



## INDONESIAN NATIONAL HEALTH INSURANCE (JKN) AND MATERNAL CARE UTILIZATION

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### Abstract

*This study uses Indonesian Family Life Survey data to estimate the association of health insurance under Jaminan Kesehatan Nasional (National Health Insurance) with maternal health care utilization. The data for this research is from the IFLS 5. The estimation uses a negative binomial regression. The results of the prenatal care estimation show that the explanatory variables have the expected signs. Key variables in the analysis, which are any health insurance and national universal health coverage insurance ownership, positively and significantly associated with maternal healthcare utilization. Having any insurance and national universal health coverage increases a mother's expected prenatal care usage. The results highlight the importance of having any or national universal health coverage insurance for a mother who seeks prenatal care services when she gets pregnant, thus contributing to healthier pregnancy outcomes. There has been limited research undertaken in Indonesia relating to the impact of health insurance on the use of maternal health care services, especially that explores the health insurance and the utilization of maternal health care services using an appropriate method.*

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## INTRODUCTION

Indonesia is currently at an important stage in developing its health system. Health systems are widely considered important in improving the population's health. Indonesia experiences a declining rate of fertility and an increase in life expectancy, meaning that the structure of the population has changed concerning family size and longevity. These changes will require an improved and more expensive health system. On the other side, the high disparity in health outcomes among regions and across socioeconomic groups is an important issue that must be confronted. Therefore, the distributional implication of Indonesia's health system among the regions and across socioeconomic groups needs particular attention because it is one of the important indicators of whether the health system has been successfully applied.

One of the critical keys to a country's health system is the role of the country's spending on health. In 2021, total government expenditure in Indonesia on health care, in general, increased approximately 2.6 times more compared to 2016. The 2011-2015 period also shows the same pattern (Wardhana & Kharisma, 2019). At the same time, public healthcare expenditure was less than private healthcare expenditure (Ministry of Finance, 2021). Out-of-pocket expenses were high at more than 30 percent in 2019 (World Bank, 2019). This number exceeded the World Health Organization's (WHO) recommendation by a maximum of 20 percent. High out-of-pocket expenses (OOP) are common in Indonesia and affect the poor disproportionately. The high OOP can lead to people opting for less expensive traditional healing treatments performed by unskilled practitioners, or it may lead to using more over-the-counter medications instead of searching for professional health treatment. It also suggests that there is still a high financial burden on individuals to access adequate healthcare services, possibly leading to poor health outcomes in Indonesia.

Concerning maternal health outcomes, currently, Indonesia has failed to meet the Millennium Development Goals (MDGs) on maternal health development with a stubbornly high maternal mortality rate. Indonesia aims to reduce maternal deaths, with only 102 per 100,000 live births in 2015. UNICEF reported that in 2012 that Indonesia's MMR remained above 200 per 100,000 live births (UNICEF Indonesia, 2012), but then in 2015, it reached 305 per 100,000 live births (Badan Pusat Statistik Republik Indonesia, 2016).

One reason for the slow progress in MNCH indicators in Indonesia is the low utilization of pregnant women in modern healthcare facilities during their pregnancy. The United Nations Children's Fund (UNICEF Indonesia, 2012) summarizes some indicators of how low maternal healthcare utilization is in Indonesia. Based on the Indonesia Demographic and Health Survey (DHS) 2017 report in the past five years, preceding the survey, only 74 percent of live births were delivered in a health facility. The IDHS shows that 91 percent of live births were delivered with the assistance of a skilled attendant. Moreover, only 77 percent of women aged 15-49 reported that in the last delivery, they did four times antenatal care visits during pregnancy as the Ministry of Health recommended (Demographic Health Survey, 2018).

The main issues of maternal and child health care (MNCH) utilization in Indonesia are a financial barrier for poor families to utilize modern health care. A study from West Java, Indonesia, shows that higher healthcare expenditure is associated with lower infant mortality rates (Wardhana et al., 2022). The high out-of-pocket expenditure for maternity care brings welfare consequences, especially for the poor. Bonu et al., (2009) use the term 'Catastrophic' Maternal Health Care to examine the effect of maternal healthcare on the household economy. It occurs when maternity care spending exceeds a certain amount of household capacity to pay. This may consequently also push them into poverty (Bonu et al., 2009). The household may borrow to finance its health expenditures, leading to long-term debt. This causes the loss of opportunity to invest in human capital and traps them in poverty. The households that have some savings may use it or sell their assets or cut back their consumption for medical expenses.

