



বাংলাদেশ উন্মুক্ত বিশ্ববিদ্যালয়
BANGLADESH OPEN UNIVERSITY



Journal of
Social Science and Humanities
(JSSH)

Willingness to Pay Premiums for Community-Based Health Insurance in Rural Bangladesh: A Study of Gaibandha District

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Abstract

As a signatory of the ‘Alma-Ata Declaration’ in 1978, Bangladesh is committed to ensuring “Health for all,” like many other low- and middle-income countries. Therefore, the study aimed to examine the willingness to pay (WTP) monthly premiums for the community-based health insurance (CBHI) scheme and the factors associated with it, which are crucial for the scheme’s implementation and sustainability before scaling up. A semi-structured questionnaire was used to conduct face-to-face interviews with 516 respondents in the Gaibandha District of northern Bangladesh, selected as the study area. Contingent valuation methods (CVM) with open-ended follow-up questions were employed to identify the WTP for monthly premiums, which ranged from the lowest to BDT 100, 101-200, and above 200 for the CBHI scheme, categorized as “Low,” “Medium,” and “High.” The Proportional Odds Model (POM), a type of ordinal logistic regression (OLR) method, was employed, and the following variables were found to be significant: gender, age, education, occupation, family size, and annual inpatient expenditures. A male-focused premium setting, age-sensitive pricing, occupation-specific strategies, and premium discounts per dependent were suggested in designing the premium rates. Thus, the study provides policy insights into WTP for monthly premiums across various groups and sustainable community-based health financing mechanisms in Bangladesh.

Keywords: CBHI, willingness, premiums, CVM, OLR, Gaibandha

Introduction

Health is a prerequisite of human well-being and a critical driver of sustainable economic and social development (WHO, 2010). Over the past few decades, Bangladesh has achieved remarkable progress in several health indicators, including reductions in maternal and child mortality through expanded immunization programs and improvements in life expectancy compared to many other low- and middle-income countries (LMICs) (Ahmed et al., 2016). Despite those significant achievements, sustaining such progress requires a well-functioning and financially resilient healthcare system. At the same time, rapid population growth, high population density, and the increasing burden of communicable and non-communicable diseases have intensified pressure on the country’s health sector. Consequently, ensuring access to essential and affordable healthcare services for all citizens has become a major national priority in light of recent challenges in the health sector.

The Government of Bangladesh adopted a healthcare financing strategy for 2012-2032, aiming to achieve Universal Health Coverage (UHC) by strengthening financial risk protection and

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Journal homepage: <https://jssh.bou.ac.bd>

expanding health services in response to those challenges. Additionally, as a signatory of the ‘Alma-Ata Declaration’ in 1978, Bangladesh remains committed to ensuring “Health for all,” alongside many other LMICs (Ahmed et al., 2016).

However, achieving UHC remains challenging due to heavy dependence on out-of-pocket (OOP) payments, which account for 68.5% of total healthcare expenditures in Bangladesh (BNHA, 1997-2020). Limited public funding, a narrow tax base, shortages of healthcare resources, and the absence of a comprehensive health insurance system restrict healthcare financing nationwide. Moreover, the government allocates only around 5% of the national budget to the health sector (HEU, 2023). As a result, rural poor and vulnerable populations bear a disproportionate financial burden. They are often forced to adopt hardship financing and other coping strategies, which may push households into severe impoverishment.

Against this backdrop, Community-Based Health Insurance (CBHI) schemes can be considered as a potential mechanism for ensuring health security and advancing UHC within the framework of the Sustainable Development Goals (SDGs) (UNDP, 2019; Abebe & Belayneh, 2023). Evidence from many developing countries suggests that CBHI schemes can enhance healthcare utilization, reduce catastrophic health expenditures, and protect households from impoverishment. In the context of Bangladesh, CBHI may provide an alternative and sustainable approach to healthcare financing through risk-pooling mechanisms that improve financial protection and ensure health security. Furthermore, studies indicate that CBHI schemes are more likely to succeed when implemented in favorable socioeconomic and community contexts (Abebe & Belayneh, 2023).

Limited research on health insurance in Bangladesh was identified during the literature review. However, health insurance schemes were introduced within the microcredit framework. As part of a new approach to develop a national healthcare financing strategy, the Health Economics Unit (HEU) organized a workshop in October 2011, marking the beginning of the Shasthyo Surokhsha Karmasuchi (SSK) for the below-poverty-line population, a government pilot project on CBHI in Bangladesh (HEU, 2014). The SSK program was designed to reduce OOP payments and strengthen healthcare financing through risk pooling mechanisms. These initiatives highlight CBHI as a policy option for financial protection and a way of progress toward achieving UHC in Bangladesh.

