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National Health Insurance on Household Out-of-pocket Health Expenses in Indonesia

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Abstract

BPJS Kesehatan is expected to increase access to fair and high-quality health care for all citizens and provide financial risk protection. Our study aims to examine the impact of BPJS Kesehatan's implementation as national health insurance (NHI) on household out-of-pocket expenses. Our study used a difference in differences (DID) regression model that was applied to repeated cross-section data from the National Socio-Economic Survey (Susenas) between 2013-2014 and 2019-2020. Propensity-score matching (PSM) is used to provide covariate balance in the regression model data. Illnesses that are represented by health conditions and treatment options (self-medication, outpatient, inpatient) are determining factors of out-of-pocket expenses. Our finding, the implementation of BPJS Kesehatan resulted in a 26.0% increase in out-of-pocket expenses. Its main reason is an increase in public health awareness, as indicated by the increased number of visits to health facilities. However, the increase in out-of-pocket expenses suggests that the usage of BPJS Kesehatan is not optimal. To optimize its function as financial protection, improvements must be made to the mechanism and system policies.

Introduction

Health is the right of every human being. The healthier a person is, the higher the likelihood of living longer. However, the increasing cost of health care causes people to be unable to pay their health costs. The high cost of health expenditure causes two main risks, namely the potential for poverty and a decline in household health status (Axelson *et al*., 2009). It is estimated that every year, around 150 million people suffer from financial disasters as well, and spend more than 40% of their non-food household expenditure on health (Grogger *et al*., 2015). The implications of this high health expenditure led to extreme poverty, social development, and far from affordable human rights (Okoroh *et al*., 2018).

Health insurance is one of the important health-related policies in a country because it has major health implications (Zhang *et al*., 2022) . The existence of health insurance can reduce the prevalence of diseases and increase the use of preventive health (He & Nolen, 2019; Zhang *et al*., 2022), as well as increase productivity in the economy, especially for middle-aged people (Zhang *et al*., 2022). In the absence of health insurance, when exposed to diseases that require high treatment costs, there is the potential to use savings, sell assets, go into debt, and even have implications for the interruption of children's education (Grogger *et al*., 2015) . This is especially the case in low-income societies or low-income countries. Thus, in general, health insurance benefits are associated with reduced risk of disease and reduced financial risk.

The government provides a national health management system for the entire

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community, known as universal health coverage (UHC). Several countries have established national health insurance (NHI) as a mechanism to achieve UHC, including Indonesia. Indonesia implemented NHI through the implementation of a massive universal health insurance program with the operation of BPJS Kesehatan in 2014, as a transformation of Askes through Law Number 40 of 2004 concerning the National Social Security System (SJSN) and Law Number 24 of 2011 concerning the Social Security Agency (BPJS). BPJS aims to organize the National Health Insurance Program-Healthy Indonesia Card (JKN-KIS) to ensure that all Indonesians are protected by comprehensive, fair, and equitable health insurance.

According to WHO, the success of UHC is measured in two dimensions, namely access to health care facilities and financial protection. This dimension of financial protection can be measured by the out-of-pocket expenses that a household pays for health. Out-of-pocket is defined as the total household expenditure on health-related needs, both medical expenses such as treatment, treatment, examinations, consultations, diagnoses, doctor's fees, modern and traditional medicines, as well as non-medical expenses such as transportation for patients and companions, companion lodging, food, care, accommodation, and other expenses (Axelson *et al*., 2009; Sriram & Khan, 2020; Tarigan *et al*., 2017).

Factors that affect out-of-pocket costs include a person's decision when sick, whether to seek treatment, or treatment. The existence of health insurance does not necessarily eliminate out-of-pocket expenses because not all medical expenses are covered by insurance, and other costs arise outside of medical costs. According to a study (Dey & Mishra, 2014), the decision to seek treatment is influenced by age, gender, income level, education level, and whether there is access to primary health facilities. Meanwhile, from the study (Widayanti *et al*., 2020), factors that affect a person's decision to seek treatment include the type of disease (including the involvement of the supernatural or mental illness) and who is sick (children or others). In the study (Abuduxike *et al*., 2020), it was stated that the determinants of a person's decision to seek treatment include health problems, having chronic diseases, health perception, education level, income level and insurance status, and/or ability to pay for themselves.

