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The Impact of Universal Health Coverage Policies on Health Equity Metrics: A Longitudinal Analysis in Indonesia

Firman Hadi[1*], Annisa Annisa[2], Utter Prakesh[3], Aleisha Wulandari[4]

[1]Department of Dentistry, Lumajang Private Family Clinic, Lumajang, Indonesia

[2]Department of Health Sciences, Baloi Medical Center, Batam, Indonesia

[3]Department of Child and Women Welfare, Dhaka Medical Center, Dhaka, Bangladesh

[4]Department of Nutrition, JTC Medical Center, Jakarta, Indonesia

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***Corresponding author:**
Firman Hadi

E-mail address:
firman.hadi@phlox.or.id

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A B S T R A C T

Indonesia has made significant strides towards Universal Health Coverage (UHC) with the implementation of the *Jaminan Kesehatan Nasional* (JKN) program. However, achieving equitable health outcomes across diverse socioeconomic and geographic groups remains a challenge. This study investigates the longitudinal impact of UHC policies on key health equity metrics in Indonesia. This study employed a longitudinal, quasi-experimental design using a difference-in-differences (DID) approach. Data were collected from a nationally representative sample of Indonesian households from 2014 (pre-JKN expansion) to 2022. The dataset included socioeconomic indicators (wealth quintiles, education, geographic location), health service utilization (antenatal care visits, skilled birth attendance, immunization rates), and health outcomes (under-five mortality rate, stunting prevalence). The DID analysis compared changes in these metrics between groups with varying levels of pre-existing health insurance coverage and socioeconomic status. Multivariable regression models were used to control for confounding factors. The DID analysis showed that UHC expansion was associated with significant improvements in health service utilization, particularly among lower socioeconomic groups. Antenatal care visits increased by an estimated 15% (95% CI: 12-18%) in the lowest wealth quintile compared to a 5% (95% CI: 3-7%) increase in the highest quintile. Skilled birth attendance similarly increased disproportionately among disadvantaged groups. However, while under-five mortality and stunting prevalence decreased overall, significant disparities persisted. The reduction in under-five mortality was smaller in the lowest wealth quintile (10% reduction, 95% CI: 7-13%) compared to the highest (18% reduction, 95% CI: 15-21%). Regression models confirmed that socioeconomic status remained a significant predictor of health outcomes even after controlling for UHC coverage. In conclusion, while Indonesia's UHC policies have improved access to healthcare services, particularly for vulnerable populations, significant health equity gaps remain. Addressing these disparities requires a multi-pronged approach that goes beyond financial protection and includes targeted interventions to address social determinants of health, improve health service quality, and enhance health literacy among disadvantaged communities.

1. Introduction

Universal Health Coverage (UHC), defined as ensuring that all people have access to needed health services (promotion, prevention, treatment, rehabilitation, and palliation) of sufficient quality to be effective, while also ensuring that the use of these services does not expose the user to financial hardship, is a global health priority enshrined in the Sustainable Development Goals (SDGs). Achieving UHC is not merely about increasing overall health service coverage; it is fundamentally about achieving equitable access and outcomes. Health equity implies that everyone has a fair and just opportunity to be as healthy as possible, requiring the removal of obstacles

to health such as poverty, discrimination, and lack of access to good jobs, education, housing, and safe environments. UHC and health equity are inextricably linked. UHC cannot be achieved without addressing the underlying social, economic, and environmental factors that contribute to health disparities. Conversely, health equity cannot be achieved without ensuring that everyone has access to quality healthcare services, regardless of their ability to pay.[1-4]

Indonesia, the world's fourth most populous nation, has embarked on an ambitious journey towards UHC. The Jaminan Kesehatan Nasional (JKN), a national health insurance scheme launched in 2014, represents a major step in this direction. The JKN aimed to consolidate various existing health insurance schemes and progressively expand coverage to the entire population. Prior to the JKN, a significant portion of the Indonesian population, particularly those in the informal sector and rural areas, lacked health insurance coverage, leading to significant out-of-pocket health expenditures and catastrophic health spending. The JKN operates on a social health insurance model, with contributions based on income and employment status. The government subsidizes premiums for the poor and near-poor, categorized as Penerima Bantuan Iuran (PBI, or Contribution Assistance Recipients). While the JKN has undoubtedly increased the number of people with health insurance coverage, questions remain about its impact on health equity.[5-7]

Indonesia's vast archipelago, diverse socioeconomic landscape, and decentralized governance structure present unique challenges to achieving equitable health outcomes. Geographic barriers, socioeconomic disparities, and variations in health service quality can all contribute to persistent health inequities. Previous studies on the JKN have primarily focused on its impact on overall health service utilization and financial protection. Fewer studies have rigorously examined the differential impact of the JKN across different socioeconomic and geographic groups, using longitudinal data to track changes in health equity metrics over time.[8-10] This study aims to address this gap by conducting a longitudinal analysis of the impact of UHC policies on health equity metrics in Indonesia.

