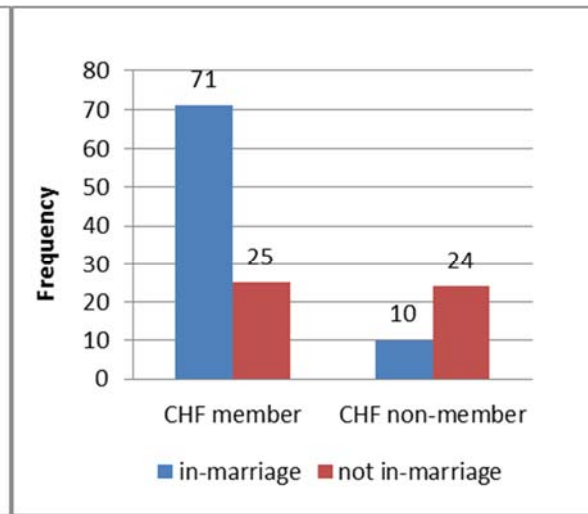


Figure 3: Membership vs. Marital Status

Age and CHF Membership: the study considers this variable to be dummy, giving the value of 1 for those who have high-age (46 years and above), and 0 for those having less than that years. The purpose is to evaluate the influence of age on the demand for CHF. Findings in Table 1 show that, there were many respondents of low-ages (60.8%) than those with high-ages (38.2%). However, the interviewed respondents who were members of CHF scheme involved 53.1% of low-aged respondents and 46.9% of high-aged respondents (Figure 4).

Education and CHF Membership: The study considers this variable as dummy, giving value 1 for those having high-education (above primary education) and 0 for normal education (primary and less education). The aim is to estimate the influence of individual's education in demand for the CHF. Respondents with high-education were many (61.5%) than those with normal education (38.5%). Moreover, a total of 97 respondents (74.6%) who are CHF members were interviewed, of which 75(57.7) were high educated and 21(16.9%) were normal educated (Figure 5)

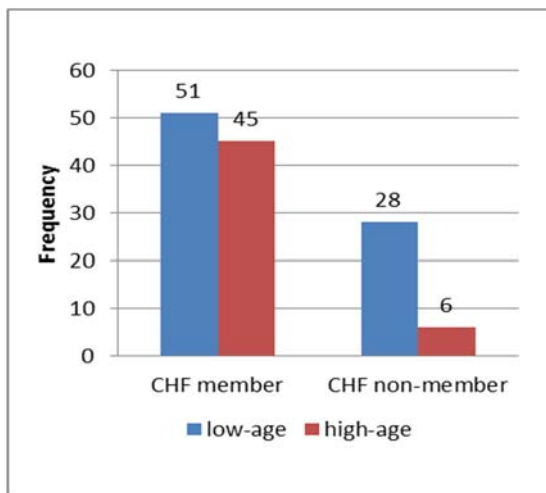


Figure 4: Membership vs Age

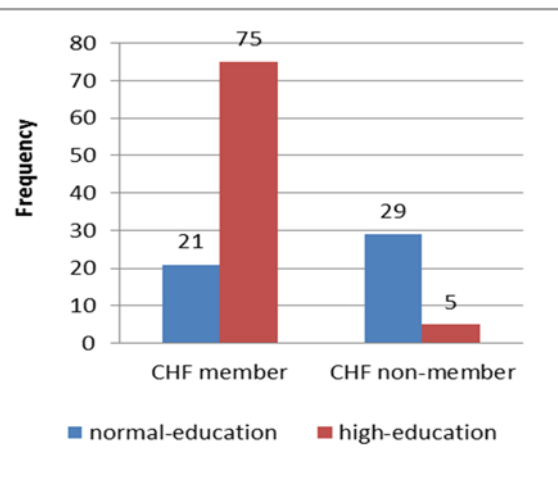


Figure 5: Membership vs Education

Occupation and CHF Membership: The study considers this variable as dummy, giving value of 1 for those who have employed and 0 for unemployed, the aim is to track the effect of nature of occupation on demand for CHF; findings in Table 1 show that, 80.8% of respondents were employed while the rest were unemployed. Moreover, out of those interviewed

CHF members were 89(92.7%) for employed and only 7(7.3%) for unemployed. The researchers failed to get an equal number of employed and unemployed respondents as the exercise involved snow-ball selection focusing on the key aspect of being a member of CHF— leaving the randomness to other characteristics (Figure 6).