Another way for a household to avoid paying for maternity care is going to Traditional Birth Attendants (TBA), which offer lower costs. However, TBA has not prepared for complicated birth cases.

Various other factors may influence the low rate of maternal healthcare services utilization in Indonesia. First, there is a limited supply of quantity and quality healthcare providers, especially in rural and non-Java and Bali regions (Laksono et al., 2023; Sambodo et al., 2021). The insurance programs used in health care facilities located in capital cities of provinces or districts are not affected by distance and transportation problems compared to those in remote areas that may prevent sick people from receiving health care. For example, the data from Indonesia Demographic Health Survey (IDHS) 2007 (Demographic and Health Survey, 2007) shows that among 41 percent of women who reported at least having one problem accessing a maternal health care service state that the problems come from the distance (15 percent) and transportation (11 percent) (Demographic and Health Survey, 2007). Moreover, these constraints also affected the families who accompanied the mothers. As a result, women sought medical care from the less-trained providers available in remote areas, who were not equipped to deal with pregnancy and birth complications.

Out-of-pocket expenses often lead to inadequate prenatal care visits for poor women. In response, many programs provide financial assistance through insurance, vouchers, or subsidies to improve the use of services and promote infant health. Targeted programs, such as Medicaid in the United States, are very common in developed countries and provide free services for low-income families to improve infant health by increasing the quantity and quality of services for women (Kaestner, 1999). Similar programs are increasingly being implemented in developing countries, such as Bangladesh, Indonesia, Nepal, and Turkey (Celik & Hotchkiss, 2000; Suci, 2006; Bhatia & Gorter, 2007;; Johar, 2009; Nguyen et al., 2012; Powell-Jackson & Hanson, 2012;).

Despite the growing data on the impact of financial assistance and related programs, the evidence shows mixed results. For example, the study by Kaestner (1999) on U.S. Medicaid found that women under Medicaid made fewer prenatal care visits and were less likely to have adequate care (as defined by the Kotelchuck index (Kotelchuck, 1994)) than those with private insurance. He argues that this is mainly due to the uninsured and Medicaid recipients beginning care later than the privately insured, although the difference was very small. Furthermore, findings relating to Medicaid and the quality of prenatal care suggest no evidence that Medicaid recipients received less quality care than the privately insured.

The experience in developing countries also shows mixed results. A voucher program in Bangladesh significantly increased the utilization of maternal health care services (Nguyen et al., 2012) through incentives for poor mothers to use antenatal, delivery, and postnatal services. Eligible women were granted access to service for free. Participating healthcare providers also benefited from the program. Results from the evaluation of the program found that, compared to women in a control group (no voucher program), the treatment group had a 46,4 percentage point higher probability of using a qualified provider and a 13,6 percentage point higher probability of delivery in a health care institution. However, the effect of this demand-side financing through a healthcare card has been more limited in Indonesia (Johar, 2009), for which the author provides some explanations. First, the demand for public health care service is inelastic; i.e., given a price change, there is little shift in the quantity of demand. Second, the variation in the level and lack of precise information about the program's scope and objectives may have contributed to the program's little impact on healthcare service use. Last, where an inadequate healthcare system and public health facilities are limited, an increase in demand cannot be accommodated. This leads to the selection of self-medication by the target community in lieu of seeking public health care, causing underutilization of any such support program. It is important, therefore, to improve the health system in tandem with any demand-side program.

There has been limited research undertaken to date in Indonesia relating to the association of health insurance with the use of maternal health care services, especially that explores the health

insurance and the utilization of maternal health care services, unfortunately, leaves a wide gap in the field of research. By using appropriate econometrics modeling, unbiased estimates that can affect the utilization of prenatal care services can be established. Therefore, the study tries to answer the questions and fill the gap in current studies on the relation of health insurance with the utilization of prenatal or maternal health care. Those questions are, firstly: "Does the health insurance status of the mother associated with the utilization of prenatal care after the implementation of *Jaminan Kesehatan Nasional* (JKN – Indonesian National Health Insurance)?" Secondly, "To what extent the relationship of the health insurance status of the mother influences the utilization of prenatal care after the implementation of JKN?"