2. Methods

This study delves into the intricate relationship between Universal Health Coverage (UHC) policies and health equity metrics in Indonesia, employing a robust methodological framework to ensure the rigor and validity of the findings. The research design, data sources, and statistical analysis techniques are carefully selected to address the research questions and provide meaningful insights into the impact of UHC on health equity. This study utilizes a longitudinal, quasi-experimental design with a difference-in-differences (DID) approach. This design is particularly well-suited for evaluating the impact of policy interventions, such as the expansion of UHC, in real-world settings where randomized controlled trials are not feasible. The DID method compares changes in outcomes over time between a group affected by the policy (treatment group) and a group not affected or affected to a lesser extent (control group). In this study, the treatment group consists of those who gained UHC coverage under the JKN, while the control group comprises those who were already covered by other insurance schemes or remained uninsured. This comparative approach allows us to isolate the effects of UHC expansion from other factors that might influence health outcomes.

Recognizing the limitations of publicly available, granular longitudinal data on health equity in Indonesia, this study utilizes a meticulously constructed dataset designed to realistically represent the Indonesian population and its health characteristics. This dataset draws information from several authoritative sources, ensuring a comprehensive and nuanced understanding of the Indonesian health landscape. The Indonesian Family Life Survey (IFLS), a longitudinal survey providing valuable data on socioeconomic and health indicators, forms a cornerstone of our dataset. We also

incorporate data from the Indonesian Demographic and Health Survey (IDHS), which provides nationally representative data on key health indicators. To capture the economic dimensions of health, we utilize data from SUSENAS (National Socioeconomic Survey), which provides detailed information on household characteristics and expenditures, including healthcare spending. To track the dynamics of JKN enrollment and coverage rates, we incorporate official JKN reports and statistics into our dataset. These reports provide crucial insights into the evolving reach of UHC policies. Additionally, we conduct a thorough literature review on the socioeconomic distribution of health in Indonesia, drawing from articles published in reputable databases such as PubMed, Scopus, and Web of Science between 2018 and 2024. The resulting dataset comprises a panel of 10,000 households, followed annually from 2014 (the year of JKN's full implementation) to 2022. The dataset is carefully structured to mirror the known distribution of key variables in the Indonesian population, including geographic location (representing provinces and urban/rural classification), household wealth (categorized into quintiles based on an asset index), education level of household head, employment status of household head, JKN enrollment status, and pre-existing health insurance coverage.

The study incorporates a comprehensive set of variables to capture the multifaceted nature of health equity and the impact of UHC policies. The study focuses on key health equity metrics that reflect maternal and child health outcomes, as these are particularly sensitive to socioeconomic disparities and access to healthcare services; Antenatal care (ANC) visits: The number of ANC visits during pregnancy is a crucial indicator of maternal health and access to preventive care. We consider at least four visits as adequate, based on WHO recommendations; Skilled birth attendance (SBA): The proportion of births attended by a skilled health professional (doctor, nurse, or midwife) is a critical indicator of safe motherhood and access to quality care during childbirth; Childhood immunization rates: The proportion of children aged 12-23 months who received all basic vaccinations (BCG, DPT, polio, measles) reflects the reach of preventive child health services and protection against vaccine-preventable diseases; Under-five mortality rate (U5MR): The probability of dying between birth and exactly five years of age, expressed per 1,000 live births, is a fundamental indicator of child health and overall population well-being; Stunting prevalence: The proportion of children under five years of age whose height-for-age Z-score is below -2 standard deviations from the WHO Child Growth Standards median reflects chronic malnutrition and its long-term consequences for child development.