Justification of the Study

During the study period, no CBHI scheme was operating in the selected study area. Therefore, a hypothetical CBHI scheme was proposed to the study respondents as a voluntary health insurance scheme to assess their WTP for monthly premiums. This approach was necessary to evaluate the potential acceptability and feasibility of CBHI in a rural setting where formal health insurance coverage is largely unavailable.

By examining the WTP for monthly premiums and the socio-economic factors influencing participation in CBHI, this study provides important evidence for policymakers and healthcare planners. The findings can help design context-specific and sustainable CBHI schemes that are more likely to be accepted and successfully implemented in rural areas where healthcare access remains limited. Moreover, the study offers valuable insights into the amount that rural households are willing to contribute to the CBHI scheme, which is essential for determining appropriate premium structures and developing effective healthcare financing models in Bangladesh. Thus, this will be supportive in informing while making decisions regarding the implementation of the scheme.

Objective of the study

The general objective of the study is to assess the level of WTP for monthly premiums for a hypothetical CBHI scheme among rural households in the Gaibandha district. The specific objectives are as follows:

- To determine the level of WTP for monthly premiums for a hypothetical CBHI scheme among rural households in the Gaibandha district.
- To identify socio-economic and demographic factors influencing the WTP for monthly premiums for the CBHI scheme.
- To examine the awareness and perceptions of rural households regarding the CBHI scheme.
- To provide policy recommendations for designing sustainable CBHI schemes to support UHC in Bangladesh.

Methodology

Selection of the Study Area

A study was conducted focusing on respondents aged 18 and above in four upazilas of the Gaibandha District: Gobindaganj, Fulchhari, Sundarganj, and Gaibandha Sadar.

Research Approach

A semi-structured questionnaire was used to conduct face-to-face interviews in Gaibandha District, gathering data on the WTP for monthly premiums. The open-ended question format of the Contingent Valuation Method (CVM) was employed to gain valuable qualitative insights.

Sample Size Selection

The sample size for the study was initially estimated at 399 using Taro Yamane's (Taro Yamane, 1967) formula for finite populations. However, to enhance the representativeness and robustness of the results, 516 participants were selected using simple random sampling. The size of a sample can be calculated using various formulas. Among the most commonly used formulas is Taro Yamane's formula: $n = N/1 + N$.

The variables in this formula are:

- n = the sample size (To be calculated)
- N = the population of the study
- e = the margin of error in the calculation

Sources of Data

Respondents completed a 'Semi-structured' questionnaire survey from February to March 2019. Additionally, secondary data were gathered from books, reports, journal articles, and web pages.

Variables of the Study

Dependent variable

Since no CBHI scheme was active in the study area, a hypothetical scenario was presented to community members to determine their WTP for monthly premiums, ranging from the lowest up to BDT 100, 101-200, and above 200. WTP for monthly premiums was used as the dependent

variable, categorized as “Low,” “Medium,” and “High.” Contingent valuation methods (CVM) were employed to identify the WTP for monthly premiums, with open-ended follow-up questions.

Independent variable

Eleven (11) independent variables include gender, age, marital status, education, occupation, family size, annual outpatient expenditures, annual inpatient expenditures, chronic illness, satisfaction with the benefit package, and knowledge of the CBHI scheme. The characteristics of the variables with category codes are detailed as follows:

Table 1. Nature of the dependent variable with the category codes

Categories of the WTP for monthly premiums	Codes
Low (Lowest up to 100 BDT)	1
Medium (101-200 BDT)	2
High (above 200 BDT)	3

Table 2. Nature of the independent variables with the category codes

Designation of Variable	Description of Independent Variables	Codes
X1	Gender	1=Male, 2=Female
X2	Age	1=Lowest up to 30 years, 2=31-45 years, 3=45 and above years
X3	Marital status	1=Unmarried, 2=Married, 3=Widow/Divorce
X4	Education	1=No education, 2=Primary, 3= Secondary and Higher secondary, 4=Bachelor's/Master's
X5	Occupation	1=Service holder, 2=Businesses, 3=Farmer, 4=Daily labor
X6	Family size	1= Lowest up to 3, 2=4-7, 3=7 and above
X7	Annual Outpatient expenditures	1= Lowest up to 1000, 2=1001-5000, 3=5000 and above
X8	Annual Inpatient expenditures	1= Lowest up to 1000, 2=1001-10000, 3=10001-25000, 4=25000 and above
X9	Chronic illness	1=Yes, 2=No
X10	Satisfaction with the benefit package	1=Dissatisfied, 2=Neutral, 3=Satisfied
X11	Knowledge of the CBHI scheme	1=Yes, 2=No

