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Associated Factors in Willingness to Shift Tobacco Expenditure Into National Health Insurance Premium Among Subsidized Members

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Abstract

In Indonesia, subsidized members are the largest group in the National Health Insurance program. Hence, it is essential to understand their ability to pay (ATP) based on tobacco expenditure. This study aimed to determine the ATP of subsidized members based on tobacco expenditure and factors associated with their willingness to pay (WTP). This cross-sectional study used secondary data from the National Institute of Health Research and Development. The population included all subsidized members; 19,918 were sampled for ATP, and 14,560 were WTP. The independent t-test, ANOVA, and logistic regression were performed. Results showed that ATP from tobacco expenditure ranged from USD 4 to 4.8, higher than the minimum monthly payment, and WTP ranged from USD 0.1 to 1.2. About 73.6% of respondents preferred to pay less than USD 0.3 as an additional payment, while 3.5% were willing to pay more than USD 1. The ATP was higher than the monthly payment and WTP, but only a few were willing to be non-subsidized members. Factors associated with WTP were sex, age, education level, family member, occupation, expenditure, and history of health facility utilization, implying the subsidized members should be reviewed, especially among smokers.

Keywords: ability to pay, insurance, subsidized member, tobacco, willingness to pay

Introduction

The Indonesian Health Insurance program has been implemented since 2014 and is classified under Law No. 40 of 2004 concerning the National Social Insurance System. This government program was signed and aimed to socially protect all Indonesian citizens through the National Health Insurance (NHI) Scheme, managed by the Social Security Administrative Body/*Badan Penyelenggara Jaminan Sosial (BPJS)*.¹ In 2019, 218 million people were registered as NHI members. The most prominent members were subsidized members, who comprised 96 million people, 44% of whom were NHI members. Membership of NHI by the Law consists of subsidized and non-subsidized members.²

Although the government pays the insurance premium, the ability to pay (ATP) and willingness to pay (WTP) should be assessed to determine if the membership is appropriate because such a special membership should be prioritized for eligible members with financial difficulty. Through the analysis of ATP, information about their money can be obtained and used as a consideration for additional insurance premiums. Meanwhile, the WTP provides insight into their awareness of paying premiums. Both ATP and WTP are crucial for future membership policy decisions.

The ATP is defined as the ability of a person to pay insurance premiums based on economic conditions counted from non-essential expenditure, such as tobacco expenditure.³ In other words, ATP is a consideration for paying based on income to buy goods or services. It consists of three groups: non-food, non-essential, and essential expenditures.³ The calculation of the ATP for health services is based on 5% household expenditure for non-food materials, such as housing and gasoline, and expenditure for non-essentials, such as tobacco, beauty, and ceremony.⁴

A person's WTP is a subjective desire to pay as demanded. Wedgwood stated that WTP is the maximum amount a person would pay for goods or services.⁵ Meanwhile, Mankew stated that WTP is the highest price that a person wants

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to pay.⁶ Noor *et al.* argued that WTP mirrors a person's behavior based on the assumption that every household will rationalize to maximize satisfaction and benefit from the resources utilized.⁷

The ATP based on tobacco expenditure in Indonesia, including from the subsidized members segment, is essential information for future membership policy decisions. The reason is that the prevalence of smokers in Indonesia is very high, and this habit leads to chronic diseases with high healthcare costs.⁸ According to the 2022 National Socioeconomic Survey, the expenditure on tobacco accounted for 12% of all household expenditures, ranking second after the expenditure for rice/meal. Expenditure from smoking in rural areas was as high as in urban areas.⁹

Moreover, based on the Indonesian Basic Health Research, the number of active smokers in Indonesia reached more than 60 million people, with a prevalence rate of daily smoking of 34.7% in 2007, 36.5% in 2013, and 33.8% in 2018.¹⁰⁻¹² These data indicate that the ATP for health insurance from smoking expenditure is one of the main non-essential expenditures that should be considered when developing future policies of the BPJS membership. Since insurance covers the cost of treatment for chronic diseases, the smoker's ability and WTP are significant information for the government. Furthermore, the factors associated with the WTP will be a source of information to consider when developing appropriate insurance membership policies.