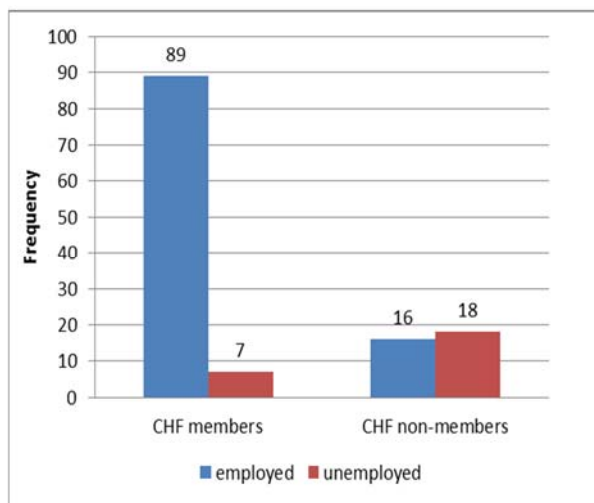


Figure 6: Membership vs Occupation

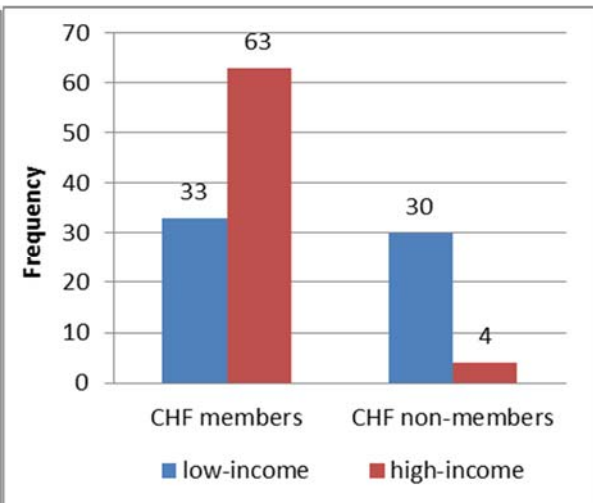


Figure 7: Membership vs Income

Income and Membership: the study considered the variable as dummy, giving value of 1 for those who earning high-income (above Tshs. 500,000/=), and 0 for those who earning low-income (Tshs. 500,000/= and less), the aim is to check the influence of the income of the demand for the

scheme. Those earning high-incomes were many (61.5%) compared to those earning low (Table 1). However, among interviewed CHF members 34.4 % (33) were low-income earners while 65.6% (63) were high-income earners (Figure 7).

Table 1: Discontinuous Variables Specified in the Model (n=130)

Sn	Variable	Description	Freq	%
1	Gender	1=male	41	31.5

		0=female	89	68.5
2	Marriage	1=in-marriage	81	62.3
		0= not in-marriage	49	37.7
3	Age	1= High-age	51	39.2
		0=low-age	79	60.8
4	Education	1=high-education	80	61.5
		0=normal-education	50	38.5
5	Occupation	1=employed	105	80.8
		0=unemployed	25	19.2
6	Income	1=high-income	67	51.5
		0=low-income	63	48.5

Number of dependants and Membership: the study considers the variable as the total number of people that an individual is supporting and/ or their livelihood depending on him/her. The purpose is to examine the effect of the number of dependants that someone has on the demand for CHF. Generally the findings show that, CHF members have many dependants than non-members, the box plot relationship for number of dependants and CHF membership shows that fewer (lower quartile) CHF members have 4 dependants while many being around 5 and 7, though there are other fewer (upper quartile) having 11 dependants. On the side of CHF non-members, they were observed to have small

number of dependants as many of those interviewed were ranging between 3 and 6 with an average of 4 (Figure 8).

Distance and Membership: the study refers this variable as the nearest distance to health facility in kilometer (i.e. government dispensary/ hospital and/or laboratory). The purpose is to analyze the influence of distance on demand for CHF. Most of CHF members living in a range of less than 1 to 2 kilometers, with very few lives 3 kilometers from the health service provider (i.e. dispensary or hospital), while many of non-members lives from 2-3 kilometers with few living up to 3.5 Km away from a health service provider (Figure 9).

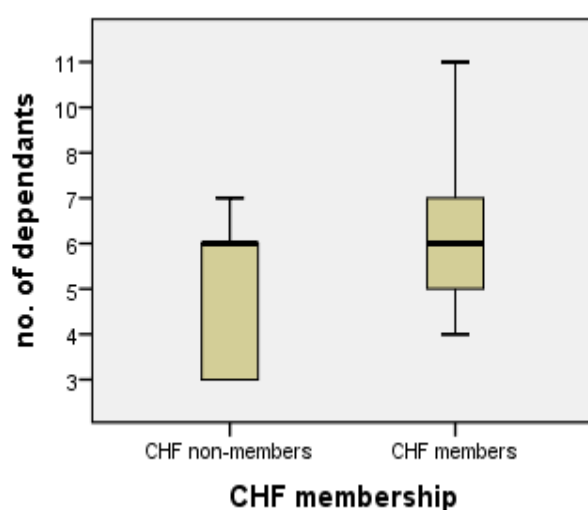


Figure 8: Membership vs Number of Dependents

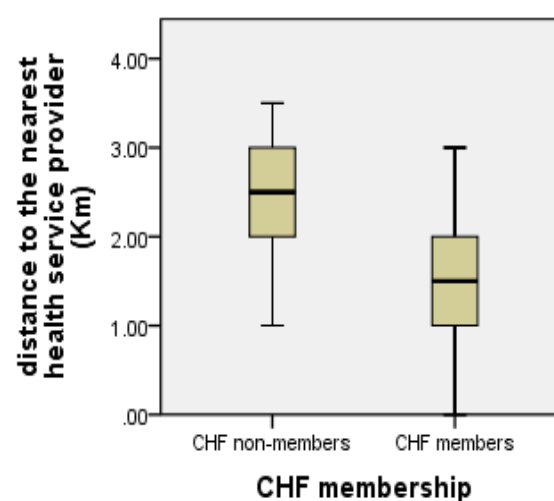


Figure 9: Membership vs Distance (in km)

3.2 Factors Associated with Demand for Community Health Insurance

The dependent variable used was community insurance scheme choice represented by “membership”, while the independent variables are socio economic variables (income,

occupation, education, and distance to the nearest health facility) and demographic characteristics (gender, age, marital status, and number of dependants). The coefficients of each variable reflect the effect of a change in each of the

variables on the probability that the individual will join the community insurance scheme.

