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The impact of national health insurance on the access of maternal care service for women in Indonesia

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ABSTRACT

Background and purpose: The government of Indonesia has established national health insurance or *Jaminan Kesehatan Nasional* (JKN) since 2014 to meet the basic needs of appropriate public health, including women. However, maternal mortality rate in Indonesia is recorded to be higher than peers and decreases slowly. This paper aims to elaborate the impact of the national health insurance on the access to maternal care and services for women in Indonesia.

Methods: This paper employs a secondary data analysis by using Indonesian National Socio-Economic Survey (SUSENAS) 2017 and applies propensity score matching methods. Within the sample, a treatment group is a group of women who are registered in the JKN, including the PBI and non-PBI participants, while the control group is a group of women who are not registered in the JKN, women who have other insurances and those who do not have any insurance. The total sample of the treatment group is 18,886 and the control group is 19,559 participants. There are two outcome variables in the analysis which reflect the access of health care and health services, which are *child-birth service facility (CBSF)* and *Birth Attendant (BA)*, respectively.

Results: The result shows that women who are the member of the JKN have greater probability in accessing formal health care and services during the maternity process. They tend to deliver babies in hospital and get helped by medical personnel. Moreover, by comparing the impact of the JKN in the rural and urban areas, the result shows that the probability of women in rural area to access health care and services is higher than women in cities.

Conclusion: Based on these results, we can conclude that the JKN has improved the access for health care as well as medical services for maternity, in both rural and urban areas. However, the JKN program improvements are still needed, particularly in ameliorating the quality of JKN program, as well as expanding the number of participants to achieve a higher impact.

Keywords: national health insurance, policy impact, health care and services, matching methods
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INTRODUCTION

In January 2014, the Government of Indonesia established national health insurance or *Jaminan Kesehatan Nasional* (JKN). The JKN is part of the national social security system which is implemented using a mandatory social health insurance mechanism based on Law number 40 of 2004. The aim is to meet the basic needs of appropriate public health given to everyone who has paid contributions or whose contributions have been paid by the government.[1]

The JKN participants are Indonesian citizens and foreigners who have stayed in Indonesia for at least six months. There are two types of participants, which are participants who receive the insurance premium assistance from the government (PBI) and participants who pays full insurance premium (non-PBI). The PBI participants are people who are classified as the poor and which are determined by government act. Then, the non-PBI participants are people who are not classified as the poor, such as workers, government staff, and employers. By having the JKN, the participants can get medical and non-medical services from health service providers who have already been a government partner. The health services include inpatient and outpatient services, as well as the drug provision, surgery and childbirth services.[2]

Pregnancy is one of the most important stages in human life. Ensuring a steady process of giving birth to a baby is crucial since the uncomplicated process results in the birth of a healthy child. One of the indicators that reflect the country's health condition is the maternal mortality rate. According to the World Health Organization (WHO),[3] the maternal mortality rate in Indonesia is higher relative to peer countries. In 2017, the UNICEF estimated there were 177 maternal deaths per 100,000 live births in Indonesia.[4] The WHO also reported that the main reasons for maternal deaths in Indonesia are due to bleeding, eclampsia and infection. Moreover, statistics shows that 11 percent of rural women in Central Java consult and receive birth care from a traditional birth attendant.[3]

WHO reported that a large number of families in Indonesia choose traditional

birth attendants (*dukun anak*) because the fee is cheaper than going to the hospital or getting help from midwives.[3] Besides, the families, particularly who live in the rural area, have poor access to formal health care. Due to these reasons, women tend to choose the traditional methods when delivering a baby and eventually increase the risk of bleeding and death. By implementing the JKN, the government of Indonesia tries to improve the access for medical care and services, particularly for expecting mothers. Pregnant women can have routine medical check-ups during pregnancy, ultrasonography, birth service and caesarean section under particular circumstances. These services are covered by the JKN at the hospitals or the clinics which already had an agreement with the Social Security Administrator for Health or *BPJS Kesehatan.*[5]

This paper evaluates the impact of having national health insurance on the access to maternity care services, particularly for women during the process of labour. It also examines the heterogeneity effect of having the JKN in the rural and urban areas to find out the differences in health access. In measuring the impact of the JKN, this paper employs matching method technique to distinguish the probability of women who have and do not have JKN in accessing maternity care services.

