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Has access to health insurance through the Indonesian social security system improved people's understanding of health issues? Evidence from a national survey

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Jeremy Smith (Head of the Department of Economics, University of Warwick) and Michael Ward (Head of the Department of Economics, Monash University)

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Has access to health insurance through the Indonesian social security system improved people's understanding of health issues? Evidence from a national survey

Muhammad Indra Kurniawan

Abstract

This essay studies the national health insurance system's impacts on health awareness in Indonesia. I estimate the effects of the insurance enrolment on health knowledge and health behaviour changes after the launch of compulsory social health insurance. Individuals who are less aware of their health may contribute to moral hazard in health insurance. I apply the difference-in-differences method to compare treatment and control groups and the before-after period of the intervention in 2014. Data from the Indonesia Demographic and Health Survey is utilised in this study. Results indicate that social health insurance is negatively correlated with the propensity of knowing certain diseases and contraceptive methods. The scheme adversely affects individuals' smoking behaviour. Therefore, improving promotive and preventive programs throughout the insurance's benefits is essential.

Keywords: National Health Insurance Scheme (NHIS), Health behaviour, Insured and uninsured, Indonesia.

JEL classification numbers: H51, I12, I13, I18

1. Introduction

Social health insurance is vital to reducing healthcare access inequality in a country aiming to ensure healthy lives and promote well-being. Achieving universal health coverage and equal access to high-quality healthcare are both parts of the United Nations' Sustainable Development Goals (SDG) United Nations (2015). Country governments can deal with this issue by increasing people's participation in social health insurance programs.

Indonesia, a nation of 270 million people (Indonesian Statistics, 2021), introduced the social health insurance (SHI) system in a two-step process. Initially, Indonesia adopted a nationwide social security system in 2004 through the Republic of Indonesia's Law (Law No. 40/2004). The law's primary purpose was to ensure basic needs for each participant and their family, including basic health needs. It was a big picture of the Indonesian social security system. Moreover, the law regulates social security programs such as health insurance, work accident insurance, elderly insurance, pension insurance, and death insurance. However, the health insurance program in this law had to be regulated explicitly by further act since the law did not impose social health insurance accomplishment at the time.

In the next step, the Indonesian government inaugurated the social security organising agency law (Law No. 24/2011). The law focused on establishing the health and social security administrative agency and set the due of implementing social health insurance completely. As a result, the Indonesian government launched the national health insurance system (NHIS) in 2014. Indeed, it took almost ten years to introduce social health insurance entirely. This regulation merged fragmented public health insurance and social support schemes into a new integrated system. The law is a requisite to promote equal access to healthcare and reduce the large number of people with no health insurance.

The implementation of the national health insurance system made several major changes to the current social security policy. Membership was compulsory for the entire Indonesian population as well as foreigners who were working for at least six months in the country. The new system also integrated all pre-existing social insurance schemes into one comprehensive system under a national board, BPJS Kesehatan. These pre-existing schemes were previously administrated by different publicly owned enterprises and provided different levels of service. As a result, all members of the NHIS are now provided with the same health treatment and benefits.

One benefit of universal health insurance is that it improved access to health care for population groups without the financial means to pay out-of-pocket for services. This benefit may, in turn, have changed their health behaviours along several interesting dimensions. For example, poorer individuals may be more likely to use elective healthcare services, such as GP health check-ups, which may in turn improve health knowledge and awareness of health risks. Decisions regarding family planning may also be affected if maternity care facilities are available.

I scrutinise the national health insurance scheme's rollout to estimate the effect of additional coverage of healthcare services on Indonesian health awareness. This study defines health awareness as the state of being aware of health, knowing and understanding that something exists. Terms of awareness, understanding, and knowledge are interchangeable in this study because they have a similar meaning in the context.

Data from Statistics Indonesia (BPS) based on the comprehensive Indonesia Demographic and Health Survey (IDHS) is utilised in this study. The survey was conducted in cooperation

between the Indonesian National Population and Family Planning Board (BKKBN), the Ministry of Health of Indonesia (Kemenkes), and the United States Agency for International Development (USAID). The principal goal of IDHS is to deliver up-to-date assessments regarding Indonesian fundamental demographic and health indicators.

The IDHS has been providing such estimates several times, including ones held in 1987, 1991, 1994, 1997, 2002-2003, 2007, 2012, and 2017. The detailed survey data collected by the IDHS provides valuable resources for policymakers and researchers in their work. Importantly for this essay's aims, the IDHS has collected data on respondents' health insurance status, including the NHIS or Jaminan Kesehatan Nasional some private insurances. I compare the changes in key characteristics of respondents prior to and after the implementation of the NHIS by analysing the results of the 2012 and 2017 IDHS.

From empirical results discovered in this study, I can conclude that current NHIS schemes have no positive impacts on raising members' health awareness. The impact is more significant for respondents who have not participated in the NHIS than for counterparts who are active members of the insurance. Thus, policymakers can refer to this result to refine current NHIS schemes by supporting preventive and promotive programs.

This study contributes to the literature on SHI, health knowledge, and health behaviours in two ways. First, I add to the developing research on the impacts of one of the largest SHI systems, the Indonesian National Health Insurance System. Second, I provide shreds of evidence of this system's effect on health knowledge and health behaviours.

The paper is structured as follows. In section 1, I present an introduction, while section 2 offers background and literature review. Section 3 describes data, variables, and empirical strategy. In section 4, I provide results and robustness checks. Section 5 offers a discussion of the results and the study's limitations. Concluding remarks follow in section 6 and presenting broader implications.

