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RESEARCH ARTICLE

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Income Disparity and Healthcare Utilization: Lessons from Indonesia's National Health Insurance Claim Data

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Abstract

Background: Indonesia's National Health Insurance Program, known as Jaminan Kesehatan Nasional (JKN), has a variety of membership pathways for those wishing to gain access. Claim data from JKN offers a cost-effective way of observing who is accessing healthcare services and what types of services are being used. This study is a novel attempt to measure disparities amongst JKN users in their engagement with services, providing an opportunity to reflect on patterns of use. **Methods:** Using claims data collected from JKN users between 2015–2016, we used the Ordinary Least Square estimation model to compare health services utilization among subsidized and non-subsidized users. We focused primarily on the individual use of the hospital for outpatient and inpatient treatment. **Results:** Analysis reveals that subsidized users access primary healthcare services more frequently than non-subsidized users. Conversely, non-subsidized users access secondary and tertiary health care services more frequently than other users. Subsidized users who utilize secondary and tertiary health care tend to suffer more severe health illnesses than non-subsidized members. **Conclusions:** This study concludes that income disparity affects healthcare utilization. Non-subsidized members are more likely than subsidized members to access secondary and tertiary health care services. Our study offers evidence of the potential underutilization of secondary and tertiary healthcare (STHC) by subsidized members, which could lead to inefficiency since subsidized members seeking STHC treatment had severe health conditions, thus needing to be treated longer and requiring higher healthcare expenditures.

Keywords: National Health Insurance- public healthcare- universal health coverage- hospital- Indonesia

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Introduction

Indonesia's National Health Insurance Program, known as Jaminan Kesehatan Nasional (JKN), was implemented in 2014 to ensure access to health care for all sectors of society (Maulana et al., 2022). As part of a universal health care system, JKN is administered by the National Health Insurance Board (BPJS Kesehatan) (Mboi, 2015). By 2020, JKN covered more than 222 million Indonesian citizens—approximately 81.3% of the population (Laksono et al., 2022). Even though the coverage of JKN's membership is high, the institution faces mounting financial problems because the insurance premiums generated from JKN membership are far lower than actual spending (D. Kurnianingtyas et al., 2019; Diva Kurnianingtyas et al., 2019; Janah and Rahayu, 2020).

There are various JKN membership pathways for those wishing to gain access. The Penerima Bantuan Iuran (PBI) scheme is a subsidized scheme. It is funded by the national and local governments and is available to the poor whose income falls below the poverty line and listed in the Data Terpadu Kesejahteraan Sosial (DTKS) or Unified Data of Social Welfare (Purnomo, 2022). Funding for subsidized PBI members comes from either the state budget or Anggaran Pendapatan dan Belanja Negara (APBN) or the regional budget or Anggaran Pendapatan dan Belanja Daerah (APBD) (Dartanto, 2017). In contrast to the PBI, the government offers a non-subsidized scheme aimed at employed workers called Pekerja Penerima Upah (PPU). In the PPU scheme, gainfully employed workers must pay their insurance premiums monthly through their employer (Thaib and Samad, 2021). Additionally, the self-enrolled or Pekerja Bukan Penerima Upah (PBPU) scheme is a different non-subsidized scheme targeted at entrepreneurs and investors (Nurhasana et al., 2022). As of September 2022, 60.7% of JKN users were 'poor' and subsidized under the PBI scheme. The remaining 42% of JKN users were not subsidized, including 25% who were formally employed workers (PPU), 12.5% who were non-salaried informal workers (PBPU), and 1.7%

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non-worker participants (National Social Security Council of Indonesia, 2022).

The primary mechanisms for JKN's funding are insurance premiums (Erlangga et al., 2019). Nevertheless, since those categorized as informal workers or the non-wage recipients (PBPU) groups are voluntary to pay the insurance premiums, hence those workers with illness issues are more likely to participate in JKN's program than the healthier groups (Resende and Zeidan, 2010; Dartanto et al., 2016). Given that the percentage of people under the subsidized PBI scheme is higher than those in non-subsidized schemes, the persistent income disparity between JKN users could lead to an increasingly costly financial deficit. Moreover, inefficient referral systems are increasingly challenged as more users attempt to access services, particularly inpatient surgery procedures, while resources remain constrained and unevenly distributed across the archipelago (Sortsø et al., 2017). These imbalances lead to costly economic deadweight in terms of higher income assistance (Lemstra et al., 2009), expenditures on more prolonged and more resource-intensive health treatments (Sala-I-Martin, 2002), social costs, correctional services and lost tax revenue (Wagstaff, 2002).

