

Original article

Willingness to Pay for the National Health Insurance Scheme: A Cross-sectional study in Sarawak, Malaysia

Hasazli Hasan^{1*}, Md Mizanur Rahman²

Abstract

Introduction: Globally, the cost of healthcare continues to rise due to demographic changes of the ageing population, the rise of non-communicable diseases (NCD) prevalence, advances in medical technologies, and innovations. Malaysia is also not an exception, where the total health expenditure has risen from MYR 8.55 billion to MYR 57.36 from 1997 to 2017. With the ongoing debate on the tax-based public healthcare system's long-term sustainability, several scholars have called to introduce national health insurance in the country. The current study has contributed to the understanding of willingness to pay (WTP) among the Malaysian population. However, there is a gap of knowledge regarding WTP in the rural area of Sarawak. **Methods:** A cross-sectional study was conducted in rural areas of Sarawak involving 45 villages from 6 rural districts that represent the North, Central and Southern regions. Through an interviewer-administered questionnaire, the instrument consisted of demographic profile, presence of underlying disease, social capital, wealth index, and willingness to pay for national health insurance scheme (NHIS) through iterative bidding method of CVM. Three regression analysis (binary logistic, multinomial logistic, negative binomial logistic) were computed to identify statistically significant factors across these three analyses. **Results:** The total number of respondents was 1208. The amount that participants willing to pay for NHIS was higher. However, the proportion of participants willing to participate was lower when compared to similar previous studies. On an average, the respondents were willing to pay MYR 40.84 (SD 35.36) per month for NHIS premium. Factors favouring their willingness to pay were smaller family size, presence of underlying diseases, a strong level of empowerment, weaker group and network connection, low social cohesion and inclusion, and finally, low perception of violence and conflicts. These were identified as factors that were found to be significant across three statistical analyses. **Conclusion:** Hence, the government needs to consider the differences in terms of geographical location (Peninsular, Sabah and Sarawak) and socio-demographic characteristics when considering the deployment of NHIS nationwide. Furthermore, communication with the local communities, organisation and group is very important to improve rural communities' participation. Steps have to be taken to avoid adverse selection, considering that ill individuals were more likely willing to join than a healthier person.

Keywords: Social Capital; Willingness to pay; Wealth index; Sarawak

Bangladesh Journal of Medical Science Vol. 21 No. 03 July'22 Page : 577-589
DOI: <https://doi.org/10.3329/bjms.v21i3.59571>

Introduction

Robust health financing is essential towards achieving Universal Health Coverage (UHC). As part of Sustainable Development Goals (SDG), the dimension of UHC is limited to access quality healthcare and protection against financial shock associated with the cost of medical care¹. Health

financing involves revenue raising, pooling of funds, and purchasing of healthcare services. This is done through various healthcare systems, such as the Bismarck model (social health insurance), Beveridge model and hybrid between these two models (national health insurance). In the national health insurance system, the fund comes from the

1. Hasazli Hasan, Department of Community Medicine and Public Health Faculty of Medicine and Health Sciences Universiti Malaysia Sarawak Email: hasazli@hotmail.com
2. Md Mizanur Rahman, Department of Community Medicine and Public Health Faculty of Medicine and Health Sciences Universiti Malaysia Sarawak Email: rmmizanur@unimas.my, aniqm@hotmail.com

Correspondence: Md Mizanur Rahman, Department of Community Medicine and Public Health, Faculty of Medicine and Health Sciences, Universiti Malaysia Sarawak, Email: rmmizanur@unimas.my, aniqm@hotmail.com

combination of government-managed insurance and general tax revenue². Malaysia has been providing a dual healthcare system: public and private healthcare providers. Public healthcare providers are mainly funded through general tax revenue, while private health sectors are financed through various health insurance schemes or out-of-pocket payment³. The social insurance scheme is undertaken by the Social Security Organisation (SOCSO), providing Employment Injury Scheme and Invalidity Scheme⁴. Additionally, mySalam⁵ and PekaB40⁶ were recently announced to provide financial aid covering 45 critical illnesses, hospitalisation, transportation, and medical equipment. However, only Malaysian citizens of low-income groups are eligible for this health insurance scheme.

A few studies have shown that socio-demographic characteristics of the female gender, younger age, higher education level, and higher income level were more likely willing to pay more for the national health insurance scheme⁷⁻⁹. Additionally, those with illnesses were also more likely willing to pay⁹. There is no published article for locally conducted research that examined the association between willingness to pay for a national health insurance scheme and social capital. A mixed-method study in Ghana revealed that community trust is a predicting factor¹⁰. Another mixed-method study in South Africa highlighted social solidarity and collective action as important considerations in implementing the National Health Insurance scheme¹¹.

In recent years, the rising healthcare cost in this country is an ongoing challenge. Total health expenditure has risen from MYR 8.55 billion in 1997 to MYR 57.36 billion in 2017¹². In terms of percentage as Gross Domestic Product (GDP), it rose from 3.03% in 1997 to 4.24% in 2017¹². Contributing factors of rising healthcare cost are demographic changes of increasing population size and ageing population, rising prevalence of non-communicable diseases, advances in medical technology and innovations¹³. The rising healthcare cost trend was argued to put a significant burden on current tax-funded public healthcare. Several studies revealed a low tax contribution level¹⁴⁻¹⁶. There has been a suggestion to introduce a national health insurance scheme¹⁷. However, there is no formal plan to introduce a national health insurance scheme for all Malaysians yet¹⁸. Nevertheless, past studies explored the acceptance and willingness to pay for the national health insurance scheme⁷⁻⁹. Hence, it

is of our interest to conduct a similar study on the East Coast of Malaysia. This study aimed to identify factors associated with the willingness to pay for the national health insurance scheme among rural communities.

Materials and Methods

Settings and sample size

This cross-sectional study was conducted in the rural area of Sarawak in the year 2019 to 2020. A multistage cluster sampling strategy was used, involving six districts representing the North, Central and South regions of Sarawak. For each district, 20 villages were chosen randomly. At the village level, the respondents were chosen via systematic random sampling. The calculated minimum sample size was 925 using the single proportion formula considering the design effect. With the addition of non-response, the final sample was 1388.