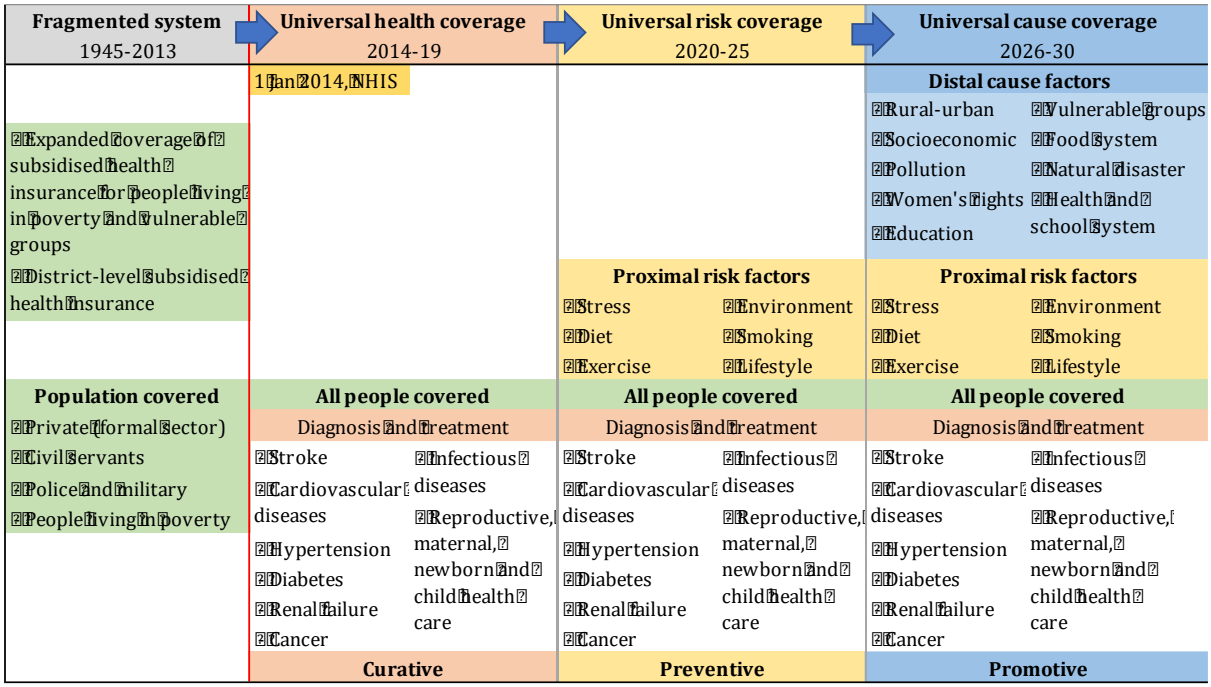
2. Background

The SHI scheme in Indonesia has been developed over time. Figure 1 shows the history of NHIS over decades and its future direction. Since being influenced by the colonial period, the initial SHI system adopted a scheme that mainly covers military and government officers. Changes in the scheme include the private sector and subsidised people living in poverty exclusively. In 2014, the NHIS intended to deliberate universal health coverage (UHC) for the first time after Indonesia independence. The system targeted all people in the country to be covered.

The NHIS created significant changes in previous fragmented SHI schemes regarding management, funding and membership. Managing the NHIS was then authorised to a single board. What is more, the Indonesian NHIS does not apply price discrimination for memberships. The funding scheme follows the ‘solidarity’ principle, which creates transfers from low-risk beneficiary to the high-risk beneficiary by imposing all members on equal premium. Therefore, members have to pay a premium each month to make them eligible for the health insurance benefits. Several group members do not pay the premium directly, but employers withholding, while others regularly arrange payments. Besides, the government subsidises some groups of participants, namely low- and vulnerable-income groups. There are

numerous levels of benefit depending on which level the member selects. Members could apply for either level 1, level 2, or level 3 and get treated based on the level's benefits.

Figure 1: The history and upcoming direction of the national health insurance system (NHIS)



Note. Reprinted and adapted from "Universal health coverage in Indonesia: concept, progress, and challenges," by Agustina et al., 2019, The Lancet, 393, p. 78. Copyright 2019 by "Elsevier Ltd".

Agustina et al. (2019) describe the NHIS direction in the next decade as preventive and promotive programs. This policy should address proximal risk factors like stress, exercise, environment, smoking, and lifestyle. Although the NHIS has drawbacks in implementation, the system should develop novel approaches to promote preventive programs that may benefit society's health.

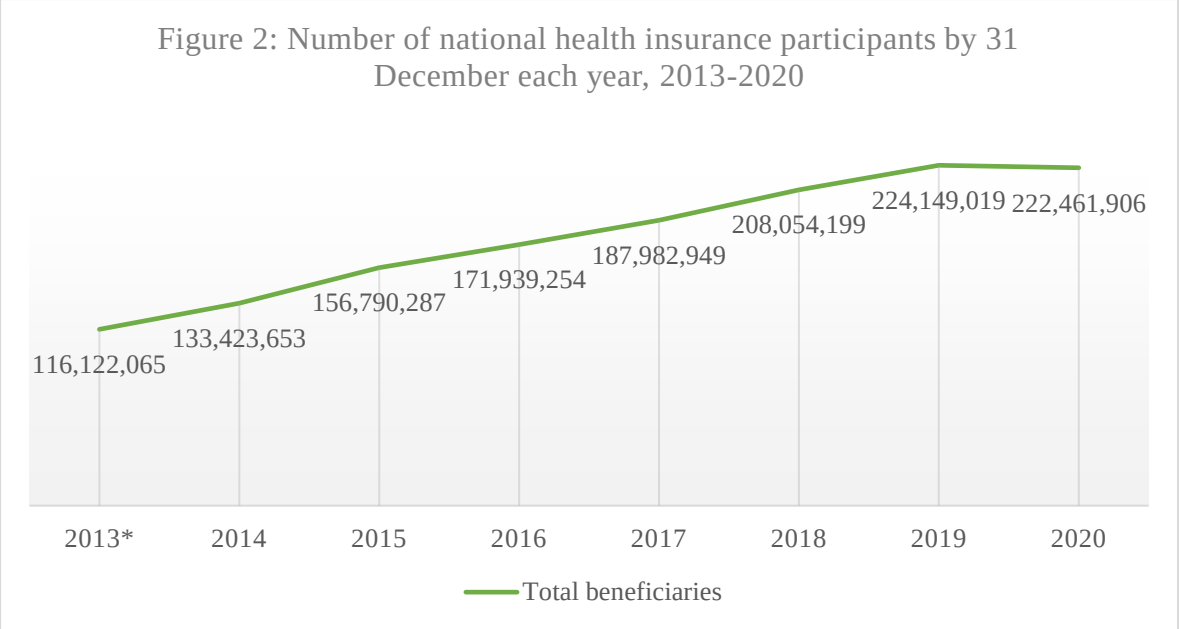
Stimulating preventive and promotive programs by utilising the NHIS is likely to be a choice of many. While focusing on equalising health care access for everyone in the country, the NHIS can surge a healthy lifestyle, contributing to health promotion and disease prevention. UHC,

particularly the NHIS, should invest and add incentives for a healthy lifestyle and reducing the risk of suffering from illnesses (Agustina et al., 2019).