A previous study in Sleman District, Indonesia, showed that age and income level significantly affected WTP.¹³ Similarly, a study in Banyumas District, Indonesia, suggested that age and food expenditure were associated with WTP on outpatient rates at the primary health care (PHC).¹⁴ A study in 2018 revealed a consistent trend indicating that the total out-of-pocket health expenses for participants in the subsidized members' program exceeded those of non-participants.¹⁵ Notably, in 2017, subsidized member beneficiaries incurred lower costs in categories such as pharmaceuticals and traditional healthcare providers than their non-beneficiary counterparts.¹⁵ In short, information on the ATP, WTP, and related factors among subsidized members is needed for the evaluation of their membership. Nonetheless, since this information is very limited, this study was aimed to determine the ATP of subsidized members based on tobacco expenditure and factors associated with their willingness to pay (WTP).

Method

This cross-sectional study used secondary data from a 2019 study on ATP and WTP conducted by the National Institute of Health Research and Development (NIHRD) of the Indonesian Ministry of Health. In the parent report, which was a national survey, the analysis involved 12,870 households from all 24 provinces in Indonesia using multistage cluster random sampling. Data was collected using a structured questionnaire developed by the team based on relevant sources tested for validity and reliability. The selected household respondents of the previous survey were all members of NHI.

The inclusion criteria were individuals aged more than 18 years, while the exclusion criteria were those with chronic or mental diseases. The ATP was calculated using monthly tobacco expenditure based on the responses of smoker respondents. Meanwhile, the WTP was determined using the bidding game method. In this approach, the interviewer asked respondents about the highest amount they would pay for the monthly premium, starting with IDR 42,000 (USD 2.57) as the minimum payment, with responses indicating either a higher or lower amount.

This study was carried out in 2019, and its population was all subsidized members of BPJS. The sample was individuals who were selected from a multistage cluster random sampling. In total, 19,918 subsidized members were classified as the ATP sample, and 14,560 of those aged more than 18 years were included as the WTP sample. The sample was estimated to represent the total population by weighting it according to the age and sex distribution of the Indonesian population. After weighting, the ATP sample consisted of 96,487,415 individuals, and the WTP sample consisted of 70,543,860 individuals.

Variables included in this study were ATP and WTP based on tobacco expenditure, as well as the characteristics of the respondents, including sex, age, education level, occupation, utilization of First Level Health Facilities (FLHF) and hospitals, number of family members, and household expenditure. Education level was categorized as uneducated, low (elementary and junior high school), middle (senior high school), and high (university). Occupation was categorized as unemployed (including student and housewife), informal worker (farmer, fisherman, entrepreneur), and formal worker (civil servant, labor/private worker).

The collected data was analyzed using SPSS version 25 (free version). Description analysis assessed the ATP for insurance based on tobacco expenditure, WTP, and respondent characteristics. Comparison analysis was performed to determine the ATP's difference among characteristics using independent t-test (two categories) and ANOVA (more than

two categories). Additionally, bivariate analysis was performed using the Chi-square test to select determinants of WTP. Since all eight variables had p-values of <0.25, they were included in the multivariate analysis. Furthermore, multivariate analysis was also carried out using multiple logistic regression to examine the relationship between age, education, number of family members, occupation, household expenditure, utilization of FLHFs and hospitals, and WTP for an additional premium for social insurance (IDR ≥5,000/USD 0.31).

Results

The sex distribution of respondents in this study was equal. Most of them were in the productive age (18-67 years) (68.6%), had low education (47%), did not work (51.9%), never used a FLHF (69.8%), never been to hospitals (91.3%), had more than three family members (63.2%), and had low family expenses (the highest at quintile 2 for 66.1%). The overall distribution of the respondents is tabulated in Table 1.