The out-of-pocket amount is also influenced by the form of the NHI program offered (Thuong *et al*., 2020), the type of insurance membership (Tobe *et al*., 2013); the severity of the disease, as well as the type of disease (Fong, 2019; Meraya *et al*., 2015; Tobe *et al*., 2013) , e.g., cardiovascular disease, diabetes, hypertension, and cancer, causing significantly higher expenses, age, and place of residence of the patient's location or distance from the healthcare facility (Tobe *et al*., 2013), length of hospitalization (Tobe *et al*., 2013), ownership of the hospital selected as a health facility, whether owned by the government or the private sector, as well as the level of health facilities (Grogger *et al*., 2015; Thanh *et al*., 2021; Tobe *et al*., 2013) and income from households (Al-Hanawi *et al*., 2021).

Many studies have been conducted to look at the impact of NHI on increased financial protection for its users, as measured by the decreasing medical and health care (curative) expenses that users must bear. Several studies illustrate that there has been a decrease in out-of-pocket as a result of the implementation of NHI in several countries, including studies on the impact of the implementation of NHI in Ghana since 2003, there has been a decrease in health expenditure, especially on medicines, by up to 20% (Garcia-Mandicó *et al*., 2021), other studies related to the implementation of NHI in Ghana in 2002-2016 show that households that do not have NHI have to spend out-of-pocket costs about 1.4 to 10 times higher than households with NHI (Okoroh *et al*., 2018). Similar findings were obtained in the study (Navarrete *et al*., 2019). In the implementation of IP in Vietnam, the voluntary health insurance (VHI) can also reduce out-of-pocket (Thuong *et al*., 2020). However, there are also research results that the implementation of NHI does not bring changes to out-of-pocket costs or only decreases in certain community groups. For example, in the results of the study (Karan *et al*., 2017; Ku *et al*., 2019; Sheu & Lu, 2014; Sriram & Khan, 2020) , there was a significant decrease in out-of-pocket expenses due to the

presence of NHI. In the study (Atella *et al*., 2015), the evaluation of the impact of health care reforms in China in 1998 only reduced the out-of-pocket in high-income residents with good health conditions (Atella *et al*., 2015). A similar study in Vietnam (Thanh *et al*., 2021), showed a decrease in out-of-pocket patients near poor in government health facilities. The results of the study (Al-Hanawi *et al*., 2021) even showed that health insurance provides a heterogeneous effect of income differences. In high-income/wealthy communities, health insurance leads to an increase in out-of-pocket expenses. Similarly, in the NHI impact study in Thailand, healthcare consumption outcomes increased, which was shown by the increase in hospitalization and outpatient care (Ghislandi *et al*., 2015).

In Indonesia, before the enactment of BPJS Kesehatan, a study was conducted on the impact of government-facilitated health insurance on out-of-pocket spending. The results of the study with data before the BPJS Kesehatan period showed that households that did not have health insurance had out-of-pocket expenses of 15% of total household expenditure, while those with health insurance had 13.2% (Tarigan *et al*., 2017). For the results of the study after the implementation of BPJS Kesehatan in the poor and rural communities, there was a positive influence with the existence of BPJS Kesehatan (Maulana *et al*., 2022). From the overview of various studies related to the impact of health insurance in Indonesia, research to see the impact of BPJS Kesehatan in Indonesia on the reduction of out-of-pocket expenditure on household health in general needs to be carried out, especially by using a model that not only observes the correlation between BPJS Kesehatan and out-of-pocket expenditure, But it can also find an impact. The purpose of the research is to find out the impact of the implementation of BPJS Kesehatan on household health expenditure (out-of-pocket).

Methodology

The data used in this study are data from the National Socio-Economic Survey (Susenas) Kor and the consumption module. The data taken as data before the implementation of BPJS Kesehatan is data from 2013-2014, while data after BPJS Kesehatan is enforced is taken from 2019-2020. The data was taken after 5 (five) years of the implementation of BPJS Kesehatan (since 2015), and the number of BPJS Kesehatan participants began to stabilize/tend to remain. Data was also taken in the period before the COVID pandemic to anticipate differences in outcomes due to the COVID pandemic. The unit of analysis in this study is Indonesian households.