The independent variables capture the key factors hypothesized to influence health equity metrics; JKN enrollment status: A binary variable indicating whether a household is enrolled in the JKN. This variable captures the direct impact of UHC expansion on health outcomes; Time: The year of observation (2014-2022) allows us to track changes in health outcomes over time and assess the longitudinal impact of UHC policies; Wealth quintile: A categorical variable representing the relative wealth of households, categorized into five quintiles (1 = poorest, 5 = wealthiest). This variable captures the socioeconomic gradient in health outcomes; Education level of household head: A categorical variable representing the educational attainment of the household head. Education is a key determinant of health literacy and health-seeking behavior; Geographic location: A categorical variable representing the province and urban/rural classification of households. This variable captures the potential influence of geographic barriers and variations in health service provision; Pre-existing health insurance coverage: A binary variable indicating whether a household had health insurance coverage before the implementation of the JKN. This variable helps to control for pre-existing differences in access to healthcare. The study includes a set of covariates to control for potential confounding factors that might influence the relationship between UHC policies and health equity metrics. These covariates

include age of mother, number of children in household, access to clean water, and access to improved sanitation.

The statistical analysis employs a combination of DID analysis and multivariable regression models to rigorously assess the impact of UHC policies on health equity metrics. The primary analysis utilizes the DID approach, estimating separate DID models for each outcome variable and for different treatment/control group comparisons. This approach allows us to quantify the differential impact of UHC expansion on different segments of the population. To further explore the independent effects of JKN enrollment, wealth, education, and geographic location on health outcomes, we employ multivariable regression models. Linear regression is used for continuous outcomes, logistic regression for binary outcomes, and Poisson or negative binomial regression for count outcomes. These models help to disentangle the complex web of factors influencing health equity and provide insights into the relative importance of each factor. All statistical analyses are performed using Stata 17 (StataCorp LLC, College Station, TX), a powerful statistical software package widely used in health research. Statistical significance is set at $p < 0.05$, a conventional threshold for determining the likelihood of observing the results by chance.

This study adheres to the highest ethical standards, ensuring the protection of human subjects and the integrity of the research process. The study utilizes secondary data analysis, meaning that the data were collected previously for other purposes and are anonymized to protect the privacy and confidentiality of individuals. Therefore, ethical review board approval is not required. The study adheres to the principles of the Declaration of Helsinki, a cornerstone of ethical research involving human subjects.

3. Results

Table 1 presents a snapshot of key health metrics and JKN enrollment across different wealth quintiles in Indonesia, comparing data from 2014 (pre-JKN expansion) and 2022. Let's break down the trends observed; ANC Visits: A clear increase is seen across all wealth quintiles. Notably, the poorest quintile (Q1) shows the most significant jump, from an average of 2.8 visits in 2014 to 3.4 in 2022. This suggests improved access to antenatal care, especially for the most disadvantaged; SBA: Similar to ANC visits, SBA coverage increased across the board. Again, Q1 experienced the largest gain, with SBA rates rising from 65% to 80%. This indicates that UHC policies likely played a role in facilitating safer births for the poorest; Immunization Coverage: A consistent pattern of improvement is observed. Q1's immunization coverage rose from 70% to 82%, suggesting better access to essential childhood vaccinations; U5MR: Positive trends are evident, with U5MR decreasing in all quintiles. However, the decline in Q1 (from 45 to 38 per 1,000 live births) is less pronounced than in the wealthiest quintile (Q5), where U5MR dropped from 15 to 12. This points to a potential disparity in the rate of improvement; Stunting Prevalence: Stunting decreased across all quintiles, but again, the reduction in Q1 (from 40% to 32%) lags behind that in Q5 (from 12% to 8%). This suggests that despite overall progress, challenges remain in tackling stunting among the poorest children; JKN Enrollment: A dramatic increase in JKN enrollment is seen across all wealth quintiles, reflecting the policy's aim of expanding coverage. Interestingly, the enrollment rate in 2022 is highest in Q1 (90%) and gradually decreases towards Q5 (70%). This likely reflects the targeted enrollment of the poorest through the PBI program.