Method of Data Analysis and Presentation

Analyzing the collected data involved using descriptive and inferential statistical techniques with SPSS 26 (Statistical Package for the Social Sciences). Additionally, the data were presented in tables and graphs using MS Excel. In this study, the Proportional Odds Model (POM), a type of ordinal logistic regression (OLR) method, was employed. The last category of each independent variable was chosen as the reference category. Inpatient care includes hospital admissions where patients stay for more than 24 hours, resulting in direct medical expenses related to their hospitalization. Outpatient care, on the other hand, involves shorter visits, typically lasting less than 24 hours, for services such as medication administration, diagnostic tests, and physician consultations. The benefit package consisted of 14 (fourteen) distinct healthcare services and offered a drug discount ranging from 15% to 25%, depending on the medication category. The WTP for monthly premiums for the hypothetical CBHI was categorized as “Low,” “Medium,” and “High.” The study examines various socio-economic factors, health expenses, illness episodes, awareness, and perceptions regarding the scheme that influence the WTP for monthly premiums among the rural population in the study area.

Findings and Analysis

Socio-Economic Status (SES)

Among the 516 respondents, 65.9% were male (Table 3), and 34.1% were female. Respondents' ages ranged from 18 to 80, with 38.4% aged 31–45, 38.2% under 30, and 23.4% aged 45 and above. The average age was 38. Married participants accounted for 97.3%, with 2.7% unmarried or divorced. The main occupations were daily laborers (37.8%), followed by service holders (22.7%), mainly in informal jobs, then self-employed in business (21.3%) and agriculture (18.3%). Education levels showed that 37% had no formal education, 42.8% had primary education, 15.5% attended secondary or higher secondary level, and only 4.7% held a bachelor's or higher degree. The average household size was 5 members; 73.3% had 1–3, 25.8% had 4–7, and 1.0% had more than 7 people.

Table 3. Socio-Economic Status (SES)

Variables	Percentage	Mean $\pm$ S.D	Minimum	Maximum
Gender				
Male	65.9			
Female	34.1			
Age		38 $\pm$ 12.567	17	80
Lowest through 30	38.2			
31-45	38.4			
45 and above	23.2			
Marital Status				
Married	97.3			
Unmarried/Widow/Divorce	2.7			
Family size		5 $\pm$ 1.734	1	14
Lowest up to 3	73.3			
4 to 7	25.8			

>7	1.0
Education	
Primary	42.8
Secondary /	
Higher	15.5
Secondary	
Bachelor's/Master's	4.7
No education	37.0
Occupation	
Service holder	22.7
Business	21.3
Farmer	18.2
Daily labor	37.8

Source: Author's calculation based on survey data

Health Expenditures and Chronic Illnesses Situation

Most respondents reported relatively low inpatient healthcare expenditures, with 62.4% spending up to BDT 1,000. In contrast, 21.1% spent between BDT 1,001 and 10,000, 9.9% between BDT 10,001 and 25,000, and 6.6% incurred inpatient expenses exceeding BDT 25,000. For outpatient care, the majority of respondents (60.5%) reported expenditures ranging from BDT 1,001 to 5,000, while 35.9% spent up to BDT 1,000 and only 3.6% spent more than BDT 5,000. Furthermore, more than half of respondents (53.5%) reported having at least one family member with a chronic illness.

Table 4. Health Expenditures and Chronic Illnesses Situation

Variables	Percentage
Household inpatient care costs last year (BDT)	
Lowest up to 1000	62.4
1001-10000	21.1
10001-25000	9.9
25000 and above	6.6
Household outpatient care costs last year (BDT)	
Lowest up to 1000	35.9
1001-5000	60.5
5000 and above	3.6
Chronic illness	
Yes	53.5
No	46.5

Source: Author's calculation based on survey data

Awareness and Perceptions Regarding the CBHI Scheme

Awareness of the CBHI scheme among respondents was notably low, as 97.1% (Table 5) had never heard of the scheme, while only 2.9% reported some level of awareness. Despite the limited

awareness, respondents showed positive perceptions toward the proposed benefit package, with approximately 63% expressing satisfaction. In contrast, 28% were dissatisfied, and 9% remained neutral regarding the proposed benefit package.