Several studies have been conducted to investigate the effect of implementing the NHIS. Firstly, Erlangga, Ali, and Bloor (2019) study public health insurance's impact on Indonesia's healthcare utilisation. Secondly, by exploiting data from the 2017 Indonesia Demographic and Health Survey, Anindya et al. (2020) study the effect of the NHIS on inequality in access to maternal health services. Finally, Dartanto et al. (2020) scrutinise the factors influencing informal sector workers who do not pay the NHIS premium consistently. However, based on my search, no study has examined the impact of the NHIS on health awareness.

On the one hand, the NHIS, which engages more than 200 million participants and around 83.86 percent of the Indonesian population (Indonesian Social Security Agency for Health, 2020), indicates a notable achievement of ensuring equal healthcare access. On the other hand, questions have arisen regarding the correlation between the scheme and how fine it performs. Various indicators can be used in the study. One of them is measuring the correlation between participants' health awareness, moral hazard in insurance and health promotion.

Figure 2 indicates significant growth in the NHIS membership in the last decade. More than 100 million new members have been enrolling on compulsory health insurance since introducing the NHIS. This growth indicates that the scheme has likely been effective in increasing access to affordable healthcare services.



Notes: * The number of participants in 2013 is the first time integrated from different public insurance schemes.

2.1 Literature Review

Moral hazard is a phenomenon in the health insurance system. In general, both insurers and beneficiaries are possible committing to moral hazard. Insured individuals can obtain advantages from behaving opportunistically after engaging in the health insurance contract. The critical point is that the insurer cannot detect hidden and unobservable actions of the insured (Zweifel, 2009). In respect of health risks, persons can impact their probability of being sick through prevention, such as a change in lifestyle.

Moreover, Arrow (1971) and Olsen (2017) determine the circumstance explained above as ex-ante moral hazard. People may become less thoughtful in their health behaviour due to protection by insurance. This behaviour change will surge health risks before an insured incident occurs. A similar moral hazard example may refer to car theft insurance when individuals do not care to put their valuable belongings safely if they have that insurance. Then, the probability of losing those items is higher than if they do not so.

I deliberate few studies below to analyse their results. These studies were conducted to identify similar outcomes to this study, health awareness, through health understanding and health behaviours. Firstly, Abrokwah, Callison, and Meyer (2019) analyse the correlation of gaining health insurance coverage to health knowledge and behaviour in Ghana. They utilised data from the Ghana Living Standards Survey (GLSS), specifically a question about 'ever heard of an illness called HIV/AIDS'. The authors find that insurance coverage was associated with improved in health knowledge by identifying respondents' awareness of these diseases. Increasing SHI coverage raises familiarity with HIV/ AIDS by 8.4 percentage points (9.4 percent). The authors also find that SHI coverage affects a slight increase in the chance of contraceptive use, which was proxied as health behaviour.

Another country that employs SHI is the Philippines, a geographically similar country to Indonesia. The country has the Philippine social health insurance program (PhilHealth), which aims to protect the marginalised, poor, and vulnerable indigents against the unaffordable costs of healthcare. El Omari and Karasneh (2020) evaluate PhilHealth's impact on the perception of diseases. They exploited data from the Philippines National Demographic and Health Survey (NDHS), an essentially identical survey to the Indonesian Demographic and Health Survey (IDHS). Moreover, being a knowledgeable consumer is essential to stimulating advantages in healthcare. The individual with lack health literacy would disadvantage from medical treatment even though they have health insurance coverages. They would like to visit health facility when their diseases become acute.

In addition to inspecting the indigents' health knowledge, they use familiarity with the Philippines' most common diseases (e.g., malaria, HIV/AIDS, leprosy, and dengue). The

authors find that the SHI has no positive impact on respondents' perception of these common illnesses. Poor health literacy may be affected by low education level. However, the authors argue that the Philippine Health Insurance Corporation worsened this drawback as the agency does not have strategies to improve health awareness. As a result, they recommend urgent and extraordinary actions to plan and apply health campaigns to raise awareness about common diseases and the benefits of seeking adequate healthcare services.

This section also presents past studies that identified different schools of thought regarding SHI across countries. As the insurance involves wide-ranging sectors, I examine related topics from designing an SHI system to evaluating its implementation. Several studies investigated SHI governance, political views, moral hazard, potential risks, and recommendations to tackle SHI issues. Each literature here is considered critical in approaching this research and its discussion.

Designing accurate SHI schemes is a vital tool for refining healthcare access and healthcare fund. The SHI design should also contemplate pooling health risks, improving healthcare quality, and reducing impoverishment (Hsiao, 2007, p. 21). Furthermore, designing an SHI scheme aims to boost social benefits by concerning political and financial constraints in a country. SHI schemes should focus on curative benefits and specific prevention programs because these two aspects can effectively improve SHI schemes to achieve the above goals.

When the SHI schemes roll out, implementing detailed programs is somewhat problematic. SHI systems involve relatively broad scopes in the application, including a budget, health outcomes, and coverage. Savedoff and Gottret (2008, p. 10) raise further questions about how countries can promote their efficiency and productivity in SHI governance. One of the latest issues is that growth in healthcare costs will be unavoidable in the future. This issue will affect

SHI funds, which are mainly depending on the state budget. The government will face challenges in budget constraints to funding SHI. Handling the finance of SHI is then more trustworthy if the authorities can minimise preventable health risks.

Agustina et al. (2019) review the concept, progress, and challenges concerning the Indonesian social health insurance, the NHIS. The study is sufficient to address recent issues and recommend some options in the country. A significant finding is that the system should provide incentives and spend for a healthy lifestyle to reduce the risk of becoming ill, particularly chronic and non-communicable diseases. For instance, investments spent on promoting physical activities, healthy diet, quitting smoking, early childhood development, maternal care, and proper sanitation. The idea behind this is that the NHIS is approaching preventive and promotive programs in the future.