From several previous studies, the regression model that is widely used is the difference in difference (DID) estimation model. This method is commonly used on data panels. The use of this DID estimation model aims to reduce bias due to the condition of time invariance, which is a condition that is not observed and is different in each individual but constant from time to time. However, the DID estimation model can still be done when panel data is not available, namely by using cross-sectional data. In the cross-sectional data, survey respondents before and after the program/intervention are not the same respondents. DID modeling was carried out by grouping treated and control groups, before and after the intervention/implementation of NHI in different groups, for example, in studies Ghislandi *et al*. (2015); Karan *et al*. (2017); Ku *et al*. (2019); Sheu & Lu (2014); Sriram & Khan (2020). The treated group, which is affected by NHI, is defined as a group that does not have NHI before NHI and a group that has NHI before NHI has or uses NHI. Meanwhile, the control group, which is not affected by NHI, is a group that, before NHI, already had other health insurance available, and a group that already had NHI still used available health insurance and/or owned or used NHI. The unit of analysis in the group can be in the form of households (Karan *et al*., 2017; Sheu & Lu, 2014; Sriram & Khan, 2020) or individuals (Ghislandi *et al*., 2015; Ku *et al*., 2019).

In this study, the data used is repeated cross-section data with the Treated Group approach, and affected by the implementation of BPJS Kesehatan, are household groups that, before the implementation of BPJS Kesehatan, did not have any type of health insurance, and household groups that, after the implementation of BPJS Kesehatan, are registered/have non-

PBI BPJS Kesehatan. The ownership of BPJS Kesehatan is taken non-PBI group, because the group that owns BPJS Kesehatan PBI is a change of name from Jamkesnas, Jamkesda, Jampersal, and Askeskin. This group is included in the Control Group, which is not affected by the implementation of BPJS Kesehatan. Another control group is a group of people who have any type of health insurance before the implementation of BPJS Kesehatan and continue to have health insurance after the implementation of BPJS Kesehatan. This group is considered not affected by the implementation of BPJS Kesehatan because the absence of BPJS Kesehatan does not affect their health expenses, as they are still covered by health insurance.

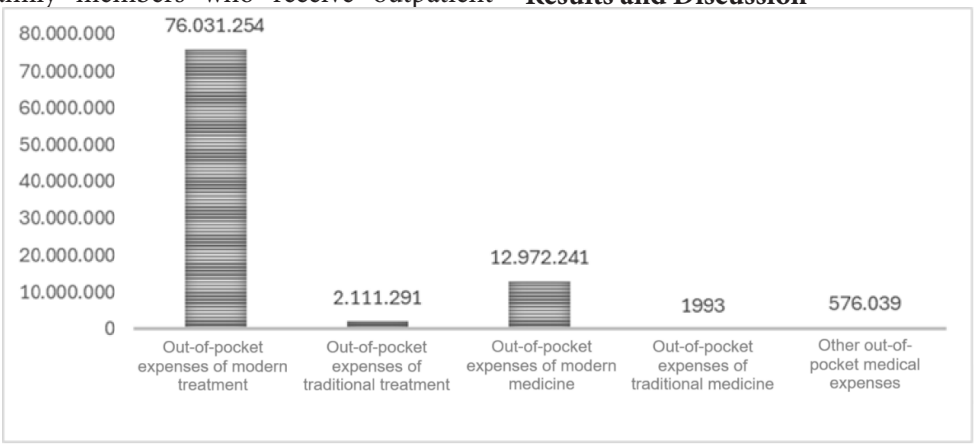
The regression model used in this study is:

$$Ln\, Y_{it} = \beta_0 + \beta_1 D_t + \beta_2 T_i + \beta_1 (D_t \, x \, T_i) + \alpha Z_{it} + \varepsilon_{it}$$