Table 5. Awareness and Perceptions Regarding the CBHI Scheme

Variables	Percentage
Knowledge of the CBHI scheme	
Yes	2.9
No	97.1
Satisfaction with the benefit package	
Dissatisfied	28
Neutral	9
Satisfied	63

Source: Author's calculation based on survey data

Checking the Model Adequacy

Table 6. Model Fitting Information

Model	-2 Log Likelihood	Chi-Square	df	Sig.
Intercept Only	397.169			
Final	268.486	128.682	22	.000

Link function: Logit

Table 7. Pseudo R-Square

Cox and Snell	.221
Nagelkerke	.405
McFadden	.317

Link function: Logit

Table 8. Goodness-of-Fit

	Chi-Square	df	Sig.
Pearson	762.762	804	.848
Deviance	260.848	804	1.000

Link function: Logit

Table 9. Test of Parallel Lines

Model	-2 Log Likelihood	Chi-Square	df	Sig.
Null Hypothesis	268.486			
General	263.001	5.486	22	1.000

Link function: Logit

The results of “Model Fitting Information”, “Pseudo R-Square”, “Goodness-of-Fit”, and “Test of Parallel Lines” (Tables 6, 7, 8, & 9) indicated that the model has been adequately fitted with the

data. Key variables listed in the “Parameter estimates” table of the OLR analysis are used to build a model. The results are shown below:

Table 10. Results of Parameter Estimates

Variable (Category)	β (S.E.)	Wald	df	Sig. value	Exp β	95%CI	
						Lower Bound	Upper Bound
Intercept=1	-.096(1.476)	.004	1	.948			
Intercept=2	.684(1.477)	.215	1	.643			
X1							
Gender (Ref: Female)							
Male	-.840(.425)	3.899	1	.048**	0.431	-1.673	-.006
X2							
Age (Ref:45 years and above)							
Lowest up to 30 years	-1.159(.558)	4.304	1	.038**	0.313	-2.253	-.064
31-45 years	-.170(.444)	.146	1	.702	0.843	-1.039	.700
X4							
Education (Ref: Bachelor's/Master's)							
No education	.173(.600)	.083	1	.773	1.188	-1.003	1.348
Primary	2.158(.647)	11.145	1	.001**	8.653	.891	3.426
Secondary and Higher	2.196(.784)	7.851	1	.005**	8.988	.660	3.733
X5							
Occupation (Ref: Daily labor)							
Service holder	1.193(.626)	3.627	1	.05**	3.296	-.035	2.420
Businesses	.998(.631)	2.502	1	.114	2.712	-.239	2.235
Farmer	-.419(.792)	.281	1	.596	0.657	-1.971	1.132
X6							
Family size (Ref: 7 and above)							
Lowest up to 3	-2.713(.690)	15.467	1	.000**	0.066	-4.065	-1.361
4 to 7	2.630(.483)	29.626	1	.000**	0.072	-3.576	-1.683
X8							
Annual inpatient expenditures (Ref: 25000 and above)							
Lowest up to 1000	-1.940(.622)	9.723	1	.002**	0.143	-3.159	-.720
1001-10000	1.666(.660)	6.366	1	.012**	0.189	-2.959	-.372
10001-25000	-.262(.661)	.157	1	.692	0.769	-1.558	1.034

***P significant at the 5% significance level*

Collinearity Statistics

Table 11. Collinearity Statistics

Variables	Tolerance Value	VIF
Gender	.915	1.093
Age	.757	1.321
Marital status	.909	1.100
Education	.858	1.165
Occupation	.842	1.188
Family size	.935	1.070

Annual Outpatient expenditure	.669	1.495
Annual Inpatient expenditure	.698	1.432
Chronic illness	.902	1.108
Satisfaction with the benefit package	.969	1.032
Knowledge of the CBHI scheme	.972	1.029

Explanatory variables should not be highly correlated in logistic regression. Multicollinearity can be easily identified using tolerance and the variance inflation factor (VIF). The “Collinearity Statistics” (Table 8) display the tolerance and VIF values. A study indicates that a tolerance of 0.1 or less is a warning and a signal of a serious collinearity problem (Myers, 1990). Another study states that a tolerance value close to 1 indicates low multicollinearity, while a value near zero suggests potential multicollinearity issues (Senaviratna, 2019). The results in Table 11 for the dataset showed no multicollinearity based on the VIF and tolerance values.