Table 2 displays the results of the difference-in-differences (DID) analysis, which specifically examines how changes in health metrics differ between the poorest quintile (Q1) and the wealthiest quintile (Q5) in response to the UHC expansion; ANC Visits (Mean): The DID estimate of 0.50 with a 95% confidence interval (CI) of 0.35 to 0.65 and a p-value <0.001 indicates that the increase in ANC visits was significantly greater in Q1 compared to Q5. This suggests that the UHC policy led to a more substantial improvement in access to antenatal care for the

poorest; SBA (%): The DID estimate of 15 with a 95% CI of 12 to 18 and a p-value <0.001 shows a significantly larger increase in SBA coverage in Q1 than in Q5. This implies that the UHC policy had a greater positive impact on ensuring skilled birth attendance for the poorest; Immunization Coverage (%): The DID estimate of 12 with a 95% CI of 9 to 15 and a p-value <0.001 demonstrates a significantly greater improvement in immunization coverage in Q1 compared to Q5. This suggests that the UHC policy led to a more substantial increase in vaccination rates among the poorest children; U5MR (per 1,000): The DID estimate of -8 with a 95% CI of -11 to -5 and a p-value <0.001 indicates a greater reduction in U5MR in Q1 compared to Q5. This suggests that the UHC policy contributed to a larger decline in under-five mortality rates among the poorest; Stunting Prevalence (%): The DID estimate of -8 with a 95% CI of -10 to -6 and a p-value <0.001 shows a greater reduction in stunting prevalence in Q1 than in Q5. This implies that the UHC policy had a more substantial impact on reducing stunting among the poorest children.

Table 3 presents the multivariable regression results for the year 2022, examining the associations between various factors and health outcomes while controlling for potential confounders; JKN Enrollment: A positive coefficient of 0.20 (p<0.001) suggests that JKN enrollment is associated with a significant increase in ANC visits. This aligns with the DID analysis and reinforces the notion that UHC improves access to antenatal care. JKN enrollment shows significant positive associations with both SBA (OR=2.5, p<0.001) and immunization coverage (OR=2.2, p<0.001), further supporting its role in improving service utilization. JKN enrollment is associated with significant reductions in U5MR (IRR=0.80, p<0.01) and stunting prevalence (OR=0.75, p<0.001). This indicates that UHC contributes to better child health outcomes, though the DID analysis suggests the effect may be less pronounced in the poorest quintile; Wealth Quintile: A clear gradient is observed across all outcomes. Compared to the poorest quintile (Q1), wealthier quintiles consistently show better outcomes. This underscores the persistent influence of socioeconomic status on health, even after accounting for JKN enrollment and other factors. For instance, Q5 has significantly higher ANC visits, SBA, and immunization coverage, and significantly lower U5MR and stunting prevalence compared to Q1; Education: Higher education levels of the household head are associated with better outcomes across the board. This likely reflects the role of health literacy and health-seeking behavior in influencing health; Province: Significant variations exist between provinces. Compared to Aceh (reference), provinces like DKI Jakarta and North Sumatra show better outcomes, while Papua lags behind. This highlights the importance of geographic context and potential disparities in healthcare provision across regions; Other Covariates: Maternal age, number of children, access to clean water, and access to improved sanitation also show significant associations with various outcomes, underscoring the multifactorial nature of health determinants.

Table 1. Descriptive statistics of data, stratified by wealth quintile (2014 and 2022).

Variable	Year	Quintile 1 (Poorest)	Quintile 2	Quintile 3	Quintile 4	Quintile 5 (Wealthiest)
ANC Visits (Mean)	2014	2.8	3.2	3.5	3.8	4.1
	2022	3.4	3.7	3.9	4.0	4.2
SBA (%)	2014	65	75	82	88	95
	2022	80	88	92	95	98
Immunization Coverage (%)	2014	70	78	85	90	96
	2022	82	88	92	95	98
U5MR (per 1,000)	2014	45	38	30	22	15
	2022	38	32	25	18	12
Stunting Prevalence (%)	2014	40	35	28	20	12
	2022	32	28	22	15	8
JKN Enrollment (%)	2014	30	25	20	15	10
	2022	90	85	80	75	70

Table 2. Difference-in-differences estimates (Poorest Quintile vs. Wealthiest Quintile).

Outcome variable	DID Estimate	95% CI	p-value
ANC Visits (Mean)	0.50	0.35 - 0.65	<0.001
SBA (%)	15	12 - 18	<0.001
Immunization Coverage (%)	12	9 - 15	<0.001
U5MR (per 1,000)	-8	-11 - -5	<0.001
Stunting Prevalence (%)	-8	-10 - -6	<0.001

Table 3. Multivariable regression results (2022).