This paper is different from the previous studies because the impact of the national health insurance in Indonesia is calculated at the national level on a specific group, which is women. While, previous studies mostly measure the relationship between the JKN and improvement in health care in general participants or specifically only to the poor people. By conducting this study, hopefully, it can help the government of Indonesia in analysing the effectiveness of the JKN and contributes to the literature about the impact of national health insurance in helping women, particularly in the process of labour.

METHODS

This paper uses secondary data from The 2017 Indonesian National Socio-Economic Survey (SUSENAS 2017) that was published by the Statistics Bureau of Indonesia. The SUSENAS provides data for socio-economic aspects and fulfilment of life necessities, encompassing health indicators for households and individuals.[6] In this paper, the analysis uses individual data and focuses on women in the range of 15-49 years old who delivered a baby in the last two years. The analysis uses cross-sectional data that includes 38,485 samples.

The treatment variable is the JKN implementation policy. Within the sample, a treatment group is a group of women who are registered in the JKN, including the PBI and non-PBI participants. This paper uses both samples to isolate the impact of the JKN on women in general, not specifically on poor women. Then, the control group is a group of women who are not registered in the JKN, women who have other insurances and do not have any insurance. From the SUSENAS 2017, the total sample of the treatment group is 18,886 and the control group is 19,559 participants.

There are two outcome variables in the analysis which reflect the access of health care and health services, which are *Child Birth Service Facility (CBSF)* and *Birth Attendant (BA)*, respectively. *CBSF* is a binary variable that shows the place of the mother when giving birth to a child. *CBSF* has a value of 1 (one) if a mother delivered a baby in a public hospital, private hospital, clinics, public health centre, or village health centre. Then, the *CBSF* has a value of 0 (zero) if a mother delivered a baby at their house or other places. The second outcome variable is *BA*. The *BA* indicates the access to medical personnel during the maternity process. The *BA* has a value of 1 if the mother was assisted by obstetricians, doctors, midwives, or nurses. Then the *BA* has value of 0 if the mother was helped by traditional birth attendants, others, or without help.

Furthermore, there are five covariates in the model which are education, age, health condition, contraception utilisation, and expenditure per-capita. According to UNICEF, wealth, mother's age and mother's education are some factors which influence disparities in maternal and health intervention in Indonesia.[7] Based on that, this paper includes women's age and women's education as covariates. Moreover, this paper encompasses expenditure per-capita as a proxy of wealth.

Furthermore, other two covariates are chosen because these variables are plausibly related to both treatment assignments and outcomes. First, health condition. This condition is reflected by sick experiences in the last 30 days, such as fever, cough, cold, diarrhoea, or chronic diseases. Intuitively, the healthier the women, the less they go to the hospital and get medical services. The health status of women can also be a consideration to have JKN or not. Second, contraception utilisation. In Indonesia, women have to go to the hospital and consult with the doctor when they are starting to use contraception. When the women have experienced to use contraception before they are pregnant, they tend to go to the hospital and get the service from the doctor because they are well informed about how to take care of their pregnancy. So, the probability to access the health care and services is greater than the women who have never had any experiences in using contraception. Besides, due to the increase of knowledge, it can also affect the decision of having health insurance or not.

As mentioned before, the registration of PBI and non-PBI participants are not randomly assigned. The government chose the PBI participants based on particular specifications stated on the law. Then, the non-PBI participants have to register themselves to BPJS-KS to get the JKN.[2] This condition potentially leads to selection bias. According to Elliot, et.al.[8] selection bias is any source of bias that appears when the initially random sample has been chosen in a way that allows cases to come out, or cases selected with unequal possibilities, in an unintentional way. Selection bias contributes to a higher probability of being selected for some group of women than others. In this case, selection bias might associate with the characteristics of the women that can affect both the treatment assignment and outcome. Some factors such as income, access to information, religions, or provinces could affect the women in participating in the JKN and also affect access to health care.