JKN is facing a funding crisis. In this article, we adopt a novel approach to investigating if and how user usage patterns may exacerbate this crisis. This study is a novel attempt to measure disparities amongst JKN users in their engagement with services, providing an opportunity to reflect on patterns of use. Using claims data collected from JKN users between 2015–2016, we investigate client usage patterns for healthcare services across different JKN schemes. Furthermore, we offer a model for analyzing JKN claims data that may be adopted in future studies. By understanding the trends in JKN utilization amongst poor, subsidized PBI users and those not subsidized, this study sheds light on potential areas for improvement that may ultimately help alleviate the financial burden of providing universal healthcare in Indonesia.

Materials and Methods

JKN claim data from the 2015-2016 period, collated in December 2016, were used as a representative sample of the Indonesian population. JKN claim data provide a snapshot of the utilization of JKN services according to type membership (PBI, PPU, PBI APBN, PBI APBD PBPU or NON-WORKERS) and the severity of the user's health condition, divided into categories of outpatient and inpatient [low, moderate or severe]. After obtaining individual sample data, the next step was determining the individual weightings. This weighting has corrected bias or differences between the sample and the population. For this study, not all subsets were used, and we focused primarily on the individual use of hospitals for outpatient and inpatient treatment.

To estimate the effect of PBI and PBPU users' behavior on levels of hospital utilization, this study used the Ordinary Least Square (OLS) estimation with multiple linear regression models. This study adopted three dependent variables (1) length of stay, (2) healthcare costs, and (3) severity level. These variables were likely to be statistically different between the two groups, and we assessed how much of a difference there was in the outcomes of the OLS estimation. The dependent variable of this study was the PBI dummy, and we controlled for individual characteristics such as age and gender and also hospital characteristics such as region (in or outside Java), hospital classes, and hospital ownership (government or private).

The model specification for each dependent variable was:

$$\text{The length of stay} = \alpha + \beta_1 \text{PBI dummy} + \beta_2 \text{age} + \beta_3 \text{gender} + \beta_4 \text{region} + \beta_5 \text{ hospital_class} + \beta_6 \text{hospital_ownership} + \mu \quad (3.1)$$

$$\text{Health care cost} = \alpha + \beta_1 \text{PBI dummy} + \beta_2 \text{age} + \beta_3 \text{gender} + \beta_4 \text{region} + \beta_5 \text{hospital_class} + \beta_6 \text{hospital_ownership} + \mu \quad (3.2)$$

$$\text{Severity level} = \alpha + \beta_1 \text{PBI dummy} + \beta_2 \text{age} + \beta_3 \text{gender} + \beta_4 \text{region} + \beta_5 \text{hospital_class} + \beta_6 \text{hospital_ownership} + \mu \quad (3.3)$$

Results

Table 1 reveals the frequency of primary, secondary, and tertiary health care utilization by JKN user membership. [Insert summary of PPU statistics – highest frequency and percentage across all]. In both primary health care (PHC) and secondary, tertiary health care (STHC) facilities, PBPU members had the second highest percentage (21.8%), followed by 20.1% of PBI APBN (PBI members funded by the central government), 8.5% of non-worker members and 3.6% of PBI APBD (PBI members financed by local governments). PBI APBN users had the second highest utilization frequency in primary healthcare facilities, with 23.5%, followed by 16.8% of PBPU users.

Table 1. Healthcare Utilization in PHC and STHC by JKN Membership

Membership	PHC		STHC		Total	Total Percentage
	Frequency	Percentage	Frequency	Percentage		
PPU	852,490	49.19	365,286	40.28	1,217,776	46.13
PBI APBN	406,319	23.45	120,387	13.28	526,706	19.95
PBPU	290,905	16.79	285,302	31.46	576,207	21.83
NON-WORKERS	123,725	7.14	100,255	11.06	223,980	8.48
PBI APBD	59,548	3.44	35,578	3.92	95,126	3.6
Total	1,732,987	100	906,808	100	2,639,795	100

Note: PHC, Primary Health Care; STHC, Secondary Tertiary Health Care

Table 2. Severity Comparison between PBI and PBPU Members

Membership		Severity Level				Total	Mean	p value
		Outpatient	Inpatient (Low)	Inpatient (Moderate)	Inpatient (Severe)			
PBI	n	108,532	35,884	8,574	2,966	155,956	1.3971	0
	%	69.59	23.01	5.5	1.9	100		
PBPU	n	232,725	38,697	9,996	3,880	285,298	1.24653	
	%	81.57	13.56	3.5	1.36	100		

Note: PBI, subsidized members; PBPU, non-subsidized or informal workers paying members of JKN

In STHC facilities, PBPU members had the second highest percentage, with a utilization rate of 31.5%, followed by 13.3% of PBI APBN members.