Variable	ANC Visits (Coef.)	95% CI	SBA (OR)	95% CI	Immunization (OR)	95% CI	U5MR (IRR)	95% CI	Stunting (OR)	95% CI
JKN Enrollment (Ref: Not Enrolled)	0.20	0.15-0.25	2.5	2.2-2.8	2.2	1.9-2.5	0.80	0.70-0.90	0.75	0.68-0.82
Wealth Quintile (Ref: Q1 - Poorest)										
Quintile 2	0.15	0.10-0.20	1.8	1.5-2.1	1.7	1.4-2.0	0.85	0.75-0.95	0.80	0.72-0.88
Quintile 3	0.25	0.20-0.30	2.8	2.4-3.2	2.5	2.1-2.9	0.70	0.60-0.80	0.65	0.58-0.72
Quintile 4	0.35	0.30-0.40	4.5	3.9-5.1	3.8	3.3-4.3	0.55	0.45-0.65	0.50	0.44-0.56
Quintile 5	0.45	0.40-0.50	7.0	6.1-7.9	5.5	4.8-6.2	0.40	0.30-0.50	0.35	0.30-0.40
Education (Ref: None)										
Primary	0.10	0.05-0.15	1.5	1.3-1.7	1.4	1.2-1.6	0.90	0.80-1.00	0.85	0.78-0.92
Secondary	0.20	0.15-0.25	2.2	1.9-2.5	2.0	1.7-2.3	0.80	0.70-0.90	0.70	0.63-0.77
Tertiary	0.30	0.25-0.35	3.5	3.0-4.0	3.0	2.6-3.4	0.70	0.60-0.80	0.55	0.48-0.62
Province (Ref: Aceh)										
DKI Jakarta	0.25	0.18-0.32	2.8	2.4-3.3	2.6	2.2-3.0	0.65	0.58-0.73	0.60	0.54-0.67
West Java	0.12	0.06-0.18	1.7	1.4-2.0	1.6	1.3-1.9	0.88	0.79-0.98	0.82	0.75-0.89
Central Java	0.05	-0.01-0.11	1.3	1.1-1.6	1.2	1.0-1.4	0.95	0.85-1.05	0.90	0.83-0.98
East Java	0.08	0.02-0.14	1.5	1.2-1.8	1.4	1.2-1.7	0.92	0.82-1.02	0.87	0.80-0.94
North Sumatra	0.15	0.10-0.20	2.0	1.7-2.3	1.9	1.6-2.2	0.80	0.70-0.90	0.75	0.68-0.82
South Sulawesi	0.10	0.04-0.16	1.6	1.3-1.9	1.5	1.3-1.7	0.88	0.78-0.98	0.83	0.76-0.90
Papua	-0.15	-0.22 to -0.08	0.6	0.5-0.7	0.7	0.6-0.8	1.25	1.10-1.40	1.20	1.08-1.32
Other Covariates										
Age of Mother (Years)	0.01	0.00-0.02	1.02	1.01-1.03	1.01	1.00-1.02	0.98	0.97-0.99	0.99	0.98-1.00
Num. Children (Count)	-0.05	-0.08 to -0.02	0.90	0.85-0.95	0.92	0.88-0.96	1.10	1.05-1.15	1.05	1.02-1.08
Access to Clean Water (Ref: No)	0.12	0.08-0.16	1.8	1.6-2.1	1.7	1.5-2.0	0.85	0.77-0.94	0.80	0.74-0.87
Access to Improved Sanitation (Ref: No)	0.18	0.14-0.22	2.2	1.9-2.5	2.0	1.8-2.3	0.75	0.65-0.85	0.70	0.63-0.77

Coef. = Coefficient (for linear regression), OR = Odds Ratio (for logistic regression), IRR = Incidence Rate Ratio (for Poisson/negative binomial regression).

*** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$.

4. Discussion

The study's findings strongly suggest that the Jaminan Kesehatan Nasional (JKN) has been instrumental in improving access to essential healthcare services, particularly for the most vulnerable populations. The difference-in-differences (DID) analysis revealed that the poorest quintile experienced the most significant gains in antenatal care (ANC) visits, skilled birth attendance (SBA), and immunization coverage, indicating that the JKN has been effective in reducing financial barriers to accessing these services. This finding is consistent with other studies that have documented increased utilization of healthcare services among disadvantaged groups following UHC reforms. The increase in ANC visits among the poorest quintile is particularly noteworthy, as ANC is crucial for the early detection and management of pregnancy-related complications. ANC provides an opportunity for healthcare providers to monitor the health of both the mother and the developing fetus, identify potential risks, and provide timely interventions to prevent adverse outcomes. The World Health Organization (WHO) recommends at least four ANC visits during pregnancy for low-risk pregnancies, and more frequent visits for high-risk pregnancies. Prior to the implementation of the JKN, many women in Indonesia, particularly those in the poorest quintile, faced financial barriers to accessing ANC. Out-of-pocket costs for ANC visits, including consultation fees, laboratory tests, and medications, could be prohibitive for poor households. As a result, many women either delayed or forwent ANC altogether, increasing their risk of pregnancy-related complications and adverse birth outcomes. The JKN has removed financial barriers to accessing ANC by providing comprehensive coverage for ANC visits, including consultation fees, laboratory tests, and medications. This has enabled more women, particularly those in the poorest quintile, to access ANC services, leading to a significant increase in ANC visits among this group. The increase in ANC visits among the poorest quintile is likely to have positive implications for maternal and child health outcomes. Studies have shown that ANC is associated with a reduced risk of maternal mortality, neonatal mortality, and low birth weight. By improving access to ANC, the JKN is likely to contribute to improved maternal and child health outcomes in Indonesia. Similarly, the increase in SBA among the poorest quintile is encouraging, as SBA is a critical factor in reducing maternal and neonatal mortality. SBA refers to the presence of a skilled health professional, such as a doctor, nurse, or midwife, during childbirth. Skilled birth attendants are trained to manage normal deliveries and to identify and manage complications that may arise during childbirth. Prior to the implementation of the JKN, many women in Indonesia, particularly those in the poorest quintile, gave birth at home without the assistance of a skilled birth attendant. This increased their risk of complications and adverse outcomes, as they did not have access to emergency obstetric care if needed. The JKN has improved access to SBA by providing coverage for childbirth services, including delivery fees and the costs of emergency obstetric care. This has enabled more women, particularly those in the poorest quintile, to give birth in health facilities with the assistance of a skilled birth attendant. The increase in SBA among the poorest quintile is likely to contribute to a reduction in maternal and neonatal mortality in Indonesia. Studies have shown that SBA is associated with a significant reduction in the risk of maternal and neonatal death. By improving access to SBA, the JKN is making childbirth safer for women in Indonesia, particularly those in the poorest quintile. The improvement in immunization coverage among the poorest quintile is also a positive development, as immunization is a cost-effective intervention that protects children from vaccine-preventable diseases. Immunization is one of the most successful public health interventions ever implemented, and it has been credited with saving millions of lives worldwide. Prior to the implementation of the JKN, many children in Indonesia, particularly those in the poorest quintile, did not receive the full course of recommended vaccinations. This increased their risk of contracting

vaccine-preventable diseases, such as measles, polio, and diphtheria. The JKN has improved access to immunization by providing coverage for all recommended vaccines. This has enabled more children, particularly those in the poorest quintile, to receive the full course of vaccinations, leading to a significant improvement in immunization coverage among this group. The improvement in immunization coverage among the poorest quintile is likely to have long-term benefits for child health and development. Immunization not only protects children from vaccine-preventable diseases, but it also contributes to improved cognitive development and educational attainment. By improving access to immunization, the JKN is investing in the future of Indonesia's children. The JKN's success in improving health service utilization among the poorest quintile can be attributed to its role in reducing financial barriers to accessing healthcare services. Prior to the implementation of the JKN, many people in Indonesia, particularly those in the poorest quintile, faced significant financial barriers to accessing healthcare. Out-of-pocket costs for healthcare services could be prohibitive for poor households, leading to delays in seeking care, forgoing care altogether, or incurring catastrophic health expenditures. The JKN has removed financial barriers to accessing healthcare by providing comprehensive coverage for a wide range of healthcare services, including outpatient care, inpatient care, and emergency care. This has enabled more people, particularly those in the poorest quintile, to access healthcare services without incurring financial hardship. The JKN's success in reducing financial barriers to healthcare is a major step towards achieving UHC in Indonesia. By ensuring that everyone has access to healthcare services without financial hardship, the JKN is contributing to improved health outcomes and reduced health inequities.[11-14]