Health promotion is another program which social health insurer can think of. The main reason is that health promotion can systematically minimise health risks. It is probably cross-sector work involving a complex framework and various authorities. Nevertheless, the governments can include health promotion initiatives in the SHI benefit. The initiatives start with educating people's awareness and attitude toward a healthy lifestyle. Bayarsaikhan and Nakamura (2015) discuss improving individuals' health knowledge and literacy to prevent avoidable illnesses. By exploring Mongolia cases, health promotion programs are essential at the individual level (Bayarsaikhan & Nakamura, 2015). The program may face financial burdens. Therefore, they suggest that SHI is a realistic alternative to fund health promotion services due to the well-established relationship between insured individuals and service providers.

Investigating beneficiaries' attitude towards SHI funds and benefits is also critical. Liu (2016) examines the relationship between social health insurance (SHI) participation and out-of-pocket expenditures (OOP) in China. Liu finds that SHI agencies must manage care-seeking behaviours where patients are more likely to seek healthcare at higher-level hospitals than primary and secondary health facilities. The author also reveals that Chinese patients' health awareness increased. The patients concern their health needs more than repayment of the SHI's benefits if they access healthcare in the higher-level facility. As a result, reviewing SHI schemes can help policymakers improve the SHI's effectiveness in fulfilling health needs at primary facilities.

In terms of politics, promoting SHI may be an admired policy that increases the popularity of politicians. This phenomenon could affect the aims of SHI itself. An example is highlighted by Zweifel (2007), in which he criticises pensioners' involvement in SHI. The author argues that pensioners are generally not poor and do not need SHI benefits. As they could vote in elections, those people obtain benefits from the government. There is a possibility that the government may design SHI schemes to benefit specific voter groups. However, in the Indonesian context, SHI was instituted in 2014 after taking the time-consuming policy agenda. Lobbying and consultation were conducted to find the best way of constituting the law. It took decades for implementing the health insurance system entirely (Pisani, Olivier Kok, & Nugroho, 2016). Therefore, the establishment of the NHIS is unlikely aimed to benefit specific political groups.

3. Data, variables, and empirical strategy

3.1 Data sources

This study's data are from the 2012 and 2017 IDHS, capturing the dynamics before and after the intervention in 2014. The IDHS focuses on demographic and health issues in the population. I focus on data describing national health insurance participation and data related

to health knowledge and health behaviours in my analysis. It is motivated by the idea that compulsory health insurance can influence people's health awareness and encourage their moral hazard. People may be less aware of their health as they assume that health insurance will cover out-of-pocket spending if having health problems. In contrast, compulsory health insurance membership can motivate people to have appropriate health understanding since they pay premiums and do not want to get sick.

The 2012 and 2017 IDHS surveys comprised four questionnaires: household questionnaire, married-man questionnaire, never-married man questionnaire, and woman questionnaire. These questionnaires were created accordingly to answer the latest demographic and health issues and applied globally. Nonetheless, questionnaires were modified to the Indonesian context and additional questions regarding the Indonesian family planning and health programs.

Table 1 presents the sample structure in the 2012 and 2017 IDHS sort by groups. In the 2012 IDHS, the total number of observations were 46,024 households, consist of 47,533 women aged 15-49 and 10,086 men aged 15-54. The 2017 IDHS samples covered 49,261 households within urban and rural areas, separated into 50,730 women aged 15-49 and 10,440 men aged 15-54. Those women and men included current married and never-married status. The definition of households in the IDHS did not include prisons, orphanages, boarding houses, and police/military barracks. Also, the 2012 and 2017 IDHS sampling design was created to collect proportional data within national, urban-rural, and provincial levels.

Table 1 Results of the household and individual interviews

Number of households, number of interviews, and response rates, sort by residence (unweighted)

	The 2012 IDHS			The 2017 IDHS		
	Residence			Residence		
Result	Urban	Rural	Total	Urban	Rural	Total
Household interviews						
Households selected	22,039	23,985	46,024	25,306	23,955	49,261
Households occupied	21,130	23,172	44,302	24,707	23,509	48,216
Households interviewed	20,866	22,986	43,852	24,560	23,403	47,963
Household response rate[1]	98.8%	99.2%	99.0%	99.4%	99.5%	99.5%
Interviews with women aged 15-49						
Number of eligible women	23,949	23,584	47,533	27,039	23,691	50,730
Number of eligible women interviewed	22,898	22,709	45,607	26,425	23,202	49,627
Eligible women response rate[2]	95.6%	96.3%	95.9%	97.7%	97.9%	97.8%
Interviews with men aged 15-54						
Number of eligible men	4,836	5,250	10,086	5,306	5,134	10,440
Number of eligible men interviewed	4,417	4,889	9,306	5,054	4,955	10,009
Eligible men response rate[2]	91.3%	93.1%	92.3%	95.3%	96.5%	95.9%

Notes: [1] Households interviewed/ households occupied. [2]Respondents interviewed/ eligible respondents.

The outcomes of the 2017 IDHS were accessible in two different reports. First, a report provides interviews with all married men aged 15-54 and all women aged 15-49. Second, another report presents interviews with never-married women aged 15-24 and never-married men aged 15-24. The latter is especially reported in adolescent reproductive health (ARH).

3.2 Variables

2.2.1 Dependent variables

I scrutinise specific health-related questions in the IDHS questionnaires. The proxy of health awareness in this study comes from indicators that are knowledge of contraceptive methods, knowledge of HIV/ AIDS, knowledge about sexually transmitted infection (STI), and smoking behaviour. These health indicators will be outcome variables in this study. The questions in the surveys are “Have you ever heard of any contraception method?”, “Have you ever heard of

HIV or AIDS?", "Have you heard about infections that can be transmitted through sexual contact?" and "Do you currently smoke every day, some days, or not at all?"