Results of the Parameter Estimates

The results (Table 10) of the Parameter Estimates are presented through the regression coefficients, odds ratios (OR), P-values, and confidence intervals (CI) as follows:

Gender. The regression coefficient of $\beta = -0.840$ indicates that, all else being equal, males have lower log-odds of being in a higher WTP for the monthly premiums category compared to females. The P-value = 0.048 shows that the gender difference in WTP for monthly premiums is statistically significant at the 5% level. The confidence interval indicates a certain level of confidence that a population parameter falls within a range defined by a lower and upper bound. The lower bound represents the smallest plausible value of the parameter, while the upper bound is the largest plausible value. The true population parameter is between these bounds at a 95% confidence level. Since there is no known true population mean, this range describes possible mean values (O'Brien & Yi, 2016). Hence, the confidence interval, with an upper bound of -1.673 and a lower bound of “-.006”, being just under zero, confirms that the effect is both statistically and substantively meaningful.

Age. The regression coefficient of $\beta = -1.159$ indicates that respondents aged ≤ 30 years (considered as younger) have significantly lower log-odds of being in higher WTP for monthly premiums categories compared to those aged 45 and above. The 95% CI for β (-2.253, -0.064) lies entirely below zero, confirming the adverse effect is statistically significant. The P-value = 0.038 for age ≤ 30 years, which is less than 0.05, indicates that the finding is statistically significant at the 5% level. Additionally, the regression coefficient of $\beta = -0.170$ indicates a slight, non-significant reduction in the log-odds of higher WTP for monthly premiums for those aged 31-45 compared to those aged 45 and above. The 95% CI for β (-1.039, 0.700) suggests the effect could be negative, positive, or null. The P-value = 0.702, which exceeds 0.05, indicates that there is no significant difference in the WTP for monthly premiums for the 31-45 age group compared to those aged 45 and above.

Education Level

No Education. The regression coefficient $\beta = 0.173$ indicates that, holding all else constant, respondents with no education have higher log-odds of being in the higher WTP category for monthly premiums compared to those with a graduation or master's degree. The P-value = .773,

which exceeds 0.05, indicates that there is no significant difference in WTP for monthly premiums between respondents with no education and those with a bachelor's or master's degree. The 95% CI for β ranges from the lower bound of -1.003 to the upper bound of 1.348, which is the range of the values expected to be estimated.

Primary Education. The regression coefficient of $\beta = 2.158$ shows that, all else being equal, respondents with a primary education have higher log-odds of being in a higher WTP for the monthly premiums category compared to those with a bachelor's or master's degree. The P-value = .001 shows a highly significant result at the 5% significance level. The 95% CI for β ranges from the lower bound of 0.891 to the upper bound of 3.426, which is the range of the values expected to be estimated.

Secondary / Higher Secondary. The regression coefficient of $\beta = 2.196$ indicates that, all else being equal, respondents with a secondary and higher secondary education level have higher log-odds of being in a WTP for monthly premiums category compared to those with a bachelor's or master's degree. The P-value = 0.005 suggests statistical significance at the 5% level. The 95% CI for β ranges from 0.660 to 3.733, representing the interval within which the true value is expected to lie.

Occupation. The regression coefficient of $\beta = 1.193$ indicates that, all other factors being equal, service holders have higher log-odds of belonging to a higher WTP category for the monthly premiums compared to daily labourers. The P-value = .05 indicates a marginally significant association at the 5% level. The 95% CI for β ranges from the lower bound of -0.035 to the upper bound of 2.420, which is the range of the values expected to be estimated.

The regression coefficient of $\beta = 0.998$ suggests that, all other factors being equal, business owners have higher log-odds of belonging to a higher WTP for the monthly premiums category compared to daily labourers. The P-value = .114 indicates that there is no statistically significant association at the 5% level. The 95% CI for β ranges from -0.239 to 2.235, which encompasses the range of values expected to be estimated.

The regression coefficient of $\beta = -0.419$ indicates that, all other factors being equal, farmers have lower log-odds of belonging to a higher WTP for the monthly premiums category compared to daily labourers. The P-value = .596 indicates that there is no statistically significant association at the 5% level. The 95% CI for β ranges from -1.971 to 1.132, representing the span of plausible values for the estimate.

Family size. The regression coefficient of $\beta = -2.713$ indicates that, all other factors being equal, family sizes of ≤ 3 have lower log-odds of belonging to WTP for the monthly premiums category compared to family sizes of 7 or more. The P-value = .000 signifies a highly statistically significant relationship at the 5% level. The 95% CI for β spans from -4.065 to -1.361, covering the range of values expected to be estimated.