This study contributes to the literature on maternal health care in developing countries in several ways. First, there has been limited research undertaken in Indonesia relating to the association of JKN with prenatal care utilization. Previous studies mainly select one health insurance or another social protection program as a subject. For example, in the case of Health Insurance for the Poor or Asuransi Kesehatan untuk Keluarga Miskin (ASKESKIN) (Samarakoon & Parinduri, 2015; Wang et al., 2017), Jaminan Kesehatan Daerah or JAMKESDA (Hartwig et al., 2019) and Conditional Cash Transfer program or Program Keluarga Harapan (PKH) (Kusuma et al., 2016; Olken et al., 2014; Triyana, 2016). Meanwhile, we use the combination of multiple insurances that are included in JKN system. This would be worth searching on how significant the effects of this merger are on prenatal care utilization. Second, we use the latest Indonesian Family Life Survey (IFLS) wave 5 (IFLS5) that captures the condition after the implementation of JKN. To the best of our observations, previous research studies use older data. For instance, the Indonesian Demography and Health Survey (Samarakoon & Parinduri, 2015; Wang et al., 2017), Survey Sosial Ekonomi Nasional (SUSENAS – National Social Economic Survey) (Hartwig et al., 2019), and World Bank field experiment (Kusuma et al., 2016; Olken et al., 2014; Triyana, 2016). Therefore, the results of this study can contribute to recent policy decision-making regarding the implementation of the universal health insurance policy.

## METHODS

The data for this research is from the IFLS 5. IFLS 5 covered respondents around September 2014 to early 2015 information. This most current dataset is used to focus analysis on the implementation of JKN policy. The surveys were conducted by the RAND Corporation and three Indonesian institutions, the University of Indonesia, Universitas Gadjah Mada, and Survey METER.

The IFLS is a large-scale national panel/longitudinal survey that provides extensive data at three levels (individual, household, and community). It includes the characteristics of communities (e.g., health and education facilities) where the individuals and households reside. The information was collected through face-to-face interviews and conducted by enumerators, whom healthcare workers accompanied to complete most of the questions. Since interviews were held in the local language, the reliability of responses is high. The data can be accessed through the RAND Corporation website (<http://www.rand.org/labor/FLS/IFLS>). The sampling and survey methods have been explained in detail elsewhere (Strauss et al., 2016). The data is collected from Indonesia's 13 most populated provinces, representing more than 80 percent of the Indonesian population.

The data that will be used in this research focus on pregnancy indicators. For this purpose, we will use information from IFLS5 relating to ever-married women aged 15 years or older. Besides that, the study will employ the information related to the socioeconomic characteristics of the mothers, mothers' health endowment, the residential of the mothers, and the information on health insurance as key variables. The total sample for this analysis is 5.469 pregnancies for the analysis of mothers are having any health insurance and 5.325 pregnancies for the analysis of they are having JKN insurance.

Most previous studies have applied the number of prenatal care visits and the timing of the visit to estimate the factors that influence prenatal care utilization. However, the overall utilization of prenatal care is also important, and the month of initiation is only part of the overall prenatal care visits. This study, therefore, will use the total number of visits during pregnancy.

The estimation of prenatal care utilization will follow equation (1) that, specified as:

$$PC_i = z_i'\alpha + \varepsilon_i \dots\dots\dots(1)$$

The dependent variable ( $PC_i$ ) in equation (1) is prenatal care. We estimate equation (1) using the total number of visits as the dependent variable. Furthermore,  $z_i$  in equation (1) is a vector of explanatory variables, including socioeconomic and demographic factors; the mother's health endowment; the household's awareness of healthcare facilities' access to prenatal care services; whether the mother made any visits to a facility in the same village where she lives; whether the mother resides in urban and rural, whether she resides in Java or non-Java region, and where the mother resides in the region of JKN insurance to capture the differences in the accessibility of health care facilities and population density.

In the regression of equation (1), representing the total number of prenatal care visits as a dependent variable, the variable is a count variable, in which the number takes on non-negative integer values:  $\{0, 1, 2, \dots\}$ . For this type of dependent variable, the linear model may not provide the best coefficient estimates over all values of the explanatory variables (nevertheless, it is useful to start with a linear regression) (Gardner et al., 1995).

A count variable does not have a normal distribution since the normal distribution relates to continuous variables that can take on all values. A Poisson distribution may be more appropriate for count data, taking on fewer values and bounded at zero. In this analysis, the objective is to establish the effect of explanatory variables,  $x$ , on the dependent variable,  $y$ , prenatal care visits (PC); therefore, we will consider the Poisson distribution conditional on  $x$ . An important assumption in the Poisson distribution is the equality of the conditional variance and mean:  $\text{Var}(y|x) = E(y|x)$ , where  $y$  represents the dependent variable which is PC in equation 1. This restriction is difficult to maintain and is often rejected in many applications. A weaker assumption is  $\text{Var}(y|x) = \sigma^2 E(y|x)$ , where  $\sigma^2 > 0$  is an unknown parameter. When  $\sigma^2 = 1$ , we obtain the Poisson assumption; meanwhile, if  $\sigma^2 > 1$ , this is referred to as overdispersion since the variance is greater than the mean for all  $x$  (Cameron & K. Trivedi, 2005). In terms of the weaker assumption, we need to adjust the Poisson maximum likelihood estimator (MLE) for standard errors from the Poisson estimation. The distribution for  $y$  given  $x$ , where the weaker assumption holds with overdispersion, is known as a Negative Binomial, and is estimated using a quasi-maximum likelihood estimation (QMLE) (Cameron & K. Trivedi, 2005).