Health awareness in this study reflects generic knowledge and understanding about specific diseases and contraception use. Here I determine whether individuals know about the diseases or not and whether they know any contraceptive method. I cannot thoroughly study the correlation by determining a large variety of diseases. Nevertheless, the data allows me to select HIV/AIDS and STI information. These diseases also being represented in many studies to measure health knowledge. Besides, the analysis of smoking behaviour among all respondents used outcomes that measured whether they reported being a current smoker of cigarettes, pipes, snuff, or other types. Smoking in the survey includes everyday and irregular use.

2.2.2 Treatment and control groups

The membership of any public health insurance acts as the main explanatory variable in the analysis. Respondents who answered affirmatively for having subsidised health insurance, nonsubsidised health insurance, and regional health insurance are categorised as treatment group (N=57,822). Only one of those three schemes counts to ensure participation in an NHIS scheme. People who participated in two schemes or more simultaneously (e.g., regional and subsidised health insurance) are measured as one observation.

From the sample provided in the 2012 and 2017 IDHS, I remove respondents who do not participate in the NHIS, notably respondents enrolled in employer-based insurance, private health insurance, and other insurance types. The aim is to distinguish the difference in outcome caused by the NHIS. Meanwhile, those who are not enrolled in any insurance schemes are classified as the control group (N=55,304). Respondents chosen to the treated and control group represent characteristics and size to exploit the effect of the treatment.

2.2.3 Confounding variables

Controlling covariates would minimise the selection bias of NHIS enrolment. Controlling all differences between treatment and control groups is complicated, however. Examining an example of the Massachusetts health reform, Fredriksson and Oliveira (2019) argue that the difference between treated and untreated observations was due to the policy and critical characteristics that distinguish those groups. Hence, I design this study to control respondents' characteristics that possibly influence the outcomes. Existing studies with similar outcome variables were considered when selecting confounding factors (Abrokwah, Callison, & Meyer, 2019; Clare, Tilford, & Bird, 2018; Delobelle et al., 2009; Kim, Haile, & Lee, 2017; Marti & Richards, 2017; Simon, Soni, & Cawley, 2017; Widyaningrum & Yu, 2018).

The confounding factors included in the analysis are socio-economic and demographic variables, namely age group in years *(15-24, 25-34, 35-44, 45-54)*, educational attainment of each respondent *(no education, primary, secondary, higher)*, type of residency *(urban and rural)*, employment status *(not working and currently working)*, sex *(man and woman)*, and wealth index *(poorest, poorer, middle, richer and richest)*. Wealth index offers scores by measuring a number of consumer goods (e.g., television and car) and housing features like toilet facilities, flooring materials, and drinking water sources. These scores were originated using principal component analysis (PCA) and ranked households into quintiles of five equal categories, each with about 20% of the population (National Population and Family Planning Board, 2013, 2018).

Table 2 presents the shares of respondents in the treatment and control group. The table is sorted into IDHS 2012 and 2017 and divided into outcome and control variables. In constructing outcome variables, each outcome sets dummy variable 1 if the respondent affirms that whether they know about any contraceptive method, know sexually transmitted infection

(STI), know HIV/ AIDS, or currently smoke (e.g., cigarettes, pipes, snuff, others). Otherwise, the value is set to 0.

Table 2: Shares of observed individuals, IDHS 2012 and 2017

Percentage of men and women, insured and uninsured by the NHIS

	All		**Treatment group**		**Control group**	
			Covered by NHIS		*Uncovered by NHIS*	
Result	IDHS 2012	IDHS 2017	IDHS 2012	IDHS 2017	IDHS 2012	IDHS 2017
Outcome variables:						
Knows of any contraceptive method	97.31	98.11	98.43	98.43	96.52	97.62
Knows sexually transmitted infection (STI)	78.08	81.89	82.48	83.22	74.98	79.87
Knows HIV/ AIDS	77.07	80.31	81.46	81.85	73.98	77.97
Currently smokes	14.36	18.59	14.25	18.09	14.44	19.35
Control variables:						
Type of place of residence						
Urban	49.75	52.16	54.33	54.84	46.52	48.09
Rural	50.25	47.84	45.67	45.16	53.48	51.91
Sex						
Man	16.92	16.72	18.20	16.43	16.01	17.16
Woman	83.08	83.28	81.80	83.57	83.99	82.84
Educational level						
No education	3.44	1.89	2.51	1.76	4.10	2.08
Primary	30.80	26.15	25.69	23.89	34.39	29.58
Secondary	51.78	54.72	50.47	53.28	52.70	56.92
Higher	13.98	17.24	21.33	21.07	8.81	11.42
Age						
15-24	25.93	25.53	22.91	24.69	28.07	26.82
25-34	30.95	27.83	30.15	26.94	31.52	29.19
35-44	29.35	30.61	31.89	31.61	27.56	29.08
45-54	13.76	16.03	15.05	16.76	12.86	14.91
Wealth index						
Poorest	23.59	22.71	22.32	22.62	24.49	22.85
Poorer	20.22	19.50	18.80	18.41	21.23	21.16
Middle	19.07	19.29	17.42	17.81	20.23	21.54
Richer	18.55	19.39	18.25	19.03	18.75	19.94
Richest	18.57	19.10	23.21	22.13	15.31	14.50
Occupation						
Not working	37.18	38.79	34.45	37.43	39.10	40.86
Yes	62.82	61.21	65.55	62.57	60.90	59.14

3.3 Empirical strategy

Both the 2012 and 2017 IDHS offered independently pooled cross-sections. Pooling random samples from the same population can increase accurate estimators and power for test statistics (Wooldridge, 2019). This also strengthens the correlation between dependent and independent variables that are consistent over the period. The random sample was taken at each survey. The surveys' sample was selected using two-step stratified sampling to provide adequate estimates at national and provincial levels. Additionally, the survey design nominated systematic random sampling in the last sampling step.

The difference-in-difference (DID) method considers the idea of comparing treatment-control groups and the before-after period. By comparing the outcomes between these two groups, I can estimate the effects that occurred after a non-random policy implementation. The time and health insurance membership in adopting the NHIS policy offers an opportunity for applying a difference-in-difference (DID) analysis. The treatment, which is the NHIS benefit, establishes the treatment group, and the control group involves men and women who do not obtain the NHIS benefit. I would compare the health knowledge of respondents prior to and after imposing the NHIS policy in 2014.