Data collection, instruments and ethical issues

We collected the data using an interviewer-administered questionnaire through a face-to-face interview. The questionnaire consists of the socio-demographic characteristics, underlying chronic diseases, annual household expenditure, social capital, wealth index and willingness to pay for the national health insurance scheme. Before the actual study, we conducted a pilot study in a non-sample area for the instruments' reliability and validity. The head of the village was informed regarding the research in their area and informed written consent was obtained from each participant. The participants were assured that no personally identifiable information would be publicly published. They were also assured of data confidentiality and privacy.

Measurements

Underlying chronic diseases: Sick individual was more likely willing to pay more for health insurance⁹. Hence, we included a question on the presence of underlying disease as one of the determining factors. The respondent was asked whether any family members had a chronic medical condition certified by a medical practitioner.

Social capital: It was adopted from the World Bank working paper on measuring social capital¹⁹. It measures social capital based on the following dimensions: (i) Group and network, (ii) trust and solidarity, (iii) collective action and cooperation, (iv) information and communication, (v) social cohesion, (vi) violence, and (vii) empowerment and

political action. There is no cut-off score; instead, each dimension was scored on a continuous scale. The composition of questions used in this study was adjusted after the pilot study. Because of this, the total score for each dimension was not similar. Hence, each dimension's score was normalised into a similar score with a scale ranging from 0 until 1.

Wealth index: It is a composite measure of a household's cumulative living standard²⁰. It was calculated using household assets, such as televisions, bicycles, cars, dwelling characteristics such as flooring material, type of drinking water source, toilet and sanitation facilities etc.^{21,22}. It consists of 23 household items from which principal component analysis²³ was done to calculate the wealth index²⁴.

Willingness to pay for the national health insurance scheme: This was elucidated through an iterative bidding contingent valuation method²⁵. Respondents were asked if they were willing to pay for the given amount of money, and the amount will be increased until they responded with "no"²⁶.

Data analysis

From the research questionnaire booklet, data was entered manually into the Microsoft Excel datasheet. "Data Validation" function built-in Microsoft Excel was used for error correction. Once completed, the datasheet was transferred into IBM Statistical Package for the Social Sciences (SPSS) version 22 for data analysis²⁷. The final sample size for data analysis was 1208 (out of the initially collected 1325 sample size after data cleanup). Missing data on the dependent variable was treated with list-wise case deletion, while those missing on the independent variable was treated with multiple-imputation technique^{28,29}. Binary logistic regression, multinomial logistic regression, and negative binomial logistic regression were done to determine factors associated with the national health insurance scheme's willingness-to-pay. Factors that were statistically significant across three of these regression analyses were regarded as important. We set the p-value 0.05 as statistically significant.

Ethics statement

Ethical approval was obtained from the Ethics Committee of Universiti Malaysia Sarawak (Reference number UNIMAS/NS.21.02/03-02 Jld.3 (83)).

Results

Characteristics of the respondents

Table 1 Characteristics of the respondents

Characteristics	Frequency	Percentage	Statistics
Age (years)			
<30	249	20.6	Mean (SD) = 43.95 (16.13) Min = 18 Max = 98
30 - 39	292	24.2	
40 - 49	255	21.1	
50 - 59	191	15.8	
≥ 60	221	18.3	
Gender			
Male	625	52.5	
Female	574	47.5	
Ethnicity			
Iban	663	54.9	
Bidayuh	195	16.1	
Malay	69	5.7	
Chinese	37	3.1	
Others	244	20.2	
Marital status			
Married	913	75.5	
Single	296	24.5	
Highest education level			
No formal education	85	7.0	
Primary	233	19.3	
Secondary	642	53.1	
Diploma	196	16.2	
Degree	42	3.5	
Masters / PhD	10	0.8	
Occupation			
Unemployed	271	22.4	
Pensioner	14	1.2	
Informal sector	467	38.7	
Government	148	12.3	
Private	218	18.0	
Others	90	7.5	
Income (monthly)			
<1000	514	42.5	Mean (SD) = 1390.58 (1082.59) Median = 1174.75 Min = 0 Max = 15000
1000-1999	468	38.7	
2000-2999	156	12.9	
3000-3999	30	2.5	
≥4000	40	3.3	
Family size			
<3	222	18.3	Mean (SD) = 5.51 (2.18) Min = 1 Max = 16
3-5	621	51.3	
6-8	313	25.8	
≥9	51	4.2	
Underlying disease			
Yes	509	42.1	
No	699	57.9	

The majority of the respondents were aged between 30-39 years old (24.2%), followed by 40-49 years old (21.1%) and less than 30 years old (20.6%). The male to female ratio was 1.1 to 1.0. Iban was the most common ethnic composition (54.9%). Three-quarters of the respondents were married (75.5%), and a majority of respondents has attained up to the secondary level of education (53.1%). Two-fifths of

the respondents were working in the informal sector (38.7%). The average monthly income (SD) was (MYR) 1390.58 (1082.59) per month (Table 1).

Table 2 illustrated a summary of the seven dimensions of social capital utilised in the study. The score was standardised into a similar scale for multivariate analysis. The highest score was collective action and cooperation (0.88), while the lowest score was violence (0.41).

Table 2 Distribution of social capital

Dimensions of social capital	Unstandardised Score			Standardised Score		
	Min	Max	Mean	Min	Max	Mean
Group and network	0.00	63.00	7.17	0.00	1.00	0.53
Trust and solidarity	8.00	23.00	16.87	0.23	1.00	0.78
Collective action and cooperation	2.00	37.00	12.17	0.10	1.00	0.88
Information and communication	2.00	40.00	9.86	0.05	1.00	0.69
Social cohesion	4.00	84.00	15.23	0.17	1.00	0.77
Violence	1.00	6.00	3.77	0.10	1.00	0.41
Empowerment and political action	4.00	17.00	12.46	0.08	1.00	0.59

Willingness-to-pay for the national health insurance scheme (NHIS)

Approximately one-third of the respondents were willing to pay for the national health insurance scheme (33.2%). On average (SD), they are willing to pay MYR 40.84 (1250.19) per month. The median was MYR 20.00 per month, with the maximum amount willing-to-pay was 250.00 per month (Table 3).