Table 1. Distribution of NHI's Subsidized Members

Characteristics	n	%
Sex		
Male	48,360,044	50.1
Female	48,127,371	49.9
Age		
18 years	25,943,555	26.9
18-67 years	66,165,309	68.6
>67 years	4,378,550	4.5
Education level		
Uneducated	12,899,211	13.4
Low	45,329,691	47.0
Middle	36,654,586	38.0
High	1,603,927	1.7
Occupation		
Unemployed	50,030,125	51.9
Formal	4,157,786	4.3
Informal	42,299,504	43.8
Utilization of the First Level Health Facilities		
Never	67,343,296	69.8
Ever	29,144,120	30.2
Utilization of hospitals		
Never	88,110,109	91.3
Ever	8,377,307	8.7
Number of household members		
1-3	35,510,535	36.8
>3	60,976,881	63.2
Household expenditure (quintile)		
1 (lowest)	1,9717,973	20.4
2	2,3140,091	24.0
3	2,2385,358	23.2
4	1,9290,095	20.0
5 (highest)	1,1953,898	12.4

The ATP based on tobacco expenses ranged from IDR 60,821 (USD 4) to IDR 74,396 (USD 4.8). Meanwhile, the subsidized members generally had a WTP (contributive payment) for an average of IDR 1,804 (USD 0.1), with the highest being IDR 19,248 (USD 1.2). The willingness to spend on tobacco was far lower than the ATP (Table 2). For respondents whose contributions were greater than IDR 15,000 (USD 1.0), 13.8% were willing to become independent/non-subsidized, with a WTP average of IDR 32,827 (USD 2.01). However, this figure was still smaller than the ATP from tobacco expenses (IDR 54,498/USD 3.33) (Table 3).

Table 2. Ability to Pay for National Health Insurance Premium Based on Tobacco Expenditure and Willingness to Pay

Increase premium (IDR)	Mean of ability to pay from tobacco expenditure (IDR)	Mean of willingness to pay (IDR)	Population	
			N	%
<5,000	60,821	1,804	44,599,643	73.6
5,001-10,000	65,862	6,129	9,693,966	16.0
10,001-15,000	74,396	10,879	4,155,695	6.9
>15,000	71,432	19,248	2,136,831	3.5
Total			60,586,135	100.0

Note: IDR = Indonesian Rupiah. 1 USD = IDR 16,350

Table 3. Readiness to Change Membership from Subsidized to Non-Subsidized Member Based on Tobacco Expenditure*

Readiness to change to a non-subsidized member	Ability to pay from tobacco expenditure (IDR)	Willingness to Pay (IDR)	Population	
			N	%
Yes	54,498	32,827	295,106	13.8
No	71,433		1,841,725	86.2
Total			2,136,831	100.0

*Subsidized members who were ready to pay more than IDR 15,000 (USD 0.92)

The ATP for the NHI premium varied across respondent characteristics. For instance, men had higher ATP than women, respondents aged below 18 years had higher ATP than those aged 18-67 and over 67 years, individuals with low and middle education had higher ATP, and those who were unemployed had higher ATP than those employed. Regarding FLHF and hospitals, those who never used the facilities had a higher ATP than those who did.

In contrast, the ATP in a group with more than three household members was higher than the opposite. Meanwhile, in terms of household expenditure, the higher the expenditure, the higher the ATP. It is important to note that there was a difference in the mean of ATP between men and women (p-value <0.001), among age groups (p-value <0.001), education levels (p-value = 0.016), several household members (p-value <0.001), and household expenditure (p-value <0.001). However, there was no difference in ATP between occupation (p-value = 0.132), utilization of FLHF (p-value = 0.871), or hospitals (p-value = 0.772) (Table 4).

Table 4. Ability to Pay based on Tobacco Expenditure by Respondents' Characteristics

Characteristic	Ability to Pay NHI Premiums from Tobacco Expenditure (IDR)		p-value
	Mean	SD	
Sex*			<0.001
Male	56,200	86,380	
Female	49,800	83,300	
Age**			<0.001
<18 years	57,700	87,100	
18-67 years	53,100	85,500	
>67 years	23,700	49,730	
Education level**			0.016
Uneducated	49,200	71,000	
Low	53,900	86,360	
Middle	53,300	87,980	
High	44,600	91,140	
Occupation**			0.132
Unemployed	53,600	84,350	
Informal	52,900	87,200	
Formal	47,700	66,920	
Utilization of the First Level Health Facilities*			0.871
Never	53,800	85,290	
Ever	51,100	84,040	
Utilization of hospitals*			0.772
Never	53,200	84,280	
Ever	50,700	91,380	
Number of household members*			<0.001
1-3	41,000	80,360	
>3	59,900	86,670	
Household expenditure (quintile)**			<0.001
1 (lowest)	12,800	23,680	
2	33,000	41,300	
3	51,900	57,510	
4	72,900	71,250	
5 (highest)	119,000	169,100	