The DID estimation can be presented as follows:

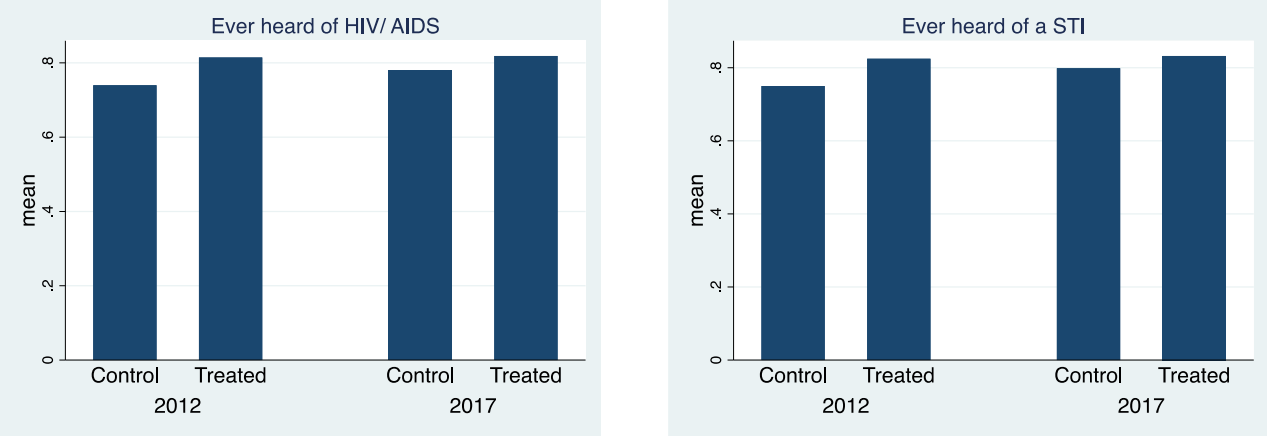
$$Y_{it} = \alpha + \beta.NHIS_i + \gamma.Post_t + \theta(NHIS_i \times Post_t) + \delta X_{it} + \varepsilon_{it}$$

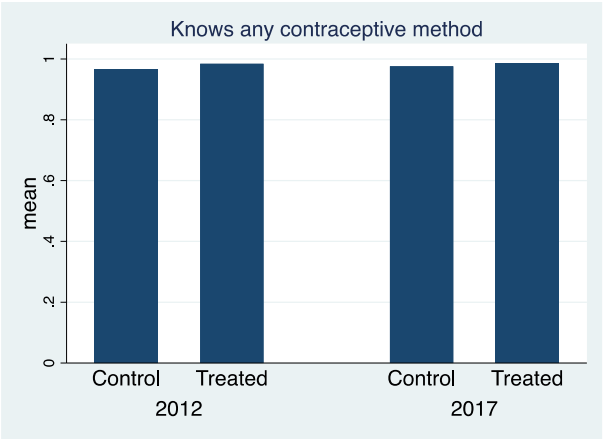
where Y_{it} is the outcome variable, which represented each health knowledge and health behaviour; $NHIS_i$ denotes NHIS enrolment status which is set to 1 if being enrolled and 0 otherwise; $Post_t$ indicates the post-treatment period in which $Post_t = 1$ if the survey was taken in 2017 and $= 0$ if the survey was taken in 2012; δX_{it} where X is the regressors and δ

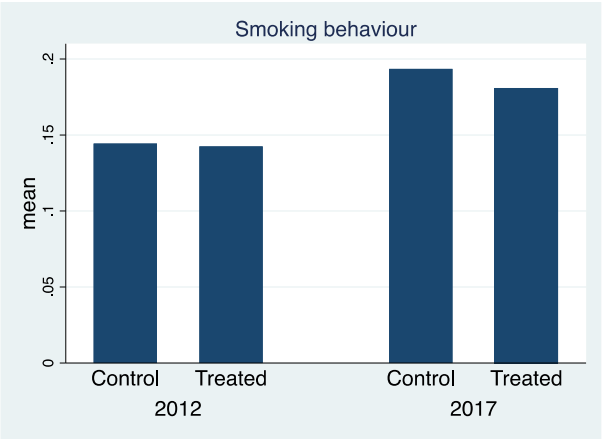
is the set of parameters; and ε_{it} is the error term. The coefficient θ captures the effect of treatment on the outcomes. I used Stata 15 (Stata Corp, College Station, Texas) to perform the statistical analysis.

The difference-in-difference analysis assumes that the potential outcomes of the period before the intervention are similar for whether obtaining the treatment or not, and the outcomes will stay parallel if the intervention did not occur. Furthermore, the common trend when running DID analysis that involves only two periods is not testable (Wing, Simon, & Bello-Gomez, 2018). Testing for a pre-trend is likely a particular case of pre-testing econometrics, and we cannot rely on the default standard errors from pre-testing (Kahn-Lang & Lang, 2020). Besides, Roth (2018) argues that researchers should not wholly rely on testing pre-trends as authentication for research design. In addition, consider pre-trends test significance and the power to exclude consequential violations of parallel trends. However, I provide bar charts (Figure 3) to show each outcome's trends before and after the NHIS policy change in 2014.

Figure 3: The trends prior to and after the NHIS policy change in 2014, Indonesia 2012-2017. Number of samples in 2012 = 54,796. Number of samples in 2017 = 58,330.







4. Results

Table 3 shows the DID estimation results of the national health insurance effect on respondents' health knowledge and health behaviour. Moreover, table rows are defined for each outcome and estimate the differences in average health awareness. Columns indicate the pre-and post-treatment period and DID values. Each dependent variable is measured in the period before and after the implementation of the NHIS policy.

The difference between the period can explain the effect of treatment on treated individuals. Column (i) presents results using the differences in interaction term, while the outcome variable is binary, and the change in average response prior to (column ii) and after the intervention (column iii). These values are essentially the difference obtained by subtracting the average value of insured and uninsured observations. I find broadly consistent results among all outcomes. Imposing compulsory NHIS defies a relatively small decrease in the likelihood of health knowledge. The interaction term is consistently negative and statistically significant at the 1 percent level for each indicator unless the smoking indicator.