Table 3 Willingness to pay for the national health insurance scheme

Variables	Frequency	Percentage	Statistics
Willingness to pay for NHIS (n = 1208)			
Agree	401	33.2%	Mean (SD) = 40.84 (35.36) Median = 20.00 Min = 1.00 Max = 250.00
Disagree	807	66.8%	
Amount willing to pay (n = 401)			
1 – 10 per month	20	5.0%	
11 – 20 per month	208	51.9%	
> 20 per month	173	43.1%	

Factor affecting willingness to pay for NHIS: Binary logistic regression analysis

A multivariate analysis was conducted to identify the potential predictors for the willingness to pay for a national health insurance scheme. First, a binary logistic regression was done to determine factors associated with the willingness to pay for the NHIS. The dependent variable was set as willing to pay (yes or no). The independent variables were socio-demographic characteristics, disease co-morbidity, social capital and wealth index. Factors that were not statistically significant ($p < 0.05$) or carry high collinearity (for example, monthly income and wealth index) were removed. The fitted model was statistically significant, $\chi^2 (22) = 376.52, p < 0.001$. The Nagalkerke R^2 was 37.2%, while the predictive classification is 76.5%. Model fitting is good, as indicated by the non-significant Hosmer Lemeshow test (goodness of fit), $\chi^2 (8) = 12.57, p = 0.127$.

The higher the education level, the more likely it that participants were willing to pay for the NHIS. Those with a Masters level of education were 16.68 times more likely willing to pay as compared to those without formal education background (95% CI: 2.80, 99.40, p -value = 0.002). This is compared to respondents with degree (AOR=6.00, 95% CI: 2.12, 16.98, p -value = 0.001), diploma (AOR=4.99, 95% CI: 2.21, 11.26, p -value < 0.001), secondary school (AOR 2.87, 95% CI: 1.48, 5.55, p -value = 0.002) and primary school (AOR=3.87, 95% CI: 1.94, 7.69, p -value < 0.001). The occupation was also statistically significant in predicting willingness to pay for the NHIS. Respondents who are working were less likely willing to pay for the NHIS than the unemployed respondent. However, only those working in the private sector (AOR=0.52, 95% CI: 0.31, 0.87, p -value = 0.013) and pensioner (AOR=0.13, 95% CI: 0.03, 0.57, p -value = 0.007) were found to be statistically significant. The smaller family has shown to be a predictor of willingness to pay for NHIS. With a small AOR of 0.86 (95% CI: 0.80, 0.93, p -value < 0.001), an additional one family member reduces the likelihood of willingness to pay by 14%. The underlying disease's presence also increased the likelihood of willingness to pay (AOR=1.83, 95% CI: 1.34, 2.50, p -value < 0.001). Except for information and communication, all social capital dimensions are shown to be statistically significant in predicting willingness to pay for NHIS. Dimensions that reduce the likelihood were

group and network (AOR=0.86, 95% CI: 0.80, 0.92, p-value<0.001), social cohesion (AOR=0.81, 95% CI: 0.73, 0.90. p-value <0.001), and violence (AOR=0.73, 95% CI: 0.63, 0.84, p-value< 0.001). Other dimensions of trust and solidarity (AOR=1.31, 95% CI: 1.15, 1.49, p-value <0.001), collective action and cooperation (AOR= 1.13, 95% CI: 1.03, 1.25, p-value = 0.001), empowerment and political action (AOR=1.35, 95% CI: 1.22, 1.50. p-value <0.001) increase the likelihood of willingness to pay for the NHIS. Finally, participants with a higher wealth index were more likely willing to pay for the NHIS when compared with wealth index quantile 1. Those with quantile 5 were 3.8 times more likely willing to pay (95% CI: 2.10, 6.90, p-value <0.001), quantile 4 were 7.56 times more likely willing to pay (95% CI: 4.44, 12.86, p-value <0.001), and quantile 3 were 3.67 times more likely willing to pay (95% CI: 2.22, 6.04, p-value <0.001) when compared to those with the lowest quantile of wealth index.

Table 4 Factor affecting willingness to pay for NHIS: Binary logistic regression analysis

Factors	Beta	SE	AOR	p-value	LL	UL
Family size	-0.15	0.04	0.86	<0.001	0.80	0.93
Underlying disease						
No (ref)						
Yes	0.61	0.16	1.83	<0.001	1.34	2.50
Highest education level				<0.001		
No formal education (ref)						
Primary school	1.35	0.35	3.87	<0.001	1.94	7.69
Secondary school	1.05	0.34	2.87	0.002	1.48	5.55
Diploma	1.61	0.42	4.99	<0.001	2.21	11.26
Degree	1.79	0.53	6.00	0.001	2.12	16.98
Masters/PhD	2.81	0.91	16.68	0.002	2.80	99.40
Occupation				0.033		
Unemployed (ref)						
Pensioner	-2.08	0.77	0.13	0.007	0.03	0.57
Informal sector	-0.37	0.20	0.69	0.063	0.47	1.02
Government servant	-0.42	0.32	0.66	0.183	0.35	1.22

Factors	Beta	SE	AOR	p-value	LL	UL
Private sector	-0.65	0.26	0.52	0.013	0.31	0.87
Others	-0.41	0.32	0.67	0.203	0.36	1.25
Social capital						
Group and network	-0.15	0.04	0.86	<0.001	0.80	0.92
Trust and solidarity	0.27	0.07	1.31	<0.001	1.15	1.49
Collective action and cooperation	0.12	0.05	1.13	0.011	1.03	1.25
Social cohesion	-0.21	0.05	0.81	<0.001	0.73	0.90
Violence	-0.32	0.07	0.73	<0.001	0.63	0.84
Empowerment and political action	0.30	0.05	1.35	<0.001	1.22	1.50
Wealth index				<0.001		
1st quartile (ref)						
2nd quartile	0.31	0.27	1.36	0.248	0.81	2.30
3rd quartile	1.30	0.26	3.66	<0.001	2.22	6.04
4th quartile	2.02	0.27	7.56	<0.001	4.44	12.86
5th quartile	1.34	0.30	3.80	<0.001	2.10	6.90
Constant	-3.69	0.89	0.03	<0.001		