The regression coefficient of $\beta = 2.630$ suggests that, all other factors being equal, family sizes of 4-7 have higher log-odds of belonging to a higher WTP for the monthly premiums category compared to family sizes of 7 or more. The P-value = .000 signifies a highly statistically significant relationship at the 5% level. The 95% CI for β ranges from -1.683 to 3.576, encompassing the values that are expected to be estimated.

Annual Inpatient Expenditures. The regression coefficient of $\beta = -1.940$ indicates that, all other factors being equal, annual inpatient expenditures of $\leq$ BDT 1,000 have lower log-odds of belonging to a higher WTP for the monthly premiums category compared to inpatient expenditures

of $\geq$ BDT 25,000. The P-value = 0.002 signifies a statistically significant relationship at the 5% level. The 95% CI for β ranges from -3.159 to -0.720 , covering the expected range of values.

The regression coefficient of $\beta = -1.666$ indicates that, all other factors being equal, annual inpatient expenditures of BDT 1,001–10,000 have lower log-odds of belonging to a higher WTP for the monthly premiums category compared to inpatient expenditures of $\geq$ BDT 25,000. The P-value = 0.012 signifies a statistically significant relationship at the 5% level. The 95% CI for β ranges from -2.959 to -0.372 , indicating the interval within which the actual value is likely to fall.

The regression coefficient of $\beta = -0.262$ indicates that, all other factors being equal, annual inpatient expenditures of BDT 10,001–25,000 are associated with lower log-odds of being in a higher WTP for the monthly premiums category compared to inpatient expenditures of $\geq$ BDT 25,000. The P-value = 0.692 indicates that there is no statistically significant association at the 5% level. The 95% CI for β ranges from -1.558 to 1.034 , representing the interval within which the actual value is likely to fall.

Exponential Value Chart (OR). After exponentiating the coefficient, the OR = 0.431 (Fig 1) means that males have 57% lower odds of reporting higher willingness to pay monthly premiums than females (since $1 - 0.431 = 0.569$).

Exponentiating the coefficient yields an OR of 1.188 (Fig 2), indicating that respondents with no education have 18% higher odds of reporting a higher WTP for the monthly premiums compared to those with a graduation or master's degree (since $1 - 1.188 = -0.188$). The OR = 8.653 indicates that individuals with primary education have about 8.7 times higher odds of higher willingness to pay monthly premiums compared to those with a graduate or master's degree. The OR = 8.653 shows that respondents with secondary and higher secondary education are nearly 8.9 times more likely to fall into higher willingness-to-pay categories for monthly premiums than those with a graduate or master's degree.

The OR = 0.313 (Fig 3) shows that the odds of reporting a higher WTP for the monthly premiums are about 31% (69% lower) compared to those aged 45 and above. The OR = 0.843 suggests that the odds of reporting a higher WTP for the monthly premiums for this age group are about 16% lower, which is not statistically significant.

The OR = 3.296 (Fig 4) suggests that service holders are 3.2 times more likely to be in higher willingness of monthly premiums categories than daily labourers. The OR = 2.712 indicates that business owners are 2.7 times more likely to be in higher willingness of monthly premiums categories than daily labourers. The OR = 0.657 suggests that farmers have approximately 5.7% of the odds of being in a higher WTP for the monthly premiums category.

The OR = 0.143 (Fig 5) indicates that respondents spending $\leq$ BDT 1,000 annually on inpatient care are significantly less likely, with approximately 14.3% of the odds, to fall into higher willingness of monthly premiums categories compared to those who spend $\geq$ BDT 25,000. The OR = 0.189 suggests that respondents spending BDT 1,001–10,000 annually on inpatient care are significantly less likely, with approximately 18.9% of the odds of being in a higher WTP for the monthly premiums categories, compared to those who spend $\geq$ BDT 25,000. The OR = 0.769 suggests that respondents spending BDT 10,001–25,000 annually on inpatient care are significantly less likely, with approximately 76.9% of the odds, to belong in a higher WTP for the monthly premiums category compared to those who spend $\geq$ BDT 25,000.

The OR = 0.066 (Fig 6) indicates that family sizes of ≤ 3 have 6.6% of the odds of being in a higher WTP for the monthly premiums category compared to family sizes of 7 or more. The OR =

0.072 indicates that family sizes of 4–7 have 7.2% of the odds of being in a higher WTP for the monthly premiums category compared to family sizes of 7 or more.