Table 3 Effects of social health insurance on health awareness by including covariates

Variables	DID estimate (i)	Pre-treatment (ii)	Post-treatment (iii)	R-square
Knows of AIDS	-0.016*** (0.004)	0.014	-0.002	0.25
Knows of a STI	-0.022*** (0.004)	0.016	-0.005	0.24
Knows any contraceptive method	-0.008*** (0.002)	0.010	0.002	0.03
Currently smokes	0.012*** (0.002)	-0.016	-0.004	0.71

Note: All regressions include controls for age, type of residence, education level, wealth index, employment status, and gender. Means and Standard Errors are estimated by linear regression. Inference: *** p<0.01; ** p<0.05; * p<0.1

Table 3 expands the analysis of outcomes associated with health awareness and health behaviours. Table 3 displays the analysis that includes confounding factors. The first outcome, which is individuals' knowledge about HIV/AIDS, reflects the interaction between the NHIS policy and the disease concern. Although most individuals in the sample have prior knowledge of HIV/AIDS, the estimate is negative and statistically significant. The finding is that the NHIS is associated with a 0.016 fall in propensity knowing HIV/AIDS.

Another proxy for health awareness, knowing about sexually transmitted infection, indicates the same effect of the NHIS intervention. There is a 0.022 decrease in the likelihood of respondents knowing an STI. The estimation is statistically significant at the 1 percent level. The change in insured individuals' knowledge about any contraceptive method following the intervention is, on average, 0.008 smaller in the chance than uninsured individuals from the pre- to post-treatment period. Finally, I find a negative correspondence in the propensity of

smoking associated with the NHIS coverage (0.012) and the estimate is statistically significant at the 1 percent level.

4.1 Robustness check

In this section, I run robustness tests to check the sensitivity of this study's results to change in the set of control variables. The estimates so far were done by controlling age, education level, type of residency, employment status, sex, and wealth index. All of these covariates are likely significant to control compositional change. Then, I re-estimate the empirical model by omitting these covariates. Although removing covariates may reduce the DID analysis' precision, this sensitivity check admits the study to evaluate whether any particular confounding factors drove the results.

Table 4 Robustness test: Dismissing covariates

Variables	DID estimate (i)	Pre-treatment (ii)	Post-treatment (iii)	R-square
Knows of AIDS	-0.036***	0.075	0.039	0.01
	(0.005)			
Knows of a STI	-0.041***	0.075	0.033	0.01
	(0.005)			
Knows any contraceptive method	-0.011***	0.019	0.008	0.00
	(0.002)			
Currently smokes	-0.011**	-0.002	-0.013	0.00
	(0.004)			

Note: All regressions do not contain control variables. Means and Standard Errors are estimated by linear regression. Inference: *** p<0.01; ** p<0.05; * p<0.1

Table 4 displays difference-in-difference estimates of outcomes that do not control covariates. I find for all these results are mainly similar to the main results indicated in table 3, in which the effects on interesting variables are negatively associated and statistically significant. A

difference with previous regression is that smoking behaviour's estimate becomes contrast which means it is negatively correlated and statistically significant at the 5 percent level.

I estimate the baseline regressions for different subsets, in particular for men, women, and poor groups, to further test the robustness of the analysis. Table 5 presents the results for these subsamples. Moreover, estimates in each subsample control for covariates in this study. Poor-group sample defines observed individuals that included in poorest and poorer clusters in the wealth index. Only men and women respondents contained separately in its subsample.

Table 5 Robustness test: Subsamples

Outcome	DID estimates		
	Poor groups (i)	Men (ii)	Women (iii)
Knows of AIDS	-0.024***	-0.001	-0.019***
	(0.008)	(0.010)	(0.005)
Knows of a STI	-0.033***	-0.019*	-0.022***
	(0.008)	(0.010)	(0.005)
Knows any contraceptive method	-0.017***	-0.010**	-0.007***
	(0.004)	(0.005)	(0.002)
Currently smokes	0.001	0.053***	0.001
	(0.004)	(0.009)	(0.002)
Observations	48,634	19,022	94,104

Note: All regressions are estimated by using different subsets, sampling either men, women, or poor groups. Regression in column (i) includes controls for age, type of residence, education level, employment status, and sex. Regressions in column (ii) and (iii) include controls for age, type of residence, education level, employment status, and wealth index. Means and Standard Errors are estimated by linear regression. Inference: *** p<0.01; ** p<0.05; * p<0.

The results of the poor-group subsample reveal essentially parallel to the main results. The correlation is, on average, negative. The differences are slightly lower between the poor subset than the full sample results. For the men subsample, the estimates show a similar pattern of effects on the outcomes. Additionally, the men subset had relatively more significant changes

in knowing HIV/AIDS and STI than the outcomes' changes attributed in the women subset. Meanwhile, the difference for knowing contraceptive method for men subsample (-0.010) is smaller than women's (-0.007). Finally, DID results in a slight positive correlation in smoking behaviour among women (0.001), and it is not statistically significant.

5. Discussion

This study found that the NHIS was associated with deteriorations in health awareness proxies for knowing HIV/AIDS, knowing any STI, knowing any contraceptive method, and smoking behaviours. Negative correspondences are evident in the disease knowledge and contraceptive method outcomes. Enrolling in the NHIS tends to reduce the probability of this health knowledge. A positive association between the NHIS and smoking behaviour also reveals that the insurance may increase the likelihood of smoking. Similar findings were figured out by a previous study investigated in knowing specific diseases (El Omari & Karasneh, 2020) and smoking behaviour (Marti & Richards, 2017). In contrast, this study's findings are unlike the previous evaluation that found positive social health insurance effects on health knowledge and health behaviours (Abrokwah et al., 2019).

If my empirical observations are correct, then the participation in the NHIS may lead to the decreased propensity of knowing any specific disease and increased committing unhealthy behaviours. The NHIS benefits might weaken the extra incentive for such behaviours by reducing financial risks, referred to moral hazard. This possibility could influence individuals to less aware of their health, sequentially creating negative externalities for the other NHIS members and taxpayers as the NHIS applies the 'solidarity' principle in funding. Then, the number of low risks may be increased. This study does not inspect its causal effects. However, unhealthy behaviours are a possible challenge to improve public health and restrain health care expenditure (Marti & Richards, 2017).

