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Active Membership in Indonesian National Health Insurance: A District Level Analysis

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ABSTRACT

Introduction: The Indonesian National Health Insurance (JKN) program in Indonesia has played an important role in providing access to health services for the community. Active membership is a key element in the development of the JKN program in Indonesia. High levels of active membership ensure financial stability, expanded coverage, and improved access to healthcare services. However, active membership in the program remains a challenge, with membership rates varying across regions. The purpose of this study was to analyze active membership and the factors influencing it at the district level.
Methods: This study used a cross-sectional design. Secondary data were sourced from the provincial central bureau of statistics in Indonesia and data from system monitoring of the national social security council in 2023. Data analysis was conducted at the district level with a sample size of 479 districts and municipalities. Robust multiple linear regression analysis was employed to assess the influence between literacy, employment, illness history, household expenditure, and active JKN membership.
Results: Findings based on cross-sectional data indicate that literacy and employment positively affect active JKN membership, while household expenditure has a negative effect; the illness history variable is not significant. Despite the model's overall significance (Prob > F = 0.00), it explains only 8.47% of the variation in JKN active membership (R-squared = 0.08).
Conclusion: Socioeconomic variables such as literacy, employment, and household expenditure are essential in developing JKN membership policies. Educational programs to raise health insurance awareness, along with policy interventions aimed at improving literacy, employment stability, and people's economic well-being, can contribute to increased membership in JKN.

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INTRODUCTION

Health is a basic right guaranteed by the state. The National Health Insurance (JKN) is an important policy in Indonesia that aims to improve access to and the quality of health services for all residents. It was implemented on January 1, 2014 and is managed by the Health Social Security Administering Body (BPJS Kesehatan). The main objective of JKN is to provide comprehensive and equitable health insurance for all Indonesians.

The JKN program in Indonesia has shown significant progress since its launch in 2014. It covered nearly the entire population. However, challenges persist, including disparities in access to services, service quality, and financial sustainability. Efforts to enhance the program's effectiveness and efficiency continue to achieve Universal Health Coverage (UHC).

Active membership is a key element in the development of the JKN program in Indonesia. High levels of active membership ensure financial stability, expanded coverage, and improved access to healthcare services. Active membership is blocked by non-compliance with premium payments. Non-compliance in paying premiums must be addressed to support the sustainability of the program in achieving universal health coverage.

Previous studies have found various factors that influence membership in health insurance programs. Income and employment are economic factors that are significantly related to JKN membership (1). In addition, education plays a role in increasing membership rates (2). However, those studies have primarily focused on the individual or household level. This study expands the analysis to include district-level factors such as literacy, employment, illness history, and household expenditure. Therefore, it offers a more comprehensive insight into the dynamics of membership across regions in Indonesia. This study addresses this research gap by analyzing district-level factors affecting JKN active membership, including literacy, employment, illness history, and household expenditure**.** By shifting the focus to regional influences, this study offers a novel perspective on how socioeconomic conditions at the district level influence JKN participation. The findings can contribute to more targeted policy interventions aimed at improving active membership rates and supporting the sustainability of JKN in achieving UHC.

Variations in regional autonomy and the capacity of local governments can influence the implementation of the JKN program at the district level. Addressing disparities in healthcare services across regions requires strong collaboration between regional governments, healthcare professionals, and the community (3). Understanding the effectiveness of the JKN program from the perspective of active membership at the district level is critical to evaluating the success and sustainability of the program. High levels of active membership reflect community engagement. It is crucial for financial stability and broad coverage of health services. Noncompliance in contribution payments and access gaps will provide insights into regional differences in membership. This information supports adjustments to policy, communication, and resource allocation strategies to improve program effectiveness and efficiency. By understanding the factors affecting active membership in detail, more targeted interventions can be implemented. This strengthens the achievement of universal health goals and increases public confidence in the national health insurance system. Therefore, the objective of this study is to analyze JKN active membership and its influencing factors at the district level in Indonesia.