The model: if  $y \sim \text{Poisson}[\lambda v]$  and  $v \sim \text{Gamma}[\mu = 1, \sigma^2 = \alpha]$

then  $y \sim \text{Negative Binomial}[\mu = \lambda, \sigma^2 = \lambda + \alpha\lambda^2]$ .

Probability mass function:  $\Pr[Y = y|\lambda, \alpha] = \frac{\Gamma(\alpha^{-1}+y)}{\Gamma(\alpha^{-1})\Gamma(y+1)} \left(\frac{\alpha^{-1}}{\alpha^{-1}+\lambda}\right)^{\alpha^{-1}} \left(\frac{\lambda}{\lambda+\alpha^{-1}}\right)^y$ .

Mean and variance:  $E[y] = \lambda$  and  $\text{Var}[y] = \alpha\lambda^2$  (overdispersion: variance > mean).

The key variables in this study are the ownership of health insurance. The analysis divides health insurance variables into two categories. The first category is whether the individual has any insurance, and the second category is whether the individual has insurance under JKN scheme. The health insurance under JKN scheme includes all public insurance organized by the government (Askes, Askeskin, Jamkesmas, Jamkesda, *Jaminan Sosial Tenaga Kerja* (Jamsostek), *Jaminan Sosial Kesehatan Sosial* (Jamkessos), and BPJS Kesehatan - present health insurance scheme under the Law on the National Social Security System (*Undang-Undang Sistem Jaminan Sosial Nasional*)). The other explanatory variables included in the analysis are the socioeconomic and demographic factors of the mother. The

socioeconomic and demographic data include the mother's monthly per capita household expenditure, years of schooling, marital status, household characteristics (household index of welfare infrastructures), and the age of the mother at the end of pregnancy.

Per capita expenditure is very commonly used as a measure of income since the data relating to reported income are less reliable. For the analyses, we use monthly per capita household expenditure. The variable for this was transformed to take into account the relative level of expenditure of the sample population compared to the Indonesian population. We divided it into four groups of per capita expenditure: the lowest 25 percent, between 25-50 percent, the second highest 25 percent, and the highest 25 percent. Most previous empirical studies state that the formal education of the mother is one of the key variables explaining a mother's knowledge about health (Rosenzweig & Schultz, 1983; Guilkey et al., 1989; Raghupathy, 1996; Reichman & Florio, 1996; Celik & Hotchkiss, 2000; Abrevaya, 2001; Bloom et al., 2001; Currie & Moretti, 2003; Barber, 2006). Years of schooling of the mother are included in the analysis, given that those with a higher level of education are more likely to have greater health knowledge and, therefore, higher utilization of prenatal care.

We will use eight measures of household characteristics for this analysis. They represent the economic and the physical infrastructure of the household: (i) status of the house (self-owned, occupied (rent-free) or rented); (ii) whether the household has a television, (iii) whether food is stored in a refrigerator, (iv) use of electricity; (v) source of drinking water (mineral water, pipe water, electric or hand pump, well water, spring water, rain water, river/creek water, pond/fishpond, or water collection basin); (vi) disposal of garbage (collected in a trash can, burned, or disposed of into river/creek/sewer, in a yard and allowed to decompose, in a pit, in a forest/mountain, in sea/lake/beach, or in paddy/other field); (vii) drains its sewage (drain ditch (flowing), drain ditch (stagnant), permanent pit, into river, in side/backyard/garden, in pond/fishpond/lake/pool, in a hole (without permanent lining), paddy/other field, or sea/beach; and (viii) toilet facilities (own toilet with septic tank, own toilet without septic tank, shared toilet, public toilet, creek/river/ditch (without toilet), yard/field (without toilet), sewer, pond/fishpond, animal stable, or sea/lake). For each characteristic, we have created a dummy variable representing good and bad infrastructure; e.g., a dummy equal to 1 if the household utilizes electricity and 0 if otherwise. Subsequently, we add the eight characteristics, which become one representative number as an index ranging from 1 (lowest/worst status) to 8 (highest/best status), representing the household's physical infrastructure.