AOR= Adjusted Odds ratio, LL=Lower limit of 95% confidence interval, UL = Upper limit of 95% confidence interval, Chi-square, χ^2 (22) = 376.52, p-value < 0.001 Nagelkerke R^2 = 0.37 Predictive classification = 76.5% Hosmer and Lemeshow X^2 (8) = 12.57, p-value = 0.127

Factor affecting willingness to pay for NHIS: Multinomial logistic regression analysis

A multinomial logistic regression analysis was conducted to identify factors associated with the willingness to pay for the NHIS. The dependent variable was the willingness to pay for NHIS, grouped into four categories, not willing (reference group), willing to pay MYR 0-10 per month, willing to pay MYR 11-20 per month, and willingness to pay MYR >20 per month. The independent variables were socio-demographic characteristics, disease comorbidity, wealth index and social capital. Eight significant factors, family size, underlying disease, and six dimensions of social capital (not collective action and cooperation) were included in the final model.

Respondents with smaller family size members were

more likely willing to pay for the NHIS scheme. This was statistically significant for a group of respondents willing to pay more than MYR 20 per month (AOR= 0.89, 95% CI: 0.81, 0.97, p-value =0.01). Those with underlying disease co-morbidity were more likely willing to pay as compared to those without underlying disease. This is statistically significant for group of respondents that were willing to pay more than MYR 20 per month (AOR= 3.01, 95% CI: 2.05, 4.43, p-value <0.001).

As for social capital, different dimensions showed different effects towards willingness to pay for the NHIS. Favoring factors include trust and solidarity (AOR= 1.94, 95% CI: 1.60, 2.35, p-value < 0.001), information and communication (AOR= 1.35, 95% CI: 1.03, 1.77, p-value = 0.032), empowerment and political action (AOR=1.29, 95% CI: 1.14, 1.45, p-value < 0.001; AOR= 1.61, 95% CI: 1.40, 1.85, p-value < 0.001, respectively). Dimensions of social capital with opposite effects were group and network (AOR= 0.80, 95% CI: 0.73, 0.88, p-value<0.001), social cohesion (AOR= 0.83, 95% CI: 0.74, 0.92, p-value = 0.001; AOR=0.69, 95% CI: 0.62, 0.77, p-value < 0.001) and violence (AOR=0.59, 95% CI: 0.48, 0.73, p-value <0.001; AOR= 0.76, 95% CI: 0.64, 0.91, p-value = 0.003).

Factor affecting willingness to pay for NHIS: Negative binomial Poisson regression

This type of analysis was chosen due to over dispersion^{30,31}, where the mean (SD) of willingness to pay for NHIS was 40.84 (35.36), and variance was 1250.19. In this model, the dependent variable was the willingness to pay for the NHIS, where those who were not willing to pay were coded as zero. In the initial step, the independent variables were socio-demographic characteristic, underlying disease, wealth index and social capital. The independent variable with high collinearity (e.g., monthly income and wealth index) and statistically insignificant (i.e. p-value < 0.05) were removed one by one.

In terms of educational background, the higher the education background, the more likely the individual would pay for NHIS. Respondents with masters or PhD were 4.08 times more likely (95% CI: 2.01,

8.28, p-value < 0.001), degree holders were 3.41 times more likely (95% CI 2.16, 5.39, p-value < 0.001), diploma holders were 2.48 more likely (95% CI: 1.77, 3.49, p-value < 0.001), secondary school graduates were 2.00 more likely (95% CI: 1.53, 2.61, p-value < 0.001) and primary school were 2.20 more likely (95% CI: 1.65, 2.94, p-value < 0.001) pay for NHIS when compared to respondents with no formal education. Compared to unemployed respondents, those working in the informal sector of occupation, private sector, and pensioner were less likely to pay for NHIS. Respondents working as government staff appear to be more likely willing to pay, but this was not statistically significant. Respondents with smaller family size were more likely willing to pay for the NHIS (AOR= 0.86, 95% CI: 0.83, 0.89, p-value < 0.001). For every additional family size member, the amount they willing to pay was 14% lesser. Those with the underlying disease were also more likely willing to pay for the NHIS than those without the underlying disease (AOR= 1.59, 95% CI: 1.39, 1.83, p-value <0.001). As for the social capital, dimensions favoring willingness to pay for NHIS were collective action and cooperation (AOR= 1.17, 95% CI: 1.13, 1.23, p-value <0.001), empowerment and political action (AOR=1.44, 95% CI 1.38, 1.52, p-value<0.001). The other dimensions had opposite effect on willingness to pay for NHIS, including group and network (AOR= 0.84, 95% CI: 0.82, 0.87, p-value <0.001), information and communication (AOR= 0.92, 95% CI: 0.89, 0.96, p-value<0.001), social cohesion (AOR=0.81, 95% CI: 0.78, 0.85, p-value < 0.001), and violence (AOR= 0.81, 95% CI: 0.77, 0.86, p-value < 0.001). Compared to the lowest quartile of the wealth index, respondents with a higher wealth index were more likely to pay for the NHIS. Those in the 3rd quartile were 3.76 times (95% CI 3.03, 4.65, p-value < 0.001), fourth quartile were 7.22 times (95% CI: 5.67, 9.19, p-value <0.001) and fifth quartile were 2.21 times (95% CI: 1.72, 2.85, p-value<0.001) more likely when compared to the 1st quartile of wealth index.