Notes: *) Independent t-test, **) ANOVA test, NHI = National Health Insurance, IDR = Indonesian Rupiah, SD = standard deviation. 1 USD = IDR 16,350

Results of the multivariate analysis indicated that sex, age, education level, number of household members, occupation, household expenditure, and utilization of FLHF and hospitals were all associated with the WTP, with a p-value of <0.001. The most influential determinants were the utilization of FLHF, hospitals, and age (Table 5).

Table 5. Factors Influencing Willingness to Pay for Insurance Among Subsidized Members

Variable	Willingness to Pay for IDR ≥5,000/USD 0.31				Adjusted OR	95% CI	p-value
	Yes		No				
	N	%	N	%			
Sex							<0.001
Male	13,786,013	39.5	21,132,383	60.5	0.998	0.997 – 0.999	
Female	13,761,461	38,6	21,864,003	61.4	1		
Age							<0.001
18-67 years	26,007,618	39.3	40,157,692	60.7	1.140	1.137 – 1.142	
>67 years	1,539,856	35.2	2,838,694	64.8	1		
Education level							<0.001
Uneducated	1,627,432	35.5	2,951,445	64.5	1		
Low	1,825,143	38.9	28,884,430	61.1	0.882	0.880 – 0.884	
Middle	6,986,176	40.0	10,463,935	60.0	0.847	0.845 – 0.849	
High	681,723	42.7	916,577	57.3	0.751	0.748 – 0.754	
Occupation							<0.001
Unemployed	9,438,551	38.5	15,083,437	61.5	1		
Informal	16,482,800	39.3	25,451,468	60.7	0.988	0.987 – 0.990	
Formal	1,626,122	39.8	2,461,481	60.2	1.018	1.016 – 1.020	
Utilization of the First Level Health Facilities							<0.001
Never	19,616,846	40.7	28,596,402	59.3	1.212	1.211 – 1.213	
Ever	7,930,628	35.5	14,399,984	64.5	1		
Utilization of hospitals							<0.001
Never	25,062,671	39.5	38,423,064	60.5	1.123	1.121 – 1.125	
Ever	2,484,803	34.7	4,672,322	65.3	1		
Number of household members							<0.001
1-3	12,127,121	39.2	18,787,220	60.8	1.036	1.035 – 1.-38	
>3	15,420,353	38.9	24,209,166	61.1	1		
Household expenditure (quintile)							<0.001
1 (lowest)	6,224,760	38.1	10,105,841	61.9	1		
2	7,075,667	41.2	10,091,538	58.8	0.893	0.892 – 0.894	
3	5,985,737	38.1	9,724,668	61.9	1.009	1.008 – 1.011	
4	5,139,143	39.2	7,962,304	60.8	0.964	0.962 – 0.965	
5 (highest)	3,122,167	37.9	5,112,034	62.1	1.017	1.015 – 1.019	

Note: IDR = Indonesian Rupiah, USD = United States Dollar, OR = odds ratio, CI = confidence interval

Discussion

Sociodemographic characteristics (sex, age, education level, occupation, utilization of the First Level of Health Facilities and hospitals, number of household members, and household expenditures) are important for policymakers when reviewing the status of subsidized membership. As for most members of the productive age, this group could be educated to secure jobs and a stable income, allowing them to become independent members. The low level of education indicated that the government should develop an insurance education program that can cater to the needs of this group. In addition, the public's literacy needs to be improved to make them realize that, instead of spending on tobacco, the money could be set aside to pay the premiums.