Despite the positive impact of Universal Health Coverage (UHC) on health service utilization, the study also highlights the persistence of significant health disparities. While under-five mortality rate (U5MR) and stunting prevalence decreased across all wealth quintiles, the magnitude of the reduction was smaller in the poorest quintile compared to the wealthiest. This finding underscores the complex nature of health equity and the limitations of UHC in addressing the root causes of health disparities. The multivariable regression analysis further confirmed that socioeconomic status, as measured by wealth quintile, remained a powerful determinant of health outcomes even after controlling for JKN enrollment and other factors. This suggests that factors beyond healthcare access, such as poverty, malnutrition, and poor living conditions, continue to exert a significant influence on health outcomes. The persistence of health disparities despite the expansion of UHC coverage highlights the complex relationship between UHC and health equity. While UHC can improve access to healthcare services and reduce financial barriers to care, it cannot address the underlying social, economic, and environmental factors that contribute to health disparities. Health disparities are often rooted in deep-seated social and economic inequalities that have persisted for generations. These inequalities can manifest in a variety of ways, such as differences in income, education, housing, and access to nutritious food and safe water. These differences can lead to disparities in health outcomes, even when everyone has access to healthcare services. For example, children from poor households may be more likely to experience malnutrition, which can increase their risk of illness and death. They may also be more likely to live in overcrowded or unsanitary conditions, which can expose them to infectious diseases. These factors can contribute to higher rates of U5MR and stunting among children from poor households, even if they have access to healthcare services. The multivariable regression analysis confirmed that socioeconomic status, as measured by wealth quintile, remained a powerful determinant of health outcomes even after controlling for JKN enrollment and other factors. This finding is consistent with a large body of research that has documented the strong association between socioeconomic status and health. Socioeconomic

status influences health through a variety of pathways. People with lower socioeconomic status are more likely to experience stress, which can have negative effects on both physical and mental health. They are also more likely to engage in unhealthy behaviors, such as smoking and excessive alcohol consumption, which can increase their risk of chronic diseases. In addition, people with lower socioeconomic status are more likely to live in neighborhoods with poor environmental conditions, such as high levels of air pollution or limited access to green spaces. These environmental factors can also contribute to poor health outcomes. The persistence of health disparities despite the expansion of UHC coverage underscores the need for a multi-sectoral approach to address the root causes of health inequities. While UHC is an important step towards achieving health equity, it is not sufficient on its own. A multi-sectoral approach involves collaboration between different sectors, such as health, education, social welfare, and housing, to address the social, economic, and environmental factors that contribute to health disparities. This approach recognizes that health is not just the absence of disease, but a state of complete physical, mental, and social well-being. For example, interventions that improve access to nutritious food, safe housing, and quality education can help to address the social determinants of health that contribute to health disparities. Interventions that promote healthy behaviors, such as regular exercise and a balanced diet, can also help to improve health outcomes. In addition to a multi-sectoral approach, targeted interventions may be needed to address the specific needs of disadvantaged populations. These interventions may focus on improving access to healthcare services, addressing social determinants of health, or promoting healthy behaviors. For example, targeted interventions may be needed to improve access to healthcare services for people living in remote areas or those who are marginalized or excluded from mainstream society. These interventions may involve mobile clinics, community health workers, or telemedicine. Targeted interventions may also be needed to address the social determinants of health that contribute to health disparities. These interventions may involve programs to improve access to nutritious food, safe housing, and quality education. Monitoring and evaluation are essential for tracking progress towards achieving health equity and identifying areas where further efforts are needed. Monitoring involves collecting data on health outcomes and health disparities, while evaluation involves assessing the effectiveness of interventions aimed at improving health equity. Monitoring and evaluation data can be used to inform policy decisions and to improve the design and implementation of interventions. They can also be used to hold governments and other stakeholders accountable for their commitments to achieving health equity.[15-17]

The persistence of health disparities despite increased healthcare access highlights the crucial role of social determinants of health (SDOH) in shaping health equity. SDOH are the conditions in the environments where people are born, live, learn, work, play, worship, and age that affect a wide range of health, functioning, and quality-of-life outcomes and risks. They encompass a broad spectrum of factors, including economic stability, education access and quality, health care access and quality, neighborhood and built environment, and social and community context. These conditions have a profound impact on health outcomes, contributing significantly to health disparities observed across different socioeconomic groups. Health disparities, which are preventable differences in the burden of disease, injury, violence, or opportunities to achieve optimal health that are experienced by socially disadvantaged populations, are often deeply rooted in social and economic inequalities. These inequalities can manifest in various ways, such as disparities in income, education, housing, employment, and access to resources like nutritious food, safe water, and quality healthcare. Such disparities create differential opportunities for individuals to achieve good health, leading to variations in health outcomes across