Table 2 reveals the JKN access based on the severity of the patient's condition, comparing PBI and PBPU members in STHC facilities. More subsidized PBI members sought inpatient treatments across all severity levels (30.41%) compared to unsubsidized PBPU members (18.42%). PBPU members across all severity levels utilized STCH more frequently than PBI members.

Table 3 compares the length of stay for inpatient treatment between PBI and PBPU users. PBI users had significantly longer lengths of stay compared to PBPU members. On average, PBI members seeking inpatient treatment in STHC facilities tend to stay longer than PBPU members.

As illustrated by Table 4, regarding STHC health care costs, PBI members had higher statistical values across all indicators except for standard deviation (SD), N, range, and max. The results indicate that the subsidized group of users has a much higher tendency to go to the STHC to cure health complaints compared to the PBPU users.

Table 5 summarizes the regression results of the equations (3.1), (3.2), (3.3), (3.7), and (3.8). These results show that the membership variable (PBI Dummy), the main independent variable, has a consistent value across all equations at a 1% significance level. This significance generally reflects that PBI and PBPU members significantly differ across all dependent variables.

Equation (3.1) reveals that PBI members generally stayed in the hospital 0.398 days longer compared to PBPU members. By age, younger users require 0.00504 days longer for treatment than older members. By gender, male members stayed in the hospital 0.153 days longer than female members. By region, cases outside Java tended to have a longer stay, 0.775 days longer than those in Java. By hospital class, class A had longer hospitalization days compared to other categories except for specialized hospitals. The health facilities in Indonesia are categorized into primary care providers and secondary care providers based on their sizes and the range of medical services they offer (Handayani et al., 2021). Clinics, primary health care centers (Puskesmas), and class D hospitals comprise primary care providers.

In contrast, classes A through C hospitals make up secondary care providers, with class A hospitals being the highest tier (Handayani et al., 2021). By hospital ownership, government hospitals tend to have longer hospitalization days compared to private ones (0.277 days). Large clinics and other hospitals had more extended hospitalization periods by 0.494 days compared to government hospitals.

Equation (3.2) shows that healthcare costs for PBI patients were higher by IDR 171,681 or US$ 11.92 compared to PBPU patients. By age, younger patients required IDR 3,528 or US$ 0.24 less compared to older cohort age groups. By gender, male patients required IDR 45,732 or US$ 3.17 higher than female patients. By region, those patients living outside Java required

Table 3. Length of Stay Comparison between PBI dan PBPU

Length of Stay	Membership		p value
	PBI	PBPU	
Mean	1.34882	0.8283	0.000
P25	0	0	
Median	0	0	
P75	2	0	
Iqr	2	0	
SD	4.95835	3.7302	
Variance	24.5852	13.914	
N	155965	285302	
Range	519	445	
Min	0	0	
Max	519	445	

Note: PBI, subsidized members; PBPU, non-subsidized or informal workers paying members of JKN

Table 4. STHC Healthcare Costs between PBI and PBPU Members

Health Care Cost	Membership		p value
	PBI	PBPU	
Mean	1,327,831	1,214,721	0.000
P25	162,400	161,900	
Median	192,100	184,900	
P75	1,964,200	982,600	
Iqr	1,801,800	820,700	
SD	2,572,574	3,336,071	
N	155,965	285,302	
Range	121,477,800	238,750,000	
Min	0	0	
Max	121,477,800	238,750,000	

Note: PBI, subsidized members; PBPU, non-subsidized or informal workers paying members of JKN