This paper tries to solve the issue

by using matching method techniques. Matching estimators attempts to improve the simple regression estimators by accounting for missing counterfactuals.[9] There are some types of matching methods such as regression adjustment (RA), inverse probability weighting (IPW), propensity score matching (PSM) and nearest-neighbour matching (NNM). This paper utilised PSM as a method to estimate the average treatment effect. PSM method would match treated unit with a control unit based on the propensity score, different from NNM method that used covariates value. In the PSM method, average treatment estimates are the difference in matched pair outcome and average across the entire sample of units and just treated units respectively.[9] Pairing process in the PSM method not only one to one matching, but it could be one to many. Then, the unmatched observation would be dropped. The propensity score for this analysis is estimated by using *probit* function since both of the treatment and the outcome is binary variables. In this paper, the impact of the treatment is also measured by NNM and IPWRA as comparisons to the PSM results. Finally, PSM is chosen because statistically it is the best model compared to IPWRA and NNM.

There are two assumptions which underline the matching methods, which are unconfoundedness and overlap assumption. Unconfoundedness means that conditional on some set of observed covariates, the treatment assignment is independent of potential outcomes or as good as randomly assigned. Under the assumption of unconfoundedness, the average treatment effect (ATE) can be estimated by OLS:

$$Y_i = \tau_i T_i + \beta_i X_i + \varepsilon_i$$

where Y is an outcome variable, τ is average treatment effect (ATE), T is a treatment variable, X is covariates and ε is error term. Then, the overlap assumption means that all values of the covariates in the model are treated and control units. Under the unconfoundedness and overlap assumptions, treatment effect can be estimated by OLS:

$$Y_i = \tau_i T_i + \beta_i X_i + \gamma T_i (X_i - \overline{X}) + \varepsilon_i$$

where Y is an outcome variable, τ is ATE, T is treatment variable, X is covariates, $\bar{}X$ is a mean value of covariates, and ε is error term.[9]

In this paper, there are two models which estimate the impact of the JKN on maternity care services for women during the labour process. In Table 1, Model 1 attempts to capture the impact of the JKN on the access of health care, with the *CBSF* as an outcome variable. Model 1 uses five covariates which are education, age, health condition, contraception utilisation and expenditure per-capita. Then, Model 2 attempts to capture the impact of JKN on the access to birth attendants, with the *BA* as an outcome variable. Model 2 uses the same covariates in the Model 1. Furthermore, this paper extends the model by examining the treatment heterogeneity effect across the rural and urban areas.

RESULTS

Table 2 shows the summary statistics of all variables used in this paper. Briefly, within 38,485 women in the sample, almost half of them are registered as JKN members and the average age profile is 29 years old. Furthermore, around 75% of them tend to deliver the baby in formal health care centre such as public hospital, private hospital, clinics, public health centre, or village health centre. In line with that, 97% of them get assistance from medical personnel, such as doctor, midwife or nurses (Table 3).

Moreover, Table 3 shows that there is approximately a quarter of women within the sample who had delivered a baby at home and have not accessed the health care during the process of giving birth. Moreover, there is around 8 percent of women within the sample had used the service of traditional birth attendants and 0.2 percent delivered the baby without help. These facts show that health care and health services access for women in Indonesia needs to be improved to fulfil the basic needs of society.

Table 4 shows that the probability of women who have the JKN is 7.6 percent higher than the women who do not have JKN in accessing health care during the time of giving birth. In other words, the JKN participants tend to give birth in the hospital, public health centre or clinics than traditional birth attendants. Similarly, the probability of women who have the JKN is 2.9 percent higher than the women who do not have JKN in accessing the birth attendant services during the time of giving birth.