Regarding occupation, most of the subsidized members were unemployed. The government needs to create more initiatives and job opportunities to improve the overall well-being of society. Interestingly, 4.3% of the subsidized members had formal work, which is essential information, as many others do not. It is important to remember that subsidized membership was developed especially for someone without a regular income. Meanwhile, most respondents still need to access the health facility, indicating that the socialization of health access should be enhanced. On top of that, the burden of family is also an issue that needs prompt solutions. This study showed that the ATP based on tobacco expenditure ranged from IDR 60,821 (USD 4.0) to IDR 74,396 (USD 4.8). In comparison, the willingness to contribute to insurance premiums was between IDR 1,804 (USD 0.1) and IDR 19,248 (USD 1.2). In other words, the willingness to spend on tobacco was far lower than that of the ATP.

A study on the impact of smoking on personal and household expenditures showed that 75% of rural moderate/heavy smokers admitted that their expenditure on smoking affected their ATP for other things, compared to 45% of urban workers and 61% of migrants. The three significant specific spending cited were health care (51%), savings (45%), and purchasing of large household items (42%).¹⁶ This ATP result indicates an opportunity for additional payment

(contributions) from subsidized members. This is important information for increasing BPJS finances and maintaining health services. All categories of respondents were found to have the capacity to pay more than IDR 60.000 for tobacco expenses, which is higher than the 3rd class premium of IDR 42.000 (USD 2.57).¹⁷ Thus, it can be surmised that these respondents should not be included in the subsidized category due to their ATP. Currently, the number of subsidized members in Indonesia is estimated to be around 120 million people, or 46% of the total population in Indonesia.² This is a considerable number, even though subsidized members can actually pay for the insurance. Therefore, the membership data needs to be rechecked, especially in Indonesia, where the expenditure on tobacco is 12%, the second highest after rice.⁹

According to Government Regulation No. 76 of 2015, mandating that subsidized members are not allowed to contribute or share costs.¹⁸ Meanwhile, the results of this study indicated that the subsidized members are not on target because they can pay the premium when the tobacco expenses are put aside. A previous study showed that the respondents still experienced additional treatment costs.¹⁹ This study showed that 13.8% of subsidized members were willing to pay more than IDR 15,000 (USD 0.92) and changed their membership to become non-subsidized. This figure was quite large even though the average ATP of IDR 32,827 (USD 2.01) was still below the minimum class 3 contribution of IDR 42,000 (USD 2.57). For this reason, it is necessary to evaluate the membership of the current members to match the willingness and ATP contributions.

It was determined that both ATP and WTP, based on the characteristics of the respondents, were significantly varied. In particular, men have higher abilities than women, those aged below 18 years showed higher abilities than those aged 18-67 and over 67 years, those with low education displayed higher abilities than those with higher education, and those who do not work exhibited higher abilities than those who were employed. The higher ATP among respondents below 18 years of age was related to the fact that younger individuals do not have significant expenditures. Meanwhile, the higher ability among those with low education and who do not work is due to the characteristics of smokers who have low education and are unemployed. In a study conducted in Salatiga City, Indonesia, on 600 households, most of the respondents were over 42 years (53.7%), while the rest (46.3%) were aged below 42 years. Based on the education level, most respondents have high school education/equivalent (41.5%), followed by elementary education at 24%.²⁰ Meanwhile, most people who have not become NHI participants do so because they cannot afford it.¹⁹ Not to mention, there were still many smokers, most of whom (82.19%) were classified as poor.²¹

Regarding utilizing FLHF and hospitals, respondents who have never used these services could pay higher contributions than they currently do. The ATP for households with more than three members was higher than those with the opposite. The quality of doctor's services and the availability of drugs were the two factors that influenced the patient's WTP for all classes of inpatient treatment.²¹ A study in a hospital in Kendari City, Indonesia, showed that there was a relationship between the quality of service to the patient's willingness to pay for outpatient in the hospital.²² Factors related to the utilization of health services at the health center were knowledge and WTP.²³ Another study showed that follow-up inpatient visits and follow-up outpatient visits decreased during the pandemic.²⁴ Meanwhile, a study in East Kalimantan showed that FLHF visited mainly PHC, followed by private practice doctors. In addition, most patients in Central Java Province went to PHC and clinics.²⁵