$Ln\, Y_{it}$ i.e., changes in household curative health expenditure (**Out-of-pocket**) are a dummy before and after the implementation of BPJS Kesehatan in 2015, with D_t= 0 if before 2015, i.e., 2013-2014, and D_t= 1 if in 2015 and above, namely in 2014-2015. T_i indicates the treatment group due to the implementation of BPJS Kesehatan. Z_{it} is the control variables used in this study include the health characteristics of household members (the number of household members who are sick and disrupted by work/school, the number of family members who use over-the-counter drugs (modern/traditional), the number of family members who receive outpatient treatment, the number of family members who receive treatment who are hospitalized (Karan *et al*., 2017; Thuong *et al*., 2020), the length of hospitalization, and the ownership of private insurance or company insurance (Tobe *et al*., 2013), household characteristics (age of the head of household and education of the head of household (Atella *et al*., 2015; Sheu & Lu, 2014), the level of household economy (Atella *et al*., 2015; Sheu & Lu, 2014) and characteristics of households (provincial areas, villages, cities) (Atella *et al*., 2015; Tobe *et al*., 2013; Zikidou & Hadjidema, 2020). ε_{it} is error terms and $\boldsymbol{i}$ represents households.

Because the household respondents used by the group before and after the intervention/ implementation of BPJS Kesehatan were different and there were differences in household characteristics between the treated and control groups, to balance the covariate between the treated and control groups, before the DID regression was carried out, data matching was carried out with the Propensity Scored Matching method (PSM). In this study, the variables used to obtain a covariate balance are the education of the head of household (Ku *et al*., 2019; Sriram & Khan, 2020) , the economic status of the household, namely the average annual expenditure per capita (Ku *et al*., 2019; Sriram & Khan, 2020) , the number of household members, the age of the head of the household, and the number of children under the age of 4 years in the household.

Results and Discussion



GRAPH 1. Average Composition of Health Expenditure Out-of-Pocket Household. Source: Susenas 2013-2014, 2019-2020 (Data Processed)

TABLE 1. The Results of Data Processing Using the DID Method

	DID	DID (VAR Health Control)	DID (var control RT character)	DID (var control area)	DID (all var control)
	(1)	(2)	(3)	(4)	(5)
Out-of-pocket changes per month	1,010***	0,716***	0,558***	0,919***	0,262***
	(0,00817)	(0,00696)	(0,00819)	(0,00819)	(0,00685)
Constant	9,715***	9,099***	8,710***	9,535***	8,115***
	(0,00382)	(0,00398)	(0,00849)	(0,00417)	(0,00751)
Observations	748.753	748.753	748.753	748.753	748.753
R-squared	0,031	0,309	0,125	0,043	0,398
Variable Control: Health characteristics of household members					
Number of sick and disturbed household members		0,0152***			0,0710***
		(0,00211)			(0,00196)
Number of self-medication household members		0,0270***			0,0446***
		(0,00153)			(0,00142)
Number of Outpatient household members		0,426***			0,413***
		(0,00212)			(0,00195)
Number of household members Hospitalization		1,651***			1,611***
		(0,00646)			(0,00589)
Private/corporate Insurance Ownership		-0,253***			-0,130***
		(0,00887)			(0,00782)
Length of stay (days)		0,00876***			0,00340***
		(0,00156)			(0,00131)
Household Characteristics					
Age of Head of Household			0,0108***		0,00876***
			(0,000148)		(0,000123)
Category Education Head of Household					
Pend. Basic Equivalent (reference)					
Pend. Intermediate Equivalent			0,143***		0,0881***
			(0,00423)		(0,00357)
Pend. Equivalent Height			0,242***		0,203***
			(0,00757)		(0,00628)

	DID	DID (VAR Health Control)	DID (var control RT character)	DID (var control area)	DID (all var control)
	(1)	(2)	(3)	(4)	(5)
Categories Household Expenses					
Poor (reference)					
Intermediate			0,736***		0,727***
			(0,00417)		(0,00353)
Rich			1,364***		1,349***
			(0,00645)		(0,00532)
Region Characteristics					
Province					
Provinces in Java and Bali (reference)					
Other Provinces				0,0316***	0,0851***
				(0,00428)	(0,00339)
Rural urban					
City (reference)					
				0,374***	0,0681***
Village				(0,00413)	(0,00340)

Note: Robust Standard Error *** Confidence level <0.01, ** Confidence level <0.05, * Confidence

From the data processing, it was found that the expenditure on **out-of-pocket** household health costs as depicted in Graph 1, was dominated by expenditure on modern medicine, both for treatment at government hospitals, private hospitals, health centers/ Pustu/Polindes/Posyandu, doctors/polyclinic practices and treatment at health workers' practices. The portion of traditional medicine, such as traditional medicine practices and shamans to help with childbirth, as well as the purchase of traditional medicine/herbal medicine for treatment, is relatively small compared to modern medicine.