Table 5 Factor affecting willingness to pay for NHIS: Multinomial logistic regression analysis

Factors (reference = not willing)	MYR 0 – 10 per month				MYR 11 – 20 per month				> MYR 20 per month			
	OR	p	LL	UL	OR	p	LL	UL	OR	p	LL	UL
Family size	1.04	0.722	0.85	1.27	0.94	0.143	0.87	1.02	0.89	0.010	0.81	0.97
Underlying disease												
No (ref)												
Yes	1.94	0.165	0.76	4.97	1.11	0.549	0.79	1.57	3.01	<0.001	2.05	4.43
Social capital												
Group & network	1.01	0.908	0.83	1.24	0.96	0.298	0.89	1.03	0.80	<0.001	0.73	0.88
Trust & solidarity	1.00	0.987	0.69	1.45	1.94	<0.001	1.60	2.35	1.09	0.283	0.93	1.26
Info & communication	1.35	0.032	1.03	1.77	0.97	0.568	0.89	1.06	1.06	0.235	0.96	1.17
Social cohesion	0.96	0.786	0.70	1.31	0.83	0.001	0.74	0.92	0.69	<0.001	0.62	0.77
Violence	1.07	0.669	0.78	1.48	0.59	<0.001	0.48	0.73	0.76	0.003	0.64	0.91
Empowerment & political action	1.21	0.224	0.89	1.65	1.29	<0.001	1.14	1.45	1.61	<0.001	1.40	1.85

AOR= Adjusted Odds ratio, LL=Lower limit of 95% confidence interval, UL = Upper limit of 95% confidence interval, Model fitting $\chi^2 (24) = 352.21, p\text{-value} < 0.001$

Goodness of fit $\chi^2 (3165) = 4847.84, p\text{-value} < 0.001$

Nagelkerke $R^2 = 0.30$

Table 6 Factor affecting willingness to pay for NHIS: Negative binomial Poisson regression

Factors	B	SE	OR	p-value	LL	UL
Family size	-0.15	0.02	0.86	<0.001	0.83	0.89
Underlying disease						
No (ref)						
Yes	0.47	0.07	1.59	<0.001	1.39	1.83
Education level						
No (ref)						
Primary school	0.79	0.15	2.20	<0.001	1.65	2.94
Secondary school	0.69	0.14	2.00	<0.001	1.53	2.61
Diploma	0.91	0.17	2.48	<0.001	1.77	3.49
Degree	1.23	0.23	3.41	<0.001	2.16	5.39
Masters/PhD	1.41	0.36	4.08	<0.001	2.01	8.28
Occupation						
Unemployed (ref)						
Pensioner	-1.15	0.32	0.32	<0.001	0.17	0.59
Informal sector	-0.40	0.09	0.67	<0.001	0.56	0.80
Government	0.27	0.14	1.31	0.064	0.98	1.73
Private	-0.43	0.11	0.65	<0.001	0.52	0.81
Others	0.04	0.14	1.04	0.781	0.78	1.38
Social capital						
Group & network	-0.17	0.02	0.84	<0.001	0.82	0.87
Collective action and cooperation	0.16	0.02	1.17	<0.001	1.13	1.23
Information and communication	-0.08	0.02	0.92	<0.001	0.89	0.96
Social cohesion	-0.21	0.02	0.81	<0.001	0.78	0.85
Violence	-0.21	0.03	0.81	<0.001	0.77	0.86
Empowerment and political action	0.37	0.02	1.44	<0.001	1.38	1.52
Wealth index						
1st quartile (ref)						
2nd quartile	0.20	0.11	1.22	0.075	0.98	1.51
3rd quartile	1.32	0.11	3.76	<0.001	3.03	4.65
4th quartile	1.98	0.12	7.22	<0.001	5.67	9.19
5th quartile	0.79	0.13	2.21	<0.001	1.72	2.85
Intercept	1.15	0.39	3.16	0.003	1.48	6.74

Goodness of fit $\chi^2 (1185) = 5075.93$

Omnibus test likelihood ratio $\chi^2 (22) = 1587.81, p < 0.001$

Comparison of three multivariate analysis models

Table 7 summarises beta coefficients from the three regression model. As shown, the statistically significant factors across the three models were family size, underlying diseases, and social capital.

Table 7 Comparison of three multivariate analysis models

Factors	Binomial logistic	Multinomial logistic			Negative binomial
		(0 – 10)	(11 – 20)	(> 20)	
Family size	-0.15***	0.04	-0.06	-0.12**	-0.15***
Underlying disease					
No (ref)					
Yes	0.61***	0.67	0.11	1.10***	0.47***
Education level					
No (ref)					
Primary school	1.35***	-	-	-	0.79***
Secondary school	1.05**	-	-	-	0.69***
Diploma	1.61***	-	-	-	0.91***
Degree	1.79**	-	-	-	1.23***
Masters/PhD	2.81**	-	-	-	1.41***
Occupation					
Unemployed (ref)					
Pensioner	-2.08**	-	-	-	-1.15***
Informal sector	-0.37	-	-	-	-0.40***
Government	-0.42	-	-	-	0.27
Private	-0.65**	-	-	-	-0.43***
Others	-0.41	-	-	-	0.04
Social capital					
Group & network	-0.15***	0.01	-0.04	-0.22***	-0.17***
Trust & solidarity	0.27***	0.01	0.66***	0.08	-
Collective action & cooperation	0.12*	-	-	-	0.16***
Information & communication	-	0.30*	-0.03	0.06	-0.08***
Social cohesion	-0.21***	-0.04	-0.19**	-0.37***	-0.21***
Violence	-0.32***	0.07	-0.53***	-0.27**	-0.21***
Empowerment & political action	0.30***	0.19	0.25***	0.48***	0.37***
Wealth index					
1st quartile (ref)					
2nd quartile	0.31	-	-	-	0.20
3rd quartile	1.30***	-	-	-	1.32***
4th quartile	2.02***	-	-	-	1.98***
5th quartile	1.34***	-	-	-	0.79***
Intercept	-3.69***	-7.73**	-4.17***	-0.88	1.15**

* *p-value* < 0.05, * *p-value* < 0.01, * *p-value* < 0.001

Discussion

Our analysis revealed that smaller family size, presence of underlying disease, strong scores in the dimension of empowerment and political action, lower perception of violence, smaller score on

group and network and social cohesion are strong predictors for the willingness to pay for the NHIS. Factors such as higher education level, a specific category of occupation, and wealth index were statistically significant in at least one of the three regression analyses models. Variables of gender,

ethnicity, and marital status were not statistically significant predictors in our analysis. We could not include monthly income in the analysis due to the high collinearity with the wealth index.