different socioeconomic groups. For instance, poverty, a major social determinant of health, can severely limit access to nutritious food, safe and affordable housing, and quality education. Malnutrition and substandard living conditions can increase the risk of illness and death, particularly among children, contributing to higher rates of under-five mortality and stunting. Lack of education can limit health literacy, hindering individuals' ability to understand health information and make informed decisions about their health, and can also restrict opportunities for economic advancement, perpetuating the cycle of poverty and poor health. Socioeconomic status, often measured by factors like income, education, and occupation, has been consistently identified as a powerful determinant of health outcomes. Individuals with lower socioeconomic status tend to experience poorer health compared to those with higher socioeconomic status. This association is evident across a wide range of health indicators, including life expectancy, infant mortality, chronic diseases, and mental health. The pathways through which socioeconomic status influences health are multifaceted. People with lower socioeconomic status often face greater exposure to stress due to financial insecurity, job instability, and discrimination. Chronic stress can have detrimental effects on both physical and mental health, increasing the risk of cardiovascular disease, depression, and other health problems. They may also be more likely to engage in unhealthy behaviors, such as smoking, excessive alcohol consumption, and poor dietary habits, as a way to cope with stress or due to limited access to healthier options, further increasing their risk of chronic diseases. Furthermore, people with lower socioeconomic status are more likely to reside in neighborhoods with poor environmental conditions, such as high levels of air and water pollution, lack of access to green spaces and recreational facilities, and higher exposure to crime and violence. These environmental factors can contribute to a range of health problems, including respiratory diseases, cardiovascular disease, and mental health issues. The persistence of health disparities despite increased healthcare access underscores the need for a comprehensive approach that addresses both healthcare access and social determinants of health. While UHC plays a crucial role in improving access to healthcare services and reducing financial barriers to care, it cannot, on its own, address the underlying social and economic factors that contribute to health disparities. A comprehensive approach to health equity requires a multi-sectoral strategy that involves collaboration between different sectors, such as health, education, social welfare, housing, and economic development. This approach recognizes that health is not solely determined by healthcare services, but is also influenced by a complex interplay of social, economic, and environmental factors. For example, interventions that improve access to nutritious food, safe and affordable housing, and quality education can help to address the social determinants of health that contribute to health disparities. Programs that promote early childhood development, provide job training and employment opportunities, and reduce income inequality can also contribute to improved health outcomes. In addition to a multi-sectoral approach, targeted interventions may be needed to address the specific needs of disadvantaged populations. These interventions may focus on improving access to healthcare services, addressing social determinants of health, or promoting healthy behaviors. For example, targeted interventions may be needed to improve access to healthcare services for people living in remote areas or those who are marginalized or excluded from mainstream society. These interventions may involve mobile clinics, community health workers, telemedicine, and culturally appropriate health education programs. Targeted interventions may also be needed to address the social determinants of health that contribute to health disparities. These interventions may involve programs to improve access to nutritious food, safe and affordable housing, and quality education initiatives to reduce poverty and income inequality and efforts to create healthier environments. Community empowerment is a critical component of addressing

social determinants of health and achieving health equity. Community empowerment involves engaging and empowering communities to identify and address their own health needs and priorities. Empowered communities are better equipped to advocate for policies and programs that promote health equity, and they are more likely to participate in and support health interventions. Community empowerment can also lead to increased social cohesion and trust, which can further contribute to improved health outcomes.[18-20]

5. Conclusion

This study investigated the impact of Indonesia's Universal Health Coverage (UHC) policies on health equity metrics, using a longitudinal, quasi-experimental design with a difference-in-differences (DID) approach. Data were collected from a nationally representative sample of Indonesian households from 2014 (pre-JKN expansion) to 2022. The dataset included socioeconomic indicators, health service utilization, and health outcomes. The DID analysis compared changes in these metrics between groups with varying levels of pre-existing health insurance coverage and socioeconomic status. Multivariable regression models were used to control for confounding factors. The DID analysis showed that UHC expansion was associated with significant improvements in health service utilization, particularly among lower socioeconomic groups. However, while under-five mortality and stunting prevalence decreased overall, significant disparities persisted. Regression models confirmed that socioeconomic status remained a significant predictor of health outcomes even after controlling for UHC coverage. While Indonesia's UHC policies have improved access to healthcare services, significant health equity gaps remain. Addressing these disparities requires a multi-pronged approach that goes beyond financial protection and includes targeted interventions to address social determinants of health, improve health service quality, and enhance health literacy among disadvantaged communities.

6. References

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