METHODS

Research design

This study examined the factors influencing active membership in Indonesia's National Health Insurance (JKN) program at the district level across 479 districts and municipalities. The research used descriptive statistics and regression analysis to test the hypotheses. To ensure the robustness of the regression model, classical assumption tests, such as multicollinearity, heteroscedasticity, and normality, were conducted.

Population and Sample

This study utilized secondary data at the district and municipality level in Indonesia. Data on the variables of literacy, employment, illness history, and household expenditure were obtained from the 2023 provincial statistics, with each province reporting data for its respective districts and municipalities. These data were sourced from the provincial central bureau of statistic’s website and were freely accessible. Additionally, data on active JKN membership in 2023 were retrieved from the National Social Security Council (DJSN) monitoring and evaluation system database, available at https://sismonev.djsn.go.id (4). The study's population encompassed all districts and municipalities in Indonesia, while the sample included only those with complete data on all independent variables:

literacy, employment, illness history, and household expenditure. Out of the 34 provinces, districts and municipalities in Papua Province lacked data for these variables, and in West Papua Province, only a few districts and municipalities had complete data. Consequently, a total of 479 districts and municipalities were included in the study's sample.

Data Analysis

Validation checks for missing values in the datasets were performed to ensure data accuracy and reliability. The dependent variable, active JKN membership, was normally distributed. Among the independent variables, only the literacy variable followed a normal distribution, while the variables for employment, illness history, and household expenditure did not. Therefore, these three non-normally distributed variables were transformed into categorical dummy variables with a median cutoff point. The active membership variable represented the percentage of active JKN memberships in districts and municipalities in 2023. The literacy variable was defined as the literacy development index for districts and municipalities in 2023. The employment variable measured the percentage of the population employed compared to the labor force in 2023 and was categorized as 0 = low (<96%) and 1 = high (≥96%). The illness history variable indicated the percentage of the population reporting health complaints in the past month in districts and municipalities in 2023, categorized as 0 = low (<25.6%) and 1 = high (≥25.6%). Lastly, the household expenditure variable represented monthly spending on food and non-food items in Rupiah for districts and municipalities in 2023, categorized as 0 = low (<Rp 1,242,526) and 1 = high (≥Rp 1,242,526). Linear regression analysis was employed to predict factors influencing active JKN membership.

Ethics approval

This study was granted by the Ethics Committee of the Health Research Faculty of Public Health at Sriwijaya University, under approval number 263/UN9.FKM/TU.KKE/2024.

RESULTS

Descriptive Statistics

Characteristics of Districts and Municipalities

The normality test checks if both variables, independent and dependent follow a normal distribution. Using the Skewness and Kurtosis test indicates that the p-value for independent variable literacy is 0.09, and then independent variables: employment, illness history, and household expenditure are 0.00. For active membership as a dependent variable, the p-value is 0.06. For employment, illness history, and household expenditure variables that have a p-value of 0.00, the data is not normally distributed and is converted into a binary categorical variable with a median cutoff point. Table 1 shows the characteristics of the districts and municipalities in Indonesia that became the unit of analysis in this study.

Table 1. Characteristics of Districts and Municipalities (n=479)

Variabel	Mean	Std. Dev	f	%
Active membership (%)	81.78	7.46	-	-
Literacy (%)	60.92	13.20	-	-
Employment (%)	-	-		
Low (<96)			236	49.27
High (≥96)			243	50.73
Illness history (%)	-	-		
Low (<25.6)			236	49.27
High (≥25.6)			243	50.73
Household expenditure (Rp)	-	-		
Low (<1,242,526)			239	49.90
High (≥1,242,526)			240	50.10

Active JKN Membership

Figure 1 provides the percentage of active JKN membership across Indonesia in 2023, highlighting regional variations and overall national coverage, which reflect the program's reach and effectiveness in enrolling participants.