The analysis showed that the average (SD) willingness to pay for NHIS was MYR 40.84 (35.36) per month, while the median was MYR 20.00 per month. The minimum and maximum amounts were MYR 1.00 and MYR 250.00, respectively. The proportion of participants willing to pay for NHIS was 33.2%. The proportion of participation was low compared to Azhar et al.³², which reported that 46.7% of the rural people were willing to pay the monthly health insurance premium in Sarawak. The amount they were willing to pay was higher, but the proportion of participants willing to join was considerably low. A study in Selangor, Malaysia, reported that 96.5% of respondents who agreed to participate were willing to pay an average of MYR 2.00⁷. Compared to a recent study in Peninsular Malaysia⁹, their willingness to pay for the National Health Financing Scheme was also lower. The reported mean (SD) was MYR 23.44 (47.11), and the median was MYR 10.

Our analysis revealed that, the proportion of participants who were willing to pay was much higher (91%) than the other studies in Asia^{33,34}. The differences in the amount they are willing to pay could be due to differences in participants' socio-demographic characteristics, underlying diseases, economic status, social capital, or even other factors between different study areas (peninsular and Sarawak). However, this may need further investigation to explain the reason behind this difference.

In terms of family size, large family size reduces the willingness to pay for the NHIS scheme. This finding is consistent with Ghana's study, where household size negatively affects their national health insurance scheme^{35,36}. With a larger family size, the head of the family would face greater responsibilities in foods, clothing, education, etc. Such financial responsibilities would lead to smaller income discretionary left to pay the monthly insurance premium. As compared to the national studies, the number of dependent family members was not statistically significant in predicting their willingness to pay for national health insurance^{8,9}. We postulate the possibility of controlling variables (such as the number of working adults or schooling children in a family member) that might explain the differences. However, this postulation might need further

evidence to be confirmed. The level of education was significant in two of the models tested for analysis. This finding is consistent with previous studies^{7,35,37}. This could be due to better knowledge and awareness regarding the importance of having health insurance. Besides, a higher education level enables access to a paying job, enabling them to afford health insurance premium payment. Being a pensioner and working in the private sector were negatively associated with the willingness to pay for NHIS in this study. Pensioners of the public sector in this country are granted medical benefit upon receiving pensioners card³⁸. With pensioners card, inpatient and outpatient treatment in public health facilities (both clinics and hospitals) are free of charge, covering their spouse and dependents currently in school or with permanent physical disabilities³⁹. As for private-sector workers, all employers and employees in private sectors in Malaysia are required to contribute under the SOCSO insurance scheme under legislation⁴⁰. For SOCSO contributors are provided with Employment Injury Scheme and Invalidity Scheme with medical benefit in the event of work-related diseases or injury.

Both pensioners and private sector workers showed a lower willingness to pay for NHIS due to their existing medical benefits. The higher economic status confers a positive effect on willingness to pay for NHIS in this study. This finding is similar to some studies^{35,36}. Higher-income levels increase affordability to pay for regular insurance premium payment. The presence of underlying morbidity in the family increases the likelihood of willingness to pay for the NHIS scheme. This is similar to the study conducted in Peninsular Malaysia⁹, where participants who were recently diagnosed with an illness were more likely willing to pay. Having personally experienced financial burden related to medical care, sick individuals appreciate the importance of having a financial protection scheme.

Social capital is a critical factor that was found to be statistically significant in predicting the willingness to pay for the NHIS. This could be an essential issue achieving community trust, social solidarity, and collective action in predicting willingness to pay for health insurance^{10,11}. We examined six dimensions of social capital, as outlined by Grootaert¹⁹. Our analysis revealed four important dimensions of social capital that influence the willingness to pay for NHIS, which are (i) group and network, (ii) social cohesion, (iii) violence and (iv) empowerment and political action. Social capital is attributed to decision-making that

reflects health improvement. Many international organisations have emphasised social capital as a powerful tool for attaining development objectives both in developed and developing countries⁴¹. In a community, it acts positively on people's health. Communities with high social capital level are more likely to go through social change and inequalities^{42,43}. Out of these four dimensions, only empowerment and political action positively affect willingness to pay for NHIS. It measures an individual ability to make decisions that affect everyday activities and may change the course of their life¹⁹. Considering that empowered individuals were more likely to take steps ahead for the benefit of their health, subscribing to health insurance could be one of them. As their future health conditions could not be predicted, empowered individuals are more likely to take precautionary steps to invest in health insurance⁴⁴. The group and network dimension were found to negatively influenced the participant's willingness to pay for the NHIS scheme. This dimension considers the participation in various social organisations and informal networks¹⁹. It also takes into consideration internal diversity within-group and cooperation with other organisations. A higher score on this dimension could lead to better participation in NHIS, only if the group members mutually agreed on the benefit of participating in NHIS. Donfouet and Mahieu⁴¹ posited that social capital contributes to health outcomes and trust between members. Trust between members enhances the exchange and diffusion of health-related information and mitigates adverse health consequences⁴⁵. Our study indicated the opposite. This might be due to their lack of understanding of the group and networking' for organisational capacity building. Another possible reason might be that the benefit of NHIS is yet to be disseminated within their organisation. Without mutual understanding and agreement amongst the participants themselves, they might be reluctant to the idea of NHIS, hence negatively influenced the willingness to pay for NHIS. Another important dimension of social capital in this study is social cohesion and inclusion. This dimension measures the perception of social unity and togetherness in the community⁴⁶. It is posited that social cohesion boosted national policies and political decisions. It might also influence individual health by providing equal opportunity and mitigating poverty, disparity, and social exclusion⁴⁷. Social cohesion may influence social norms to reduce risky behaviour and diffuse health information from psychological

and behavioural perspectives⁴⁸. However, this study revealed a negative effect on the willingness to pay for the NHIS. It contrasted with previous research on the impact of social solidarity towards health insurance¹⁰. We postulated that strong social bonds within the community mean that their relatives and neighbours were ready to assist them in medical emergencies. Hence, the urgency to pay a monthly premium for NHIS seems unnecessary in their point of view.

As a cross-sectional study, the temporal relationship between factors and willingness to pay for NHIS examined in this research could be established. Considering the long existence of government subsidised healthcare system in this country that covers every Malaysian citizen, having health insurance may differ from respondents of other countries without subsidy for healthcare services.