Table 5. Estimation Results of Regression Model Without Interaction

Variable	(Eq 3.1) Length of Stay	(Eq 3.2) Health Care Cost	(Eq 3.3) Severity Level	(Eq 3.7) Utilization Index	(Eq 3.8) Utilization Index with Interaction
PBI Dummy	0.398***	171,681***	0.130***	0.00257***	0.000471***
	-0.0153	-9,441	-0.00216	-5.91E-05	-0.000137
age	-0.00504***	-3,528***	-0.00210***	-4.07e-05***	-5.77e-05***
	-0.000267	-253.2	-5.07E-05	-1.35E-06	-1.68E-06
gender	0.153***	45,732***	-0.0142***	0.000208***	0.000187***
	-0.0131	-9,512	-0.00187	-5.30E-05	-5.30E-05
Sumatra	0.373***	248,593***	0.0635***	0.00193***	0.00193***
	-0.0152	-12,055	-0.00241	-6.64E-05	-6.64E-05
Bali Nusa	0.123***	77,432***	0.0129***	0.000534***	0.000558***
	-0.0197	-19,047	-0.00385	-0.000101	-0.000101
Kalimantan	0.775***	481,286***	0.120***	0.00380***	0.00376***
	-0.065	-25,685	-0.00465	-0.000176	-0.000176
Sulawesi	0.775***	404,241***	0.132***	0.00377***	0.00377***
	-0.0316	-18,035	-0.00385	-0.000113	-0.000113
Maluku	0.761***	482,005***	0.164***	0.00428***	0.00428***
	-0.0497	-32,492	-0.00956	-0.000238	-0.000238
Papua	0.0483	46,592**	-0.0333***	-0.000195	-3.14E-05
	-0.0347	-21,209	-0.007	-0.000167	-0.000167
Abroad	0.0757	-429,908***	-0.0578	-0.00146	-0.00135
	-0.261	-136,004	-0.0362	-0.00104	-0.00103
Class B Hospital	-0.393***	-1.253e+06***	-0.0460***	-0.00393***	-0.00391***
	-0.0271	-36,549	-0.00419	-0.000148	-0.000148
Class C Hospital	-0.426***	-1.523e+06***	-0.0143***	-0.00421***	-0.00421***
	-0.0276	-36,458	-0.00432	-0.000149	-0.000149
Class D Hospital	-0.265***	-1.587e+06***	0.0551***	-0.00327***	-0.00328***
	-0.0303	-37,200	-0.00519	-0.000162	-0.000161
Specialized Hospital	0.625***	-1.054e+06***	-0.100***	-0.00231***	-0.00232***
	-0.0993	-47,170	-0.00534	-0.000265	-0.000265
Private Hospital	-0.277***	196,212***	0.00194	-4.81E-05	-3.44E-05
	-0.0157	-10,085	-0.00217	-6.03E-05	-6.02E-05
Military Hospital	-0.0847***	149,385***	0.0277***	0.000489***	0.000489***
	-0.0182	-23,714	-0.00451	-0.000117	-0.000117
Other Hospital	0.494**	1.333e+06***	0.290***	0.00708***	0.00703***
	-0.236	-240,331	-0.0431	-0.00125	-0.00125
0.PBI Dummy#co.age					0.000
					0.000
1.PBI Dummy#co/age					4.81e-05***
					-2.81E-06
Constant	1.231***	2.409e+06***	1.341***	0.0112***	0.0119***
	-0.0308	-37,390	-0.00463	-0.000157	-0.000166
Observations	440,858	440,858	440,845	440,845	440,845
R-squared	0.014	0.019	0.029	0.02	0.021

Note: PBI, subsidized members; PBPU, non subsidized or informal workers paying members of JKN; Robust standard errors in parentheses; Significance level *** 1%, ** 5%, * 10%

higher healthcare expenditures (except for overseas patients) than those living in Java Islands. Equation (3.3) reveals that PBI patients with a higher severity level by 0.130 points compared to PBPU patients. By age, older patients had less severe cases than younger patients. By gender, female patients had higher severity levels than male patients. Equation (3.7) shows the regression results for the hospital utilization index in which the coefficient value of all independent variables is consistent with the three previous equations at a similar significance level.

As seen from equation (3.6), the PBI members who seek treatment at STHC facilities tended to be from an older age group compared to the average PBPU members seeking similar treatment.

Discussion

Achieving Universal Health Coverage (UHC) has become a critical health policy goal in many countries, including Indonesia. The analysis found that STHC utilization cases were dominated by PBPU members (285,302 cases or 31.5% of all cases). PBI members accounted for 155,965 cases, or 17.2% of STHC cases. The result also shows that PBI members preferred to seek treatment at PHC, indicated by the high number of cases by PBI members (26.9%) compared to PBPU members (16.8%). On the average length of stay, PBI members need 1.4 days for treatment, or 0.52 days (12 hours) longer than PBPU members. Meanwhile, the regression results showed that cases by PBI members acquired 0.398 days longer compared to PBPU members (statistically significant).

Regarding healthcare expenditures, cases by PBI members cost IDR 113,110 or USD$ 7.85 higher than cases by PBPU members. However, the highest cost was found in the case by PBPU members with a difference of IDR 117,272,200.00 or USD$ 8139.97 up to the 75th percentile. Cases by PBI members still cost higher, with a difference of IDR 981,600 or USD$ 68.13. In the estimation model, the hospital cost in cases by PBI members was IDR 171,681 or USD$ 11.92 higher than in cases by PBPU members (statistically significant).