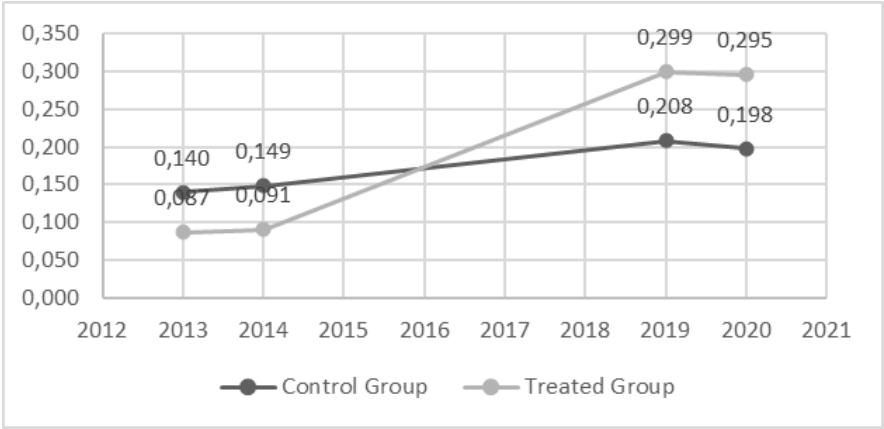
Table 1 shows the data processing results using the difference in difference (DID) estimation model to find changes in the value of out-of-pocket expenses due to BPJS Kesehatan ownership. By using various control variables that affect independent variables, it is hoped that it can further reduce the possibility of bias that arises, therefore, the estimation results in column (5) were chosen with estimation results that are not overconfident and with the highest R-squared results compared to other columns. Furthermore, data matching was carried out using the Propensity Scored Matching (PSM) method using Nearest Neighbor Matching combined with radius/caliper matching. The data that has been rematched is estimated based on the data on support using DID by adding all control variables.

Table 2 column (1) shows the estimated data of DID without PSM. Column (2) shows the DID estimate using all control variables other than household characteristics, while column (3) shows the DID estimate using all control variables, including the variables used in the PSM, after matching. The estimated results from PSM-DID are not much different from the estimates using DID, namely, the implementation of BPJS Kesehatan caused a significant **increase in out-of-pocket** per month of 26.0% at a confidence level of 0.01.

TABLE 2. Data Processing Results Using the PSM - DID Method

	DID (all var. control)	PSM - DID (var. control kec. RT characters)	PSM - DID (all var. control)
	(1)	(2)	(3)
Out-of-pocket changes per month	0,262***	0,646***	0,260***
	(0,00685)	(0,00704)	(0,00692)
Constant	8,115***	8,954***	8,130***
	(0,00751)	(0,00420)	(0,00754)
Observations	748.753	736.282	736.282
R-squared	0,398	0,316	0,397

Note: Robust Standard Error *** Confidence level <0.01, ** Confidence level <0.05, * Confidence level<0.1. Source: Susenas 2013-2014, 2019-2020 (data reprocessed)

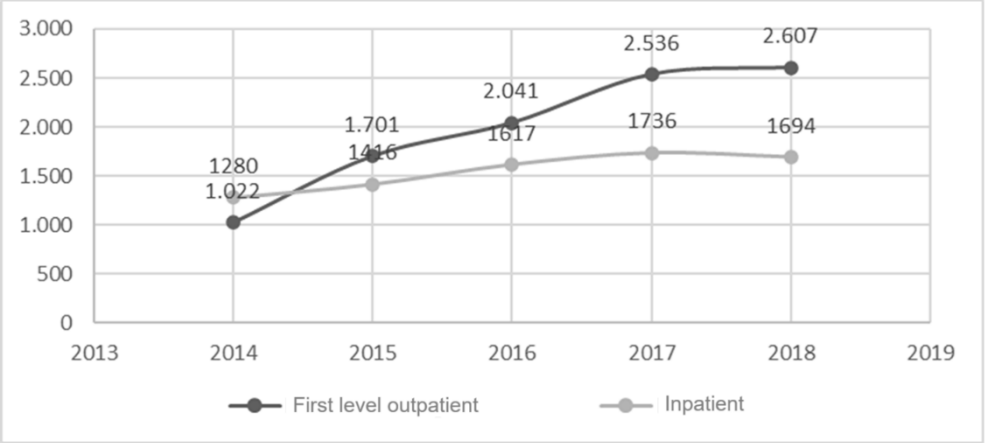


GRAPH 2. The average number of household members who are hospitalized. Source: Susenas data 2013-2014, 2019-2020 (data reprocessed)