Table 1. Variables in the Economic Model Specification

Model	Outcome	Covariates
Model 1	Child Birth Service Facility (CBSF)	Mother's Education, Mother's age, Per-capita Expenditure, Contraception Utilisation and Health Condition
Model 2	Birth Attendant (BA)	Mother's Education, Mother's age, Per-capita Expenditure, Contraception Utilisation and Health Condition

Table 2. Summary Statistics

Variables N=38,485	Mean	Standard Deviation	Min	Max
JKN (%)	49.1			
CBSF (%)	74.7			
BA (%)	90.6			
Mother's education (years)	9.482	5.210	1	21
Mother's age	29.807	6.445	15	49
Per-capita expenditure	847898.90	701390.40	88970.24	1.65e+07
Contraception (%)	73.7			
Health condition (%)	20.6			

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Table 3. Distribution of Place of Giving Birth and Birth Attendants

Place of giving birth	Percentage
Hospital	26.68
Primary Clinics	16.61
Public Health Centre (*Puskesmas*)	12.80
Sub Public Health Centre (*Pustu*)	2.23
Secondary Clinics (*Praktek Nakes*)	9.59
Village Health Centre (*Poskesdes*)	4.84
House	24.73
Others	0.53
Birth Attendant	**Percentage**
Obstetricians	25.67
General Practitioners	1.46
Midwives	62.52
Nurses	0.94
Traditional birth attendants (*dukun anak*)	7.90
Others	1.34
Without help	0.17

Table 4. The Average Treatment Effect (ATE) Estimation for General Model

Outcome	ATE (SE)	Number of Observation
Model 1: CBSF	0.076* *(0.005)*	37,838
Model 2: BA	0.029* *(0.003)*	37,838

ATE=average treatment effect
**significant in 1% level*

Table 5. Average Treatment Effect (ATE) Estimation in Rural and Urban Areas using PSM

Outcome	Rural ATE(SE)	Urban ATE (SE)
Model 1: CBSF	0.096* (0.008)	0.039* (0.006)
Model 2: BA	0.031* (0.005)	0.015* (0.003)
# of observations	21,893	15,945

ATE=average treatment effect
**significant in 1% level*

Moreover, this paper compares the impact of having the JKN on the access of maternity care services for women during the time of giving birth in the rural and urban areas. The result in Table 5 shows that the impact is positively significant, both in the rural and urban areas. However, there is a heterogeneity impact of having the JKN between these two areas. To be more detailed, in the rural areas, the probability of women who have the JKN is 9.6 percent and 3.1 percent higher on accessing health care and health services, respectively.

Furthermore, in the urban areas, the probability of women who have the JKN is 3.9 percent and 1.5 percent higher on accessing the formal health care and health services than the women who are not the JKN's participants, respectively. In other words, the JKN can improve the access for women to give birth in formal health care and to get help from medical personnel in both rural and urban areas. By comparing the impact in the rural and urban areas, Table 5 shows that the ATE is greater in rural than in urban areas for health care and health services access.

DISCUSSION

The result shows that the JKN has improved the access for women to get maternity services, both for health care and birth attendants. The finding is in line with theory, where health insurance protection can reduce financial barriers and lead to an increase of health services usage. This result is also in-line with the BPJS-KS statistics[10] that there was a significant increase in health facilities that works together with the BPJS-KS. As of August 2019, there were 2,436 primary health facilities (e.g.: hospital) and 23,129 secondary health facilities (e.g.: community health centres, clinics). These numbers increased from 1,727 units and 18,644 units since 2014, respectively.

Furthermore, by having the JKN, women tend to have medical assistance during the labour. The doctors, midwives, or medical assistants will help the expecting mother if they need to have emergency treatments and eventually reduces the risk of complications or deaths. However, the ATE estimation in Model 2 is lower than in Model 1. It means that the probability of women to access health care (hospital, clinics, etc) is higher than the probability to access birth attendants. This issue is related to the distribution of medical personnel among provinces, particularly in remote area. According to the BPJS-KS statistics,[10] in 2016, there were 740 public health centres in 27 provinces that do not have doctors or general practitioners. Three provinces which have public health centres without doctors are mostly located in the eastern part of Indonesia.

Then, the higher impact of JKN in the rural areas might happen because most of the big cities in Indonesia already have the sufficient number of health care and services, so this mandatory health insurance policy might not be impactful to the urban condition. The urban women tend to have a higher per-capita

income, so they might choose private insurances rather than the JKN. Besides, the JKN procedures seem to be more complicated than private insurance, since some studies often suggest improving the responsiveness of the services in the health care that are BPJS-KS' partner. According to Lianti, et al,[11] 44.7 percent of the patients who are the JKN's participants and had obtained the service in Islamic Hospital in Surabaya which is located in the capital of East Java, expressed dissatisfaction with the JKN service procedures. The study suggests providing services quickly, precisely and responsively to all patients.