Other demographic variables include marital status and the age of the mother at the end of pregnancy. Since we use ever-married women as a sample, thus we differentiate marital status into married and unmarried, which unmarried includes divorced or widowed. Furthermore, the mother's age when she was pregnant is divided into three categories: mothers with age less than 25 years old, mothers between 25 to 35 years old, and mothers who have age more than 35 years old. This definition is generated to capture the differentiation between productive and unproductive ages of mothers for pregnancy.

The mother's health endowment is measured by her general health, BMI, whether she smoked prior to or during pregnancy, whether she had any pregnancy complications, and the number of chronic illnesses experienced by the mother. The derivation of the general health condition relates to the question in the survey, "In general, how is your health?" A dummy variable has been created from the response: equal to 1 if the mother responded as being 'very healthy' or 'somewhat healthy', and zero if the response was 'somewhat unhealthy' or 'unhealthy'. The derivation of BMI is from height (in centimeters) and weight (in kilograms) data and is calculated as weight divided by height squared. The height and weight measurements were taken by a health worker who accompanied the interviewer during the IFLS survey. A dummy of BMI has been created that represents a normal and not normal condition of BMI. For pregnancy complication variable, a dummy was created for a mother who experienced a complication during pregnancy. Complications during pregnancy include swelling of the feet or leg, difficulty of

vision during the day and/or night, vaginal bleeding, fever, convulsions and fainting, and premature labor. Furthermore, the number of chronic conditions derives from the question of whether the respondent experiences one or more of the common chronic situations: hypertension, diabetes, tuberculosis, asthma, other lung diseases, heart attack, liver, stroke, cancer, arthritis diseases, cholesterol, prostate, kidney diseases, any other stomach diseases, emotional diseases, and diseases related to memory. Order of pregnancy is also included in the model, which is whether the baby is from a first pregnancy. The other control variables are related to the household's awareness of the existence of modern healthcare facilities. Awareness indicates accessibility to facilities which may, in turn, influence the use of prenatal care services and identifies the type of facility. These variables also represent the availability of healthcare facilities within the community where the mother resides. The IFLS data include responses from spouses (asked on behalf of the entire household), whether they, themselves, knew the location of a health center (*Puskesmas*), public hospital, and/or private hospital.

Another relevant factor relating to accessibility to prenatal care is whether the mother made any visits to a facility in the same village where she lives. This may represent ease of access, thus increasing the use of the service. A dummy variable was created for the mother who visits prenatal care facilities in the same village where she lives. A dummy variable relating to the residence in an urban or rural area and whether the individual resides in Java or non-Java region are also included in the prenatal care model, which will reflect the community's infrastructure, which can influence the mother's access to such facilities. Finally, the variable that relates to the region of JKN insurance that may also represent the differences in the availability of health care facilities and accessibility is included in the analysis. The region of JKN insurance defines into five regions where. Region 1 has the highest availability of healthcare facilities and accessibilities. Regions 1, 2, and 3 include all provinces in Java Island, Sumatra, Bali, Sulawesi, and Nusa Tenggara Barat; Regions 4 and 5 include some provinces from Kalimantan Island and eastern Indonesia.

## RESULT AND DISCUSSION

By the beginning of 2015, 51,36 percent of the respondents in our sample had any insurance, either public and or private insurance (Table 1). Most are from the poorest (17,1 percent) and near-poor populations (14,37 percent). Table 1 confirms that respondents with any insurance are well-educated, with 17,88 percent being senior high school graduates. Besides that, the mothers in productive age (between 25-34 years old) have the most insurance (24,59 percent). It may be explained that mothers of this age are the mothers who may have more pregnancy experience than those from other age groups; therefore, the need to have any insurance for accessing prenatal care services is higher than that of other groups of age.

Based on health indicators such as BMI, general health status, whether a mother experienced pregnancy complications, and whether a mother had ever smoking experience, the statistics show that the ownership of any insurance comes from healthier mothers. Furthermore, a mother who lives in the urban area, resides in region 1 or 2 of JKN region, and is aware of the existence of modern health facility is also has a higher percentage of having any health insurance. Region 1 includes all provinces in Java Island, and Region 2 includes West Sumatra, Riau, South Sumatra, Lampung, Bali, and Nusa Tenggara Barat provinces that may show the highest availability of health care facilities.