The graphical representation of OR has been shown as follows:

Figure 1. Gender

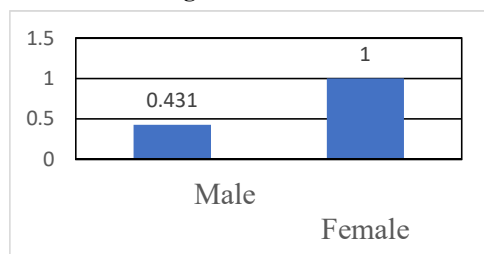


Figure 2. Education

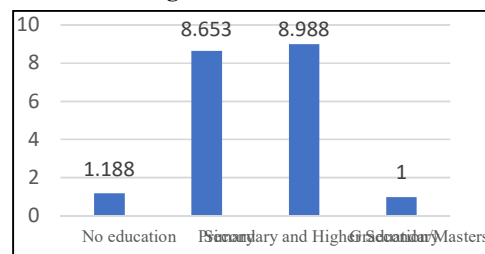


Figure 3. Age

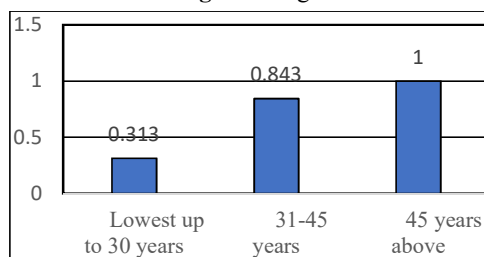


Figure 4. Occupation

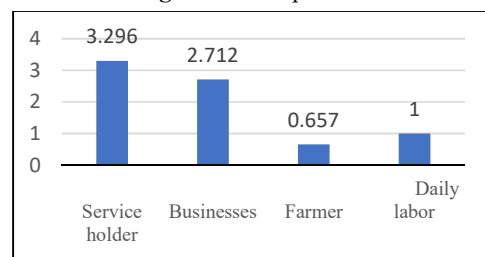


Figure 5. Annual Inpatient Expenditures

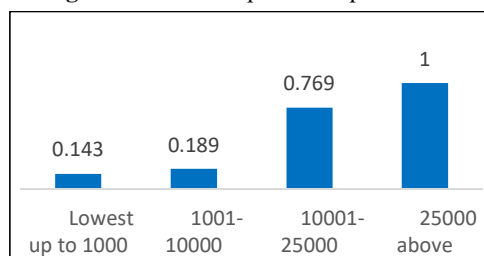
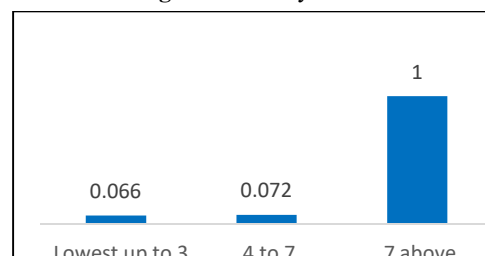


Figure 6. Family size



The Model of OLR

The model of OLR for the WTP for monthly premiums can be written as follows:

Where β_0 is the j th Intercept, $X_1, \dots, X_p$ are the Explanatory variables, and $\beta_1, \dots, \beta_p$ are the Regression coefficients.

Here,

$$\text{WTP for monthly premiums} = 0.840 + 2.158 + 2.196 + 1.193 - 2.630 - 1.666$$

Where $\beta_1 = .096$, and $\beta_2 = .684$

Discussion

An apparent gender disparity in WTP for monthly premiums has been identified, with male respondents exhibiting lower WTP. This is supported by a study from Nigeria, where female respondents were more willing to pay for CBHI than male respondents (Elegbede et al., 2022). Therefore, it is essential to introduce gender-sensitive pricing tiers or benefit schemes to enhance male engagement, as males are the prime decision-makers in a household. Furthermore, campaigns should be developed to raise awareness among respondents about perceived benefits.

A positive relationship between educational level and the WTP for the monthly premiums was expected, with educated respondents potentially having a better understanding of the benefits of making regular insurance payments to prevent catastrophic medical expenses in an emergency (Minyihun, 2019). However, this study shows that education has a significant negative effect on the WTP for the monthly premiums. Although this result contradicts many other findings, it is supported by a study by Negera and Abdisa (2022). Educated individuals may critically assess risks, perceive CBHI benefit packages as less comprehensive, and show lower WTP for the monthly premiums. However, this finding is not similar to the study conducted in Bangladesh by Ahmed et al. (2016) and in Ethiopia by Abebe & Belayneh (2023). Furthermore, the scheme features, trust, and perceived value are more preferred among educated respondents, especially concerning private plans and saving strategies.