Less out-of-pocket spending of the insured than uninsured when having poor health may lead more insured to develop unhealthy lifestyle. The insured who does not pay the NHIS premium directly but is subsidised by the government would be less aware of healthy behaviour. This is because they assume that there are no economic effects if they have poor health. They could access health care either for free or contribute a small amount of OOP spending. The financial burden of bad health may drive persons with less coverage to not increase their smoking habits, especially after having a health shock (Richards & Marti, 2014). In a broader view, premium subsidies substitute for SHI if there is a substantial negative relationship between health and productivity (Kifmann & Roeder, 2011). Lastly, the result shown in table 4 indicates that the NHIS enrolment is consistently shown a negative correlation with health awareness in the subset of poor groups.

Advantages and positive spillovers from the NHIS could compensate for this minor shortcoming. Achievement in one of SHI primary aims that is equity in healthcare access, may outweigh that side effect. SHI may improve healthcare access to beneficiaries and, broadly, the people who have the financial burden (Agustina et al., 2019; Balsa & Triunfo, 2021; Clare et al., 2018; Powell-Jackson, Hanson, Whitty, & Ansah, 2014). Also, SHI may tackle other exacerbations related to insufficient coverage (Baicker & Goldman, 2011; Chandra, Gruber, & McKnight, 2010).

I found that the NHIS schemes have not had increased the probability of insured to aware of their health. The NHIS' role in prevention is, therefore, a huge consideration. The NHIS should invest much on preventive and promotive programs. Investment and financing on health promotion by utilising the SHI are reliable approaches to deal with this issue (Agustina et al.,

2019; Bayarsaikhan & Nakamura, 2015). Likewise, ex-ante moral hazard can be relieved if preventive actions are subsidised (Zweifel, 2009). For instance, sickness funds in Germany present activities in nordic walking and inline skating, as well as offer advice to encourage healthy diet. With the existing NHIS schemes, promoting a healthy lifestyle and health knowledge can be done at the individual level and treated like curative benefits.

To gain beneficiaries' awareness about health, the Indonesian Healthcare and Social Security Agency as the only NHIS administrator may educate the insured by utilising various platforms. A good approach is utilising social media to promote a healthy lifestyle and diseases awareness. Despite the fact that only a few health insurance companies have been done this approach in German, Loss and von Uslar (2021) find that social media can foster health behaviour and health promotion in the community.

Apart from the results stated above, I found that the changes in the outcomes' propensity are more significant for the control group than the treatment group over the period (Appendix A). This trend can show that increases in the likelihood of health knowledge and adverse health behaviour happen over time for control and treatment groups. However, the intervention may reduce that likelihood to be smaller for treated individuals than uninsured. By not participating in the NHIS, an individual may have a more significant chance to obtain health knowledge. It could be argued that an intervention is being considered successful if the treatment group's estimate is more substance than the control group has. In this study, this means that observed individuals in the control group, on average, tend to affirm the outcomes more than those in the treatment group. In terms of public policy, the NHIS is not likely beneficial to health knowledge and health behaviour for the whole population.

5.1 Limitations

This study is a few studies that employ difference-in-difference analysis on NHIS and health awareness using national surveys. The study is, nevertheless, not without its limitations. First, most individuals (e.g., public servants, military, police) in treatment groups were enrolled in public health insurance before the intervention imposed in 2014. Their status, more or less, could influence their health awareness before the intervention. Second, this study uses secondary data from IDHS that sampled much more women (around 83 percent) than men (around 17 percent). The proportion could affect specific questions in the survey.

6. Conclusion

In this essay, I evaluate the national health insurance system in influencing people's health awareness in Indonesia. For this purpose, I utilised data from the 2012 and 2017 IDHS and adopted the DID analysis. The surveys designed observations that equally represented at national, urban-rural, and provincial levels. Thus, the results can implicate the policy nationally.

The empirical results obtained indicate that the NHIS is negatively correlated with health awareness. The program decreases the propensity of knowing sexually transmitted diseases, HIV/AIDS, and contraceptive methods. I also found that the NHIS raises the probability of smoking and the finding is statistically significant. This clearly reveals that, in the Indonesian context, the NHIS opens less opportunities to gain health knowledge and healthy behaviour.

However, health promotion is not one of main focuses of the NHIS. Equal healthcare access and affordable health expenditure for everyone are the primary purposes of social health insurance. Again, these goals seem successful since their implementation in 2014. If the NHIS's next focus is to maintain preventive and promotion aspects, I argue that the current

scheme does not effectively support it. Specific changes in the NHIS' benefits and financing may deal with improving the population's health awareness.

Although this study has several weaknesses, this essay contributes to narrow literature on the health awareness effects of the Indonesian National Health Insurance Scheme and, more broadly, provides evidence-based analysis to the policymakers in developing countries regarding health knowledge and health behaviours that complement a social health insurance expansion. Ultimately, the future study can examine optimal health insurance contracts more, focusing on optimal insurance coverage with moral hazard.

Appendix A

Difference-in-differences estimation results

Number of observations in the diff-in-diff: 113,126

Variables		before imposing (i)	after imposing (ii)	change (iv)	difference-in-difference (v)	R-square
Ever heard of AIDS	Insured	0.471	0.471	0	-0.016***	0.25
	Uninsured	0.458	0.473	0.015	(0.004)	
	difference	0.014	-0.002			
Ever heard of a STI	Insured	0.494	0.498	0.004	-0.022***	0.24
	Uninsured	0.478	0.504	0.026	(0.004)	
	Difference	0.016	-0.005			
Knows any contraceptive method	Insured	0.899	0.898	-0.001	-0.008***	0.03
	Uninsured	0.889	0.897	0.008	(0.002)	
	difference	0.010	0.002			
Currently smokes	Insured	0.043	0.096	0.053	0.012***	0.71
	Uninsured	0.059	0.100	0.041	(0.002)	
	difference	-0.016	-0.004			

Note: Column (iv) = column (ii) - column (iii). All regressions include controls for age, type of residence, education level, wealth index, employment status, and gender. Means and Standard Errors are estimated by linear regression. Inference: *** p<0.01; ** p<0.05; * p<0.1

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