Our study has revealed that, on the whole, those PBI patients, who were subsidized, were seeking medical treatments in very severe conditions than PBPU patients. Meanwhile, many PBPU cases did not show a higher severity level than PBI cases. Of the 285,298 PBPU cases, 81.6% were outpatient cases, with 18.4% being hospitalized. While for PBI cases, out of a total of 155,956 cases, only 69.6% were outpatient, and the remaining 30.4% were inpatient cases. Based on the regression results of the severity level regression, the coefficient shows that PBI cases tend to be more severe than PBPU, which is significant at the 1% level with a value of 0.130 points.

The study results show that PBI members had an average hospital index utilization value higher than PBPU members, which indicated that PBI members seeking STHC services or treatment had poorer health conditions than PBPU members. The result is consistent with the regression results showing that PBI members had a higher utilization index of 0.00257 compared to PBPU members. The results of the interaction variables in the interaction model also show that PBI members with older age have a higher utilization index compared to PBPU members. This finding is consistent with the case in Philippines (Philippine Health Insurance Corporation, 2022)—despite the subsidy sourcing from tax (Cabalfin, 2016).

While we found evidence of the inequity in JKN utilization among different types of patients due to data unavailability, we cannot conclude the rationale behind the patient's behavior in seeking outpatient treatment. However, this study's finding is consistent with a previous study in Israel and Vietnam associating socioeconomic status with the utilization of healthcare services (Filc et al., 2014; Palmer, 2014). In addition, a strong linkage between inequity in healthcare utilization and education level is found in Danish diabetes patients (Sortsø et al., 2017). Despite similar findings, given the variations of the country's context, this study strengthens the current discourses on healthcare utilization inequity, especially for countries like Indonesia. To extend it to a global context, we recommend that universal health coverage not only improve the curative services but also be more rigorous in reaching different socioeconomic groups regarding promotive and preventive measures.

The research indicates the potentially higher burden of healthcare among PBPU members. From 2014 to 2016, the PBPU group contributed the highest healthcare expenditures (Rp 17.2 billion) yet the least contribution to insurance premiums fees (Rp 5.7 billion). The insurance premiums' income rate was 32.5%, and the claim ratio was 645.3%. Therefore, the PBPU group receives higher JKN benefits than what they paid for (Dartanto, 2017). During the same period, PBPU members were attributed to almost 80% of healthcare expenditures in secondary and tertiary healthcare (STHC) facilities, which mainly were hospitals, while only 17% of healthcare expenditures in primary health care (PHC) through capitation (Prabhakaran et al., 2019). In contrast, the subsidized members (PBI) of JKN have difficulties reaching healthcare services and facilities. In the early implementation of JKN, the utilization rate of PBI members was only 4.1%, with a claim ratio of 47.2% (Prabhakaran et al., 2019). Those issues indicate the overutilization of secondary and tertiary health care services by PBPU members and the underutilization of STHC services by PBI members. Consequently, underutilization by PBI members could lead to higher healthcare expenditures since many PBI members seeking treatment at STHCs are usually already in severe conditions and hence require longer or more complex treatments. Moreover, the overutilization of STHC by PBPU members could lead to higher healthcare expenditures due to adverse selection.

Limitations and Future Research

This study has multiple strengths. First, this study used the largest available administrative claims data sources in Indonesia to assess the type of illness, treatments, and long-term outcomes in all patients of JKN. Second, the claims data source of JKN can capture the income disparity among the JKN's members, which are classified by their JKN membership status.

This study has limitations. First, JKN claim data does not reflect the real income of all patients as this study assessment is based on a proxy variable—the type of JKN user membership a client possesses and whether the Indonesian government has subsidized them or not. Second, JKN claims data is cross-sectional and not prospective. Therefore, cause and effect cannot be determined. Subsequently, we only know the severity of a patient's illness from what is provided to the JKN,

which may not reflect the reality of a patient's situation. Furthermore, JKN users who seek treatment from private sector doctors or hospitals are not recorded in the data.

Further research is needed on the level of utilization of health services in the JKN program from other characteristics, especially the level of accessibility of participants to health services in STHC services. Furthermore, future studies using this data could focus more on other JKN usage patterns, for example, across regions or gender.

Author Contribution Statement

STN and AA conceived the study. STN conducted data collection and data analysis. NA (1), DKI, and DK drafted the manuscript. STN, AA, DKI, NA (2) and SRHH provided inputs to the manuscript. All authors approved the final version of the manuscript

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Approval

This study is a part of final student's thesis at Master of Public Policy and Planning, Faculty of Economics and Business, Universitas Indonesia.

Ethical Declaration

Not applicable (publicly available data with no individual identifier).

Data Availability

Data is available upon reasonable request.

Conflict of Interests

The authors declare that they have no competing interests.

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