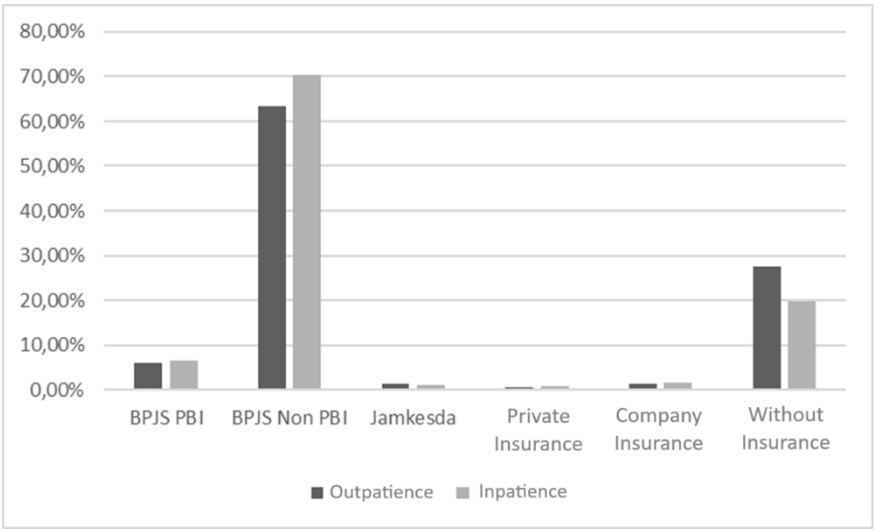
The increase in out-of-pocket expenses can be explained by the existence of BPJS Kesehatan as a national health insurance (NHI) can increase the average number of public visits to health facilities (Ghislandi *et al*., 2015; Thuong *et al*., 2020), increase the probability of being treated (Sriram & Khan, 2020), and increase the use of health facilities (Axelson *et al*., 2009).

The results of Susenas data processing in Graph 2 showed a change in behavior in the treated group, namely an increase in family members who were hospitalized in 2019-2020, which is the period after having BPJS Kesehatan. Meanwhile, in the control group that has had health insurance since 2013, family members who were hospitalized in 2019-2020 tended to remain the same compared to 2013-2014. This is reinforced by the data in Graph 3 from BPJS Kesehatan in 2014-2018, namely an increase in the number of visits per 10,000 residents at first-level outpatient health facilities and outpatient-inpatient at advanced health facilities since the implementation of BPJS Kesehatan.

Thus, having BPJS Kesehatan will improve people's behavior when conducting outpatient and inpatient medical visits. This increase has implications for an increase in out-of-pocket expenses due to the cost of medical services that are not covered and non-medical expenses such as transportation and accommodation, which BPJS Kesehatan does not cover. This condition also occurs in other



GRAPH 3. Data on the number of first-level outpatient visits and advanced-level hospitalizations per 10,000 people in 2014-2018. Source: National Social Security Board, 2019 (data reprocessed)



GRAPH 4. Choice of insurance use by BPJS Non-PBI Health Owners for Outpatient and Inpatient Care. Source: Susenas data for 2019-2020 (data reprocessed)

countries that implement NHI, where not all health-related services are covered by insurance (Karan *et al.*, 2017; Sheu & Lu, 2014; Sriram & Khan, 2020; Thanh *et al.*, 2021). The increase in visits to health facilities, if not accompanied by an increase in the quantity of health facilities and the quantity of medical personnel, will cause long queues in getting health services when using BPJS Kesehatan. BPJS Kesehatan also results in some people needing a longer time to carry out treatment until it is completed. These things can imply that BPJS Kesehatan owners do not use BPJS Kesehatan at the time of treatment, which has implications for an increase in out-of-pocket expenses.