Conclusion

Our study showed that the willingness to pay for the NHIS among Sarawak's rural community is higher than a similar study in peninsular Malaysia. However, the proportion of participants willing to join was lower. Factors that were significant in determining their willingness to pay were the smaller family size, presence of underlying disease, a healthy level of empowerment, weaker group and network connection, low social cohesion and inclusion, finally, low perception of violence and conflicts. With the factors examined in this research, policymakers shall consider family size, economic status, education level, and underlying disease as important elements in formulating NHIS. This also includes medical coverage, regular premium payment and subsidy. Considering the impact of social capital on willingness to pay for NHIS, policymakers should be involved alongside the local community to design the NHIS scheme. Further study might be needed to examine the differences in the findings between east and west Malaysia regarding their willingness to pay for NHIS.

List of abbreviations

GDP	Gross Domestic Product
MYR	Malaysian Ringgit
NHIS	National Health Insurance Scheme
SD	Standard deviation
SDGs	Sustainable Development Goals
SOCISO	Social Security Organisation
SPSS	Statistical Package for Social

Sciences

UHC Universal Health Coverage

UNIMAS Universiti Malaysia Sarawak

WHO World Health Organization

Acknowledgement

We would like to thank those who contributed to making this research successful, including colleagues in Universiti Malaysia Sarawak and our research assistants in the area of Serian, Tebedu, Sibul, Kanowit, Miri and Marudi. Our sincere gratitude to UNIMAS for the support in conducting the research.

Declaration

Consent for publication

Both authors read the edited the manuscript and consented to publication.

Funding

Self-funded without external funds or grants were received for this study.

Author's Contribution: Conceptualisation, data collection, analysis, drafting manuscript: Hasazli Hasan

Conceptualisation, supervision, analysis, drafting and editing: Md Mizanur Rahman

References

- WHO. Universal health Coverage. Published 2019. [https://www.who.int/news-room/fact-sheets/detail/universal-health-coverage-\(uhc\)](https://www.who.int/news-room/fact-sheets/detail/universal-health-coverage-(uhc))
- Wallace L. A view of health care around the world. *Ann Fam Med*. 2013;**11**(1):84. doi:10.1370/afm.1484
- Safurah Jaafar, Kamaliah Mohd Noh, Khairiyah Abdul Muttalib, Nour Hanah Othman, Judith Healy. Malaysia Health System Review. Published online 2012.
- ILO. *Employment Injury and Invalidity Insurance*. ILO Social Protection Department, Malaysia: Employment Injury Insurance; 2016. https://www.perkeso.gov.my/en/mySalam Skim Perlindungan Masyarakat. mySalam National Health Protection Scheme. Published 2020. Accessed March 9, 2021. https://www.mysalam.com.my/b40/info/?url=main_EN
- Peka40. Penyertaan Skim Peduli Kesihatan untuk Kumpulan B40. Published 2019. Accessed March 9, 2021. <https://www.pekab40.com.my/eng>
- Aizuddin A, Hod R, Rizal A, Yon R, Al Junid S. Ability and willingness to pay for health care and contribute to national healthcare financing scheme among farmers in Selangor. *J Community Health*. 2011;**17**(1):56-63.
- Almuallim Y, Alkaff SE, Aljunid S, Alsagoff SS. Factors Influencing Support for National Health Insurance among Patients Attending Specialist Clinics in Malaysia. *Glob J Health Sci*. 2013;**5**(5):1-10. doi:10.5539/gjhs.v5n5p1
- Azimatun Noor A, Saperi S, Aljunid SM. The Malaysian community's acceptance and willingness to pay for a National Health Financing Scheme. *Public Health*. 2019;**175**:129-137. doi:10.1016/j.puhe.2019.07.008
- Fenenga C, Nketiah-Amponsah E, Ogink A, Arhinful D, Poortinga W, Hutter I. Social capital and active membership in the Ghana National Health Insurance Scheme - a mixed method study. *Int J Equity Health*. 2015;**14**(118). doi:https://doi.org/10.1186/s12939-015-0239-y
- Douwes R, Stuttaford M, London L. Social Solidarity, Human Rights, and Collective Action: Considerations in the Implementation of the National Health Insurance in South Africa. *Health Hum Rights J*. 2018;**20**(2):185-196.
- MOH. Malaysia National Health Accounts: Health Expenditure Report 1997-2017. Published online 2019.
- MOH. Malaysia Health System Research: Contextual Analysis of the Malaysian Health System. Published online 2016.
- Quek DK. The Malaysian Health Care System: A Review. In: Women's Development Research Centre; 2009. <http://cpds.fep.um.edu.my/events/2009/workshop/29042009/PPT%20&%20full%20paper/session%203/The%20Malaysian%20Health%20Care%20System1-presentation-dr%20david%20quek.pdf>
- Chen YK. The Progressivity of the Malaysian Personal Income Tax. *Kaji Malays*. 2012;**30**(2):27-43.
- Su-Lyn B. The overtaxed middle class. *Malay Mail*. <https://www.malaymail.com/news/opinion/2019/04/12/the-overtaxed-middle-class/1742361>. Published April 12, 2019. Accessed March 7, 2021.
- Dzulkipli MR, Jamal A, Ma'On SN. The framework of national health insurance (NHI) in Malaysia. *Information*. 2016;**19**(7B):2913-2917.
- Rahim R, Sivanadam H, Carvalho M, Tan T. No plans to introduce National Health Insurance for M'sians. *The Star*. <https://www.thestar.com.my/news/nation/2020/11/04/no-plans-to-introduce-national-health-insurance-for-m039sians-says-deputy-finance-minister>. Published November 4, 2020. Accessed March 7, 2021.
- Grootaert C, Narayan D, Jones VN, Woolcock M. *Measuring Social Capital: An Integrated Questionnaire*. The World Bank; 2004.
- Pirani E. Wealth Index. In: Michalos AC, ed. *Encyclopedia of Quality of Life and Well-Being Research*. Springer Netherlands; 2014:7017-7018. doi:10.1007/978-94-007-0753-5_3202
- Rutstein SO, Johnson K. *The DHS Wealth Index: DHS Comparative Reports*. ORC Macro; 2004:77. <https://dhsprogram.com/pubs/pdf/cr6/cr6.pdf>
- Hjelm L, Mathiassen A, Miller D, Wadhwa A. VAM guidance paper: Creation of a Wealth Index. *World Food Programme*. Published online 2017:26. <https://docs.wfp.org/api/documents/WFP-0000022418/download/>
- Denis DJ. Principal Components Analysis. In: *SPSS Data Analysis for Univariate, Bivariate, and Multivariate Statistics*. 1st ed. John Wiley & Sons, Ltd; 2018:163-173. doi:10.1002/9781119465775.ch12
- Kolenikov S, Angeles G. Socioeconomic Status Measurement with Discrete Proxy Variables: Is Principal Component Analysis a Reliable Answer? *Rev Income Wealth*. 2009;**55**(1):128-165. doi:https://doi.org/10.1111/j.1475-4991.2008.00309.x
- John W. A practitioner's primer on the contingent valuation method. Published online 2000.
- Klose T. The contingent valuation method in health care. *Health Policy*. 1999;**47**(2):97-123. doi:10.1016/S0168-8510(99)00010-X
- IBM SPSS. *IBM SPSS Statistics for Windows*. IBM SPSS; 2013.