The previous study shows that a national health insurance scheme can improve the access to health care and services. In Ghana, women who have insurance have a lower probability to face complication and infant death.[12] Besides, they have a higher probability to give birth in a hospital with certified professionals. The insurance members also get more comprehensive postnatal services and vaccinations. In Rwanda, mutual health insurance also causes higher utilisation of the health service.[13] According to the study, health insurance has improved many households in Rwanda to seek healthcare service when it needed, particularly for the poor and uninsured. The paper finds that the households which have insurance use health services two times higher than those without insurance. Furthermore, the health insurance program for the poor in Indonesia (*Jamkesmas*) has improved the health facility and skill birth delivery among the poor women. *Jamkesmas* is one of the social security programs that is implemented by the government of Indonesia from 2005 until 2007 for the poor and near-poor only. The result shows that the poor women with *Jamkesmas* have 19 percent more probability to get health facility delivery and have 17 percent more likely to get skilled birth assistance.[14]

Related to the robustness of the result, this paper conducts three kinds of checking methods, which are overlap assumption, covariate balance and heterogeneity checking. The matching methods need to satisfy that, on average, the characteristics of women which are determined by the covariates are balanced. If there is unbalance covariance, there might be a case of selection bias or heterogeneity bias that make the ATE estimation is not quite good.

First, by doing overlap assumption checking, there is strong evidence that the overlap assumption is satisfied. Second, by checking the covariates balance, the results show that most of the covariates are balance but some of them are not. The covariates are imbalance because the standardised difference is not close to zero and the variances are not close to one. In the general and rural models, two variables are not balance, which are mother's education and per-capita expenditure. Then, in the urban model, only mother's education that is not balance. Third, heterogeneity bias checking. The result show that the ATT is not quite different from ATE and the number is within the 95% of the confidence interval in all models. The results suggest that there is no heterogeneity bias.

However, the results need to be considered as a short-term impact since the JKN coverage is still expanding and the BPJS-KS is still improving the program. Besides, there are some parts of this study that can be improved in the future. First, there might be unobservable variables related to treatment and outcome but not available in the 2017 National Socio-Economic Survey, such as the distance from home to health care and services. Second, some covariates are not balanced so the ATE estimation might not quite robust. Third, the future study might combine several years of National Socio-Economic Survey data and produce the analysis based on panel data to see more comprehensive impacts. Another caveat is related to the causal effect of insurance and health care utilisation. According to Sparrow, et al[15] there is fundamental issue that disrupt the impact analysis of health insurance since there is a simultaneous relationship between insurance and demand for health care. Moreover, since the registration for the JKN membership is not random and depends on individual compliance (non-PBI participants) or is targeted by the government (PBI participants), the causal effect of health insurance on health care and health service utilisation cannot be seen as a straightforward effect.

CONCLUSION

This paper explores the impact of national health insurance in Indonesia (JKN) on the access of health care and services for women, particularly during the time of giving birth. By using the 2017 National Socio-Economic Survey and employing matching methods as tools to measure the impact, this study found that on average the probability of women who have the JKN is higher than women who do not have JKN in accessing the health care and services. Moreover, by splitting the data into the urban and rural areas, this study concludes that the positive impact of having the JKN on access to formal health care and health services is greater in the rural than urban areas. In other words, the probability of the JKN participants who live in a rural area to deliver a baby in a formal healthcare is higher. Furthermore, the chance to have assistance from medical personnel such as obstetricians, doctor or midwives during the giving birth process is also higher. Based on the result, we can see that the impact of JKN in improving the access for maternity service is positive but the room for improvement is still open. The government, in this case Ministry of Health and BPJS-KS, should ameliorate the quality of JKN program, as well as expanding the number of participants to achieve a higher impact.

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AUTHOR CONTRIBUTION

MR designed and conducted the study as well as managed the data. MR also analysed the data and prepared the manuscript.

CONFLICT OF INTEREST

The author declares that she has no competing interests.

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