The same statistics is also found for JKN ownership. This JKN insurance ownership includes the ownership of Askes (Health Insurance for a civil servant), Askeskin (Health insurance for poor people), Jamsostek (Health Insurance for Workers), Jamkesmas (Social Health Insurance), Jampersal (Health Insurance for Baby Delivery), Jamkesda (District Health Insurance), and BPJS Kesehatan (New Health Insurance Scheme).

**Table 1.**  
**Health Insurance Characteristics for Having Any Insurance**

Indicators		Have any Insurance (%)	Have JKN Insurance (%)
Real per capita expenditure	Poorest 25 percent	17,10	17,53
	Second poorest 25 percent	14,37	14,4
	Second richest 25 percent	12,10	11,32
	Richest 25 percent	7,79	6,97
Education level	No school	3,44	3,53
	Primary school	10,20	10,4
	Junior high school	10,99	10,99
	Senior high school	17,88	17,03
	College/university	8,85	8,09
Age of mother	Less than 25 yrs old	22,05	21,46
	25-34 yrs old	24,59	23,89
	35 yrs old and above	4,72	4,69
Marital status	Married	50,17	48,9
	Unmarried	1,19	1,15
BMI	Normal	26,99	26,29
	Others	24,37	23,76
Order of birth	First	36,11	35,21
	Others	15,25	14,84
Health condition	Healthy	40,48	39,49
	Unhealthy	10,88	10,55
Smoking experience	Yes	0,62	0,58
	No	50,74	49,46
Pregnancy complication	Yes	11,52	11,27
	No	39,84	38,78
Awareness of modern health facility location	Yes	51,14	49,82
	No	0,22	0,23
The health facility in the same Village	Yes	24,45	24,24
	No	26,92	25,8
Residence	Urban	32,2	30,97
	Rural	19,16	19,08
Region of JKN	Region 1	25,53	24,77
	Region 2	15,74	15,59
	Region 3	7,94	7,66
	Region 4	2,16	2,03
Region Java-outside Java	Java	23,35	22,78
	Outside Java	28,01	27,27

Source: Data Processed, 2024

Tables 3 and 4 show the results from the main estimations conducted for the study, all of which used negative binomial regression as the estimation method. The overdispersion test on the total number of prenatal care visits was conducted prior to the estimation, applying the negative binomial regression to examine whether the equidispersion of variance and mean exist. The result of this revealed that there



is overdispersion (t-value is 7,38 with p-value=0,000), implying that the variance is greater than the mean. In addition, the summary statistics indicate that the mean of the total number of prenatal care visits is 9,41, while the sample variance is 3,9972= 15,976 for sample 5.469. This is an indication of overdispersion in the prenatal care variable. The negative binomial regression, therefore, is more appropriate than the Poisson regression. Table 3 presents the results of the negative binomial regression, reported as incidence rate ratios (IRR) for the estimation of whether the mother has any health insurance, and table 4 for the estimation of whether the mother has JKN health insurance. In general, the estimated coefficients of explanatory variables have the expected signs. The OLS regression provided the same results as the negative binomial regression regarding the sign and significance of the estimated coefficients (detailed result is available upon request).

Our main concern about the results in Tables 3 and 4 is whether our estimation has an endogeneity bias. There are two possible sources of bias: (1) that having health insurance is due to the fact that one expects to get pregnant (that is, reverse causality), and (2) that we have omitted important variables defining prenatal care service utilization that are correlated with health insurance ownership. We argue against the first potential bias for two reasons. First, the proportions of prenatal care utilization are almost similar among those with health insurance than among those without health insurance, both for having any insurance and JKN insurance (see Table 2). The proportion of those who have insurance would be much larger than those without insurance if there were endogeneity problems. The second reason is that the majority of mothers with insurance have it mandatorily rather than choice – that is because they are civil servants, their husband as household head is civil servant, or they are poor or near-poor. Private health insurance is the only scheme because they expect to be pregnant. However, the proportion of those with private insurance is very small (see Table 2).

**Table 2.**  
**Prenatal Care Utilization and Health Insurance Ownership**

<b>Have Insurance</b>		<b>Have Prenatal Care Check-Up (%)</b>
Any Insurance	Yes	51,36
	No	48,64
JKN Insurance	Yes	50,05
	No	49,95
Private Insurance	Yes	5,70
	No	94,30

*Source:* Data Processed, 2024

This study includes as many determinants as possible to the estimations as control variables to overcome the second potential source of bias. This strategy does not prevent unobserved heterogeneity: a panel data analysis would have been a better approach. However, the dataset in this study does not allow for conducting that analysis. However, we try to include as many control variables in the estimations – including the socioeconomic characteristics of the mother, the mother's health endowment, and the indicators for accessibility of prenatal care services – which should minimize any bias caused by omitting important factors. Therefore, we argue that the result in Tables 3 and 4 are relatively unbiased.