28. Jakobsen JC, Gluud C, Wetterslev J, Winkel P. When and how should multiple imputation be used for handling missing data in randomised clinical trials – a practical guide with flowcharts. *BMC Med Res Methodol.* 2017;**17**(1):162. doi:10.1186/s12874-017-0442-1
29. Sterne JAC, White IR, Carlin JB, et al. Multiple imputation for missing data in epidemiological and clinical research: potential and pitfalls. *BMJ.* 2009;**338**:b2393.
30. Lindén A, Mäntyniemi S. Using the negative binomial distribution to model overdispersion in ecological count data. *Ecology.* 2011;**92**(7):1414-1421. doi:https://doi.org/10.1890/10-1831.1
31. Saputro DRS, Susanti A, Pratiwi NBI. The handling of overdispersion on Poisson regression model with the generalized Poisson regression model. *AIP Conf Proc.* 2021;**2326**(1):020026. doi:10.1063/5.0040330
32. Azhar A, Rahman MM, Arif MT. Willingness to Pay For Health Insurance in Sarawak, Malaysia: A Contingent Valuation Method | Bangladesh Journal of Medical Science. *Bangladesh J Med Sci.* 2017;**17**(2):230-237. doi:https://doi.org/10.3329/bjms.v17i2.35876
33. Khuwaja HMA, Karmaliani R, Mistry R, Malik MA, Sikandar R. Factors Influencing Low Enrollment in a Community Based Health Insurance Scheme, Karachi, Pakistan: a Mixed Methods Case Study. *Bangladesh J Med Sci.* 2021;**20**(2):293-301. doi:10.3329/bjms.v20i2.51538
34. Rahman MM, Mizan S, Safi R binti, Ahmad SA. Willingness to Pay for Health Insurance among Urban Poor: An Evidence from Urban Primary Health Care Project in Bangladesh. *Bangladesh J Med Sci.* 2020;**19**(3):433-443. doi:10.3329/bjms.v19i3.45860
35. Jehu Appiah C, Aryeetey G, Spaan E, Hoop T, Agyepong I, Baltussen R. Equity aspects of the National Health Insurance Scheme in Ghana: Who is enrolling, who is not and why? *Soc Sci Med.* 2011;**72**:157-165. doi:10.1016/j.socscimed.2010.10.025
36. Owusu-Sekyere E, Chiaraah A. Demand for Health Insurance In Ghana: What Factors Influence Enrollment? *Am J Public Health Res.* 2014;**2**(1):27-35. doi:10.12691/ajphr-2-1-6
37. Agago TA, Woldie M, Ololo S. Willingness to join and pay for the newly proposed social health insurance among teachers in Wolaita Sodo Town, South Ethiopia. *Ethiop J Health Sci.* 2014;**24**(3):195-202. doi:10.4314/ejhs.v24i3.2
38. Jabatan Perkhidmatan Awam. Kad Pesara. Kad Pesara. Published 2021. http://www.jpapencen.gov.my/kad_pesara.html
39. Jabatan Perkhidmatan Awam. Panduan Umum Untuk Pesara Kerajaan Malaysia. Published online 2018. <http://www.jpapencen.gov.my/2018%20Panduan%20Umum%20Untuk%20Pesara%20Kerajaan%20Malaysia%2009072018.pdf>
40. PERKESO. Frequently Asked Questions. Frequently Asked Questions. Published 2021. <https://www.perkeso.gov.my/en/our-services/employee-self-employed/employee-eligibility.html>
41. Donfouet HPP, Mahieu P-A. Community-based health insurance and social capital: a review. *Health Econ Rev.* 2012;**2**(1):5. doi:10.1186/2191-1991-2-5
42. Coleman JS. *Foundations of Social Theory.* Harvard University Press; 1994.
43. Wilkinson RG. *Unhealthy Societies: The Afflictions of Inequality.* 1st ed. Routledge; 2002.
44. Islam MR. NGOs' Facet in Social Capital and Community Empowerment. In: Islam MR, ed. *NGOs, Social Capital and Community Empowerment in Bangladesh.* Springer; 2016:51-69. doi:10.1007/978-981-10-1747-6_5
45. Dror DM, Radermacher R, Koren R. Willingness to Pay for Health Insurance Among Rural and Poor Persons: Field Evidence from Seven Micro Health Insurance Units in India. *Health Policy Amst Neth.* 2007;**82**(1):12-27. doi:10.1016/j.healthpol.2006.07.011
46. Fonseca X, Lukosch S, Brazier F. Social cohesion revisited: a new definition and how to characterize it. *Innov Eur J Soc Sci Res.* 2019;**32**(2):231-253. doi:10.1080/13511610.2018.1497480
47. Chuang Y-C, Chuang K-Y, Yang T-H. Social cohesion matters in health. *Int J Equity Health.* 2013;**12**:87. doi:10.1186/1475-9276-12-87
48. Yap S-F, Kim J-E, Lee CKC, Xu Y, Kim J. Social Capital and Health Risk: An Integrative Review. *Australas Mark J.* 2019;**27**(1):24-31. doi:10.1016/j.ausmj.2018.10.012