From Susenas data in 2019-2020 on graph 4, the treated group, namely the owners of BPJS Kesehatan Non-PBI in 2019-2020 at the time of outpatient treatment, around 63% did use BPJS Kesehatan facilities, but there are still around 28% who do not use insurance, both BPJS Kesehatan and other insurance. Likewise, in hospitalization, in the treated group, namely the owners of BPJS Kesehatan Non-PBI in 2019-2020, around 70% used BPJS Kesehatan facilities, but there are still around 20% who do not use insurance, both BPJS Kesehatan and other insurance. Without the use of insurance in outpatient and inpatient treatment, there are out-of-pocket health expenses that must be borne or incurred by the household.

From Susenas data in 2019-2020, data

was also obtained that the reason for the treated group, namely the owners of BPJS Kesehatan Non-PBI in 2019-2020, did not use BPJS Kesehatan during outpatient and inpatient treatment, among others, because BPJS Kesehatan owners did not know how to use the facility, long service waiting times, inactive cards, the existence of other insurance, and the absence of transportation costs when going to do treatment. While the biggest reason is other reasons, no more detailed or detailed data or information is obtained. On the other hand, in Table 1, there is ownership of insurance other than BPJS Kesehatan, for example, private/ corporate insurance will contribute 13% lower out-of-pocket expenses than households that only have BPJS Kesehatan. Thus, the existence of additional insurance other than BPJS Kesehatan can contribute to reducing out-of-pocket expenses. From the characteristics of the provincial area, out-of-pocket expenditure in regions other than Java and Bali is 8.5% higher than provincial households in Java and Bali. This is because the number of health facilities in regions other than Java and Bali is smaller. The ratio of the number of health facilities to the first health facility in areas outside Java and Bali is higher than in the Java and Bali regions. The wider area outside Java-Bali than the Java-Bali region requires more costs to be required, for example, transportation and larger accommodation to be able to reach health facilities. Likewise, the characteristics of urban and rural areas, **out-of-pocket** spending in rural areas is 6.81% higher than that of urban households. This contrasts with the results of studies (Zikidou & Hadjidema, 2020) that urban households spend higher health costs than rural areas. Almost the same as the difference in **out-of-pocket** expenditure in regions by province, health facilities in villages are more affordable than in cities, so it requires costs, such as transportation and greater accommodation, to be able to reach health facilities.

This research is inseparable from the limitations that result in regression results being biased. First, in the health expenditure data from Susenas, it cannot be ascertained whether the respondents include or provide treatment data, including transportation and accommodation, so the out-of-pocket expenditure data issued may be higher. Second, there is a limitation of control variable data that can affect out-of-pocket expenditures, including data on the severity and type of disease, the type and level of health facilities used, and recurrent illness conditions in family members within a period, which cannot be obtained or are not available. The availability of such data allows the bias in the estimation results to be reduced. Finally, there are unobserved variables that cannot be identified, including behavior, trust in modern health, expectations of health care needs, and health-seeking behaviors, which also affect out-of-pocket spending.

Conclusion

From the regression results using PSM-DID, it was found that the implementation of BPJS Kesehatan had an impact on an increase in out-of-pocket expenses of 26%. The increase in out-of-pocket expenses was due to the increase in the number of outpatient and inpatient visits, as well as changes in behavior from the treated group to make more frequent visits, especially for inpatient visits. The increase in the number of visits is accompanied by the fact that BPJS Kesehatan is still not used during outpatient or inpatient treatment because BPJS Kesehatan owners do not know how to use the facility, long service waiting times, inactive cards, other insurance, no transportation costs when going to do treatment and other reasons. From several control variables added to strengthen the estimation model, households in the provincial area of Java-Bali have higher out-of-pocket expenditures than outside the province, as well as households in rural areas have higher out-of-pocket expenditures than in urban areas. On the other hand, the ownership of insurance other than BPJS Kesehatan, both private insurance and from companies, causes lower out-of-pocket expenses compared to households that only have BPJS Kesehatan. Thus, the existence of additional insurance other than BPJS Kesehatan can contribute to reducing out-of-pocket expenses.

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