Table 3 presents the results of the negative binomial regression, reported as incidence rate ratios (IRR) for the estimation of whether the mother has any health insurance, and table 4 for the estimation of whether the mother has JKN health insurance. Those results show that the relation of health insurance ownership, both having insurance and JKN insurance, is positive and statistically significant. Model in Table 3 shows that if a mother has any insurance, her rate of prenatal visits would be expected to rise by a factor of 1.0258, holding other variables constant. While for the model in Table 4 indicates that if a mother has JKN insurance, her prenatal visit will be expected to increase by a factor of 1.0234 after controlling for other factors.

**Table 3.**  
**Relation of any insurance ownership**

<b>Independent variable</b>	<b>Negative Binomial (IRR)</b>
Having any insurance	1,0258** (0,0109)
The health facility in the same village	1,0051 (0,0108)
Urban	1,0580*** (0,0120)
Region2	-0,9643 (0,0269)
Region3	0,8315*** (0,0249)
Region4	1,0264 (0,0355)
Region Java Island	1,1434*** (0,0309)
Constant	6,8290*** (0,6047)
Ln alpha	-3,1832*** (0,0638)
Alpha	0,0415 (0,0026)
Number of observations	5.469
Pseudo R <sup>2</sup>	0,0213

Standard errors in parentheses

Note: Estimation includes all control variables: HH index, per capita expenditure, years of education, age of mother when she was pregnant, marital status, the general health status of the mother, BMI, number of chronic diseases, smoking experience, pregnancy complication experience, order of pregnancy, and awareness of modern health facility location. The detailed result can be seen in Appendix 1. \*  $p < 0,10$ , \*\*  $p < 0,05$ , \*\*\*  $p < 0,01$

Source: Data Processed, 2024

The result in Table 4 gives a higher association than that of the model in Table 3. This is logical since having any insurance includes any private insurance, and some mother have both JKN and private health insurance. The results highlight the importance of having any insurance or JKN insurance for a mother who seeks prenatal care services when she gets pregnant, thus may contributing to healthier pregnancy outcomes. The results of this study are in line with the one of Vidyattama et al. (2014) for the case of outpatient care in Indonesia with a different dataset, where they found a positive significant influence of health insurance in Indonesia on the choice of outpatient care utilization.

The coefficients for the variables relating to the mother's socioeconomic indicators, such as years of education, age of mother between 25 and 35, and per capita expenditure above the poorest of the population level, are all highly significant and have the expected signs. These results are consistent with the findings from previous studies, which used different models (Raghupathy, 1996; Gwatkin, Bhuiya, and Victora, 2004; Sepheri et al., 2008). Meanwhile, married women are expected to have higher prenatal care usage than unmarried ones, yet there is no significant difference among them in prenatal care utilization.

In the equation relating to the model in Table 3 and model in Table 4, if the mother increased her years of education by one year, her rate of prenatal visits would be expected to rise by a factor of 1,004. Those from a higher income level are expected to have a rate of visits 1,040, 1,071, and 1,106 times that of the lowest-income women (below the 25<sup>th</sup> percentile) for a model in Table 3, and 1.040, 1.076, and 1,098, for a model in Table 4, respectively, holding all other variables constant. The significance of these variables indicates that women from better socioeconomic backgrounds are more likely to have better access to prenatal care services and, consequently, make more visits than others.

**Table 4.**  
**Regression Results of JKN insurance**

<b>Independent variable</b>	<b>Negative Binomial (IRR)</b>
JKN insurance	1,0234** (0,0109)
The health facility in the same village	1,0048 (0,0110)
Urban	1,0561*** (0,0121)
Region2	0,9600 (0,0275)
Region3	0,8363*** (0,0255)
Region4	1,0020 (0,0356)
Region Java Island	1,1399*** (0,03178)
Continue:	
Constant	6,8691*** (0,6120)
Ln alpha	-3,1883*** (0,0651)
Alpha	0,04124 (0,0027)
Number of observations	5325
Pseudo R <sup>2</sup>	0,0213

Standard errors in parentheses

Note: Estimation includes all control variables: HH index, per capita expenditure, years of education, age of mother when she was pregnant, marital status, the general health status of the mother, BMI, number of chronic diseases, smoking experience, pregnancy complication experience, order of pregnancy, and awareness of modern health facility location. The detailed result can be seen in Appendix 1.