The value of R^2 (0.78) shows there is a correlation between probability to join insurance scheme and factors influencing households' decision. Further analysis shows

that, many variables used in assessing the demand to join insurance schemes in Dodoma were significant at [$P < 0.01$; $P < 0.05$] which includes gender, marriage, education, age, distance, income as shown in Table 2 by marked star (*) and (**) showing significant at 5% and 1% respectively.

Table 2: Logistic regression on factors determining demand to join community health insurance scheme

Variable	Coef.	$P > z $
Sex (female)	-1.533	0.005**
Marital status	2.012	0.067
Age	0.057	0.049*
Age ²	-0.006	0.012*
Education	4.605	0.000**
Dependants	1.808	0.199
Occupation	2.252	0.133
Distance	-2.603	0.006**
Income	0.849	0.000**
Constant	-6.321	0.021
Number of observations = 130		
Wald = 29.36		
Prob > χ^2 = 0.0003		
Pseudo R^2 = 0.7817		
Log pseudolikelihood = -16.308355		

*Significant at 5%, **Significant at 1%

The finding of this study showed that, being a woman has a negative influence on demand for health insurance scheme. That is, men in Tanzania are more likely to benefit from CHF scheme than women. The fact that men occupy occupations usually with greater exposure to risk, and still constitute the largest percentage of the active population, may be the basis of these results.

To the age factor what the results reveal to us is that the effect of this in the probability to join an insurance scheme presents the form of an inverted parabola. Up to a certain age this increases the propensity to join CHIS, and from that age, that ratio becomes negative - the longer the age the less chance to join CHIS. In this situation we can speak of the adverse selection phenomenon, if we think that the younger individuals, given their low risk, are not interested in acquiring health insurance and, on the other hand, also the phenomenon skimming can be approached because from a certain age the level risk increases, so insurers seek to exclude these individuals.

As for marital status, the coefficients of the logistic model do not present statistical significance for the standard levels,

so the marital status factor (whether married, single, widowed or divorced) does not influence the decision to join CHIS.

On the other hand, the schooling/education level (analyzed by years of study of the individual) positively influences the decision to join CHIS. The longer the individual's study years, the greater the propensity to benefit from CHIS. The results obtained can be related to the fact that individuals with higher levels of education have privileged access to information, give more value to the freedom of choice, value the opportunity cost of their time, among others.

Distance to health facilities has statistical and significant association with demand for Community health insurance services. The logistic model showed that as distance to health facility increases, the probability to join CHIS decreases. This finding are similar to the study conducted in Ghana [11], West Africa [19], Uganda [20], Armenia [12] and Benin [21].

Economic status of the household (defined in terms of income) was also found to be positively associated with enrollment. The result survey revealed that the higher household income associated with higher probability of seeking to join health insurance scheme. Lack of affordability

(financial constraints, lack of money etc.) was found to be barrier to join health insurance scheme. This finding was consistent with studies conducted in Peru [22], Tanzania [23], and India [24].

IV. CONCLUSION

This study showed that, the observed increase in the number of individuals benefiting from CHIS can be explained by several factors that influence positively or negatively their relationship with CHIS acquisition. Thus, we can conclude that age, increased levels of schooling and increased income levels of individuals in Dodoma region, Tanzania, exert a positive influence on the acquisition of CHIS. On the other hand, other factors that negatively influence the acquisition of health insurance, being that they are women and distance to health facility. Our analysis also suggests that the professional activity carried out, the marital status of the individuals, as well as the number of dependents in a household do not explain the decision to join Community Health Insurance Scheme.

The results also confirms that individuals who joined Community Health Insurance Scheme are characterized by being young, men, workers, with high levels of income and with high schooling levels. Thus, it is concluded that the free choice of health insurance is not carried out by the population in general, but by a population group with very specific characteristics that at all do not meet the general characteristics of the Tanzania population.

The local government administrations, insurance regulatory authorities and other relevant stakeholders need to create an enabling environment by putting in place a coherent legal and policy framework, financially support the very poor and vulnerable groups who are unable to pay premium to make the schemes more inclusive, increase in funding for health services and improvement in the quality of care. Moreover, CHI should be clearly linked to a broader strategy to ensure universal health coverage for the informal sector to help address the small risk pools. Similarly, the local authorities and Health Officers needs to work to improve the awareness of communities/patients on the importance of having health insurance.

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