Younger respondents are much less likely to report higher WTP for monthly premiums compared to those aged 45 and above. This is supported by a study of Nigeria, where older respondents were more willing to pay for CBHI than younger respondents (Elegbede et al., 2022). Older individuals often have higher disposable incomes, making it easier for them to afford premium services. Furthermore, older users may find more practical value in the premium offerings. In contrast, younger people tend to have smaller budgets and prioritize essential expenses over optional subscriptions.

Occupation appears to influence the WTP for monthly premiums, but only service holders show a potentially reliable trend. Service holders have a marginally significant positive correlation with higher WTP for monthly premiums, though it is borderline significant, and the confidence interval (CI) is broad. Business owners display a higher point estimate for the WTP for monthly premiums, but this effect is not statistically significant. Farmers tend to have lower WTP for the monthly premiums, but the relationship is not statistically meaningful due to the wide CI and non-significant p-value. The study can be compared to a study by Bayked et al. (2023), where a total of 17% of public servants were willing to pay for the proposed health insurance scheme, which represents the variation in WTP for monthly premiums by occupation. Therefore, occupation-specific strategies are suggested, including promoting benefits aligned with predictable premiums.

Family size significantly influences WTP for monthly premiums; households with 3 or fewer members are notably less likely to report medium or high WTP compared to those with 7 or more. Households with 4 to 7 members also have lower odds of high WTP for the monthly premiums, but with more uncertainty because the CI spans zero, even though the p-value is significant. Therefore, larger households (≥ 7 members) have a higher WTP, indicating that they might be more supportive of pooled insurance premiums. Moreover, in larger families, people may perceive more benefit because there are more at risk and a potentially higher financial burden, influencing them to pay more, which is similar to a study by Minyihun et al. (2019). Another Ethiopian study found family size as a significant determinant of CBHI enrolment (Mirach et al., 2019). Conversely, smaller families tend to have a lower WTP for the monthly premiums; thus, subsidized schemes for smaller

families could enhance their participation. Policies could leverage the greater willingness to encourage larger families to enroll by offering premium discounts per dependent.

A strong, notable negative correlation was found between higher WTP for monthly premiums and inpatient expenditures of $\leq$ BDT 1,000; additionally, significantly lower WTP for monthly premiums was observed for BDT 1,001–10,000. However, no substantial difference was identified for the BDT range of 10,001–25,000. A study showed that those who received inpatient services had significantly lower WTP for the monthly premiums in cost-sharing programs under a Universal Health Coverage scheme in Yogyakarta, Indonesia. However, a strong negative association existed between inpatient service use and willingness to contribute to health insurance (Nugraheni et al., 2022). Therefore, annual inpatient expenditure is a strong predictor of the WTP for the monthly premiums, and policies aimed at increasing participation should focus on expenditure categories.

Conclusion

The study examined the WTP of monthly premiums for the CBHI scheme and identified key determinants associated with it, which are crucial for the scheme's sustainability before large-scale implementation. The findings identified that gender, age, education, occupation, family size, and annual inpatient expenditures significantly influence respondents' WTP of monthly CBHI premiums. The study also highlights a substantial and largely unexplored opportunity in mobilizing financial resources for health protection among disadvantaged rural populations in the Gaibandha district of Bangladesh.

Furthermore, the findings indicated that willingness differed across socio-economic and demographic groups. Thus, suggesting a uniform premium structure may not ensure equitable participation or long-term sustainability. Variations in willingness based on gender, age, family size, and healthcare expenditure patterns should therefore be carefully considered in designing and implementing a CBHI scheme. Therefore, the study provides important policy options for developing sustainable and well-functioning risk pooling mechanisms among rural populations in Bangladesh.

Recommendations

- Premium structures should be designed by considering differences in willingness across socio-economic and demographic groups to ensure equitable participation.
- Awareness-building campaigns should be strengthened, particularly in rural areas, to improve understanding of the benefits of CBHI and encourage enrollment.
- Targeted initiatives should be implemented to increase male participation in CBHI schemes and reduce gender disparities in enrollment.
- Policymakers should adopt age-sensitive pricing, communication, and benefit packages to address willingness differences among various age groups.
- Premiums should be discounted, considering the family size of the household in designing premium rates.
- Policy efforts should focus on increasing access to healthcare services for disadvantaged communities through sustainable and community-based health financing mechanisms.

Strengths and Limitations of the Study

Having a large sample size and a high response rate are strengths of the study. However, the study relies on cross-sectional data, which cannot effectively identify unobserved factors affecting

respondents' WTP for monthly premiums. Additionally, responses may be biased, leading to overestimates or underestimates.

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