Furthermore, as household expenditure increased, the ATP for NHI contributions from tobacco spending also increased. This result showed that most people with a high economic capacity could make the payment. Household spending on tobacco will reduce the spending on others. Every 10% increase in cigarette spending lowers household food expenditure by 1.75%, reduces household education expenditure by 0.75%, and reduces household health expenditure by 0.77%.²⁶ Most people with low incomes (nearly 90%) spent less than a quarter (25%) of their non-food expenditure on health.²⁶ The high tobacco production was due to the assumption of the relationship between tobacco and other foods.²⁶ Consumers of tobacco spend less on food than non-consumers. Tobacco expenditure crowded out more consumer durables, followed by foodgrains, healthcare, and education.²⁷ As a complement, tobacco is often found in activities such as smoking while drinking (tea/coffee/other beverages) or eating snacks. as well as during smoking activities after eating.²⁸

Comparing ATP analysis showed a difference in the mean of ATP between men and women, among age groups, education level, number of household members, and household expenditure. In addition, there was no difference in ATP between occupation and utilization of FLHF and hospitals. The findings also showed that age, education level, number of household members, occupation, household expenditures, and history of utilizing FLHF and hospitals were associated with the WTP. The most significant factors influencing the WTP were age and utilization of FLHF and hospitals. These

results are in line with a previous study in Sleman District, Indonesia, which showed that age and income level significantly affected WTP.¹³ Another study showed a relationship between age, ATP, and food expenditure with WTP on outpatient rates at a PHC in Banyumas District, Indonesia.¹⁴ Similarly, a study of WTP in Yogyakarta showed that income affected WTP on NHI.²⁹

Another study of ATP in the Public Health Care Insurance in Salatiga City showed that knowledge, attitude, beliefs about the benefits of the insurance, family support, and support from community leaders/religious leaders were related to willingness to become insurance participants.²⁰ According to the ATP concept, the ATP for health services is the expenditure for non-essential goods. The respondent's ability to determine the amount of BPJS contributions is highly dependent on various factors ranging from sources of income to a collection of assets.³ Meanwhile, if viewed from the respondents' level of expenditure, there is no relationship between the level of expenditure and the size of the selection of BPJS contributions. This happens because, with different expenditure levels, respondents will naturally have different interests that depend on various factors, including lifestyle and individual needs.³⁰ Regarding WTP, a study on the informal sector in Sierra Leone showed that living outside the city and working in agriculture were associated with decreased WTP premiums.³¹ On the other hand, the maximum WTP is positively related to work.³⁰

This study had several limitations. The first related to the possibility of bias when discussing the WTP. The interviewer might influence the initial offer of WTP in terms of the amount of money contributed to the insurance premium. Unsure respondents might consider the first offer as the appropriate price and may not want to increase it. The subsequent bias was a hypothetical bias. This bias occurs when the respondent does not fully understand or accept the interviewer's explanation or because the respondent does not want to answer the question seriously.³²

Conclusion

The ATP of subsidized members from tobacco expenditure is higher than the minimum monthly insurance payment. However, the WTP is lower than the ATP. Several subsidized members express their willingness to be non-subsidized. Sex, age, education level, number of household members, occupation, household expenditure, and utilization of FLHF and hospitals are associated with WTP. This implies that the subsidized members should be reviewed, especially among smokers. Future studies should focus on the WTP among subsidized members transitioning to non-subsidized and the methods to shift membership.

Abbreviations

NHI: National Health Insurance; BPJS: *Badan Penyelenggara Jaminan Sosial*/Social Security Administrative Body; ATP: Ability to Pay; WTP: Willingness to Pay; PHC: primary health care; NIHRD: National Institute of Health Research Development; FLHF: First Level Health Facility.

Ethics Approval and Consent to Participate

This study obtained approval from the Commission on Health Research Ethics – The National Institute of Health Research and Development, Indonesian Ministry of Health, to conduct secondary data analysis of the ATP and WTP Survey. The commission granted an ethical clearance certificate numbered LB.02.01/2/KE.340/2019 on August 26, 2019.

Competing Interest

The authors declare there is no conflict of interest.

Availability of Data and Materials

The study data was available upon request from the corresponding author.

Authors' Contribution

MW conceptualized the study, designed it, and prepared the initial draft and framework. MAM, RIA, and VA contributed to data analysis and discussions.

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