\*  $p < 0,10$ , \*\*  $p < 0,05$ , \*\*\*  $p < 0,01$

Source: Data Processed, 2024

This may reflect the difficulties of poor households in using prenatal care services where, in Indonesia, it is required that household members pay a high direct fee for services, at least until the introduction of universal health insurance. Alternatively, other high costs accompany the visits, such as transportation costs and opportunity costs of losing a day of work due to visits, constrain the poor from having prenatal care visits. Furthermore, pregnant mothers between 25 and 35 years of age have an expected rate of prenatal visits 1,029 times that of younger mothers (the reference age is less than 25 years old) for the model in table 3 and 1,031 times for the model in table 4, respectively. It may show that mothers in productive age are more likely to be pregnant or have pregnancies more frequently than other age groups, therefore, have significantly higher expected use of prenatal visits.

Some variables that represent a mother's health endowment, including smoking experience and the number of chronic conditions experienced by the mother, are significantly associated with prenatal care utilization after controlling for other variables. Mothers with smoking experience have an expected rate of prenatal visits 1,093 times that of those without smoking experience for the model in table 3 and 1,098 for the model in table 4, respectively. Besides that, if the number of chronic diseases increases by 1 point experienced by a mother, her expected utilization of prenatal care services would rise by a factor of 1,014 and 1,016, respectively. This finding is related to the theory that suggests that a mother's health condition may also directly contribute to the use of prenatal input (e.g., mothers with poor nutrition or health condition may seek care earlier or increase the frequency of visits to offset an unfavorable health outcome).

Experiencing pregnancy complications has a positive but insignificant effect on the rate of prenatal care usage. The indicators of any complication during pregnancy derive from the general health condition of the mother during pregnancy, which may not be specific to any adverse health condition or disease that potentially impacts prenatal care usage. Nevertheless, the indicator for general health status is also insignificant. Therefore, the study includes several chronic illnesses experienced by the mother that may show more specific health conditions of the mother that can influence her in prenatal care usage.

The interesting finding from this study is the result for indicators of the residence of the mother. They are whether a mother living in urban, residing in Java island, and JKN region differentiation. Those positive and statistically significant variables influence the use of prenatal care services. If a mother lives in an urban area, her expected prenatal care visits will rise by a factor of 1,058 and 1,056, respectively, for the model in Table 3 and Table 4. The same result is for a mother who lives in all provinces on Java Island. This may indicate that living in areas with more healthcare facilities encourages the mother to visit more. The interesting thing is that mothers who reside in region 3 of JKN insurance region have lower expected prenatal care uses than mothers who reside in region 1 of JKN insurance. It can be highlighted the difference in the health infrastructures and in the regional development between region 1 (as a base region in the analysis), which is noted to be a more developed region compared to region 3 in Indonesia. Meanwhile, the awareness of the location of modern health facilities insignificantly influences the number of visits. This may be because the difference in accessibility may have already been captured by other variables in the model, such as urban and a dummy of the Java region.

## CONCLUSION

This study has used the IFLS data to estimate the association of health insurance together with maternal characteristics and socioeconomic factors on prenatal care utilization. In general, the results of the prenatal care estimation show that the explanatory variables have the expected signs. Key variables in the analysis, which are any health insurance and JKN insurance ownership, positively significantly influence prenatal care utilization. Having any insurance and JKN insurance increases a mother's expected prenatal care usage. The results highlight the importance of having any insurance or JKN insurance for a mother who seeks prenatal care services when she gets pregnant, thus may contributing to healthier pregnancy outcomes.

There is a significant difference between women living in urban areas and those living in rural regions in terms of prenatal care usage and women living in Java Island compared to those living outside Java. Another interesting finding is that women living in region 3 of JKN insurance region significantly have lower utilization of prenatal visits. This is consistent with the explanation that living in an area with better health infrastructures incentivizes women to access more. In contrast, awareness of modern health facility locations does not contribute to the number of visits. Similarly, a mother who visits prenatal care facilities within their own village is not significantly influenced by the visits. However, interventions to improve prenatal service usage for poorer mothers may be more effective if they address not only the distance effect but also the affordability of accessing them. In terms of policymaking, therefore, consideration should be given not only to improve the supply side by increasing the number of facilities close to where women live but also to improve the demand side of services, such as policy programs that will either incentivize low-income women to access the services and/or that will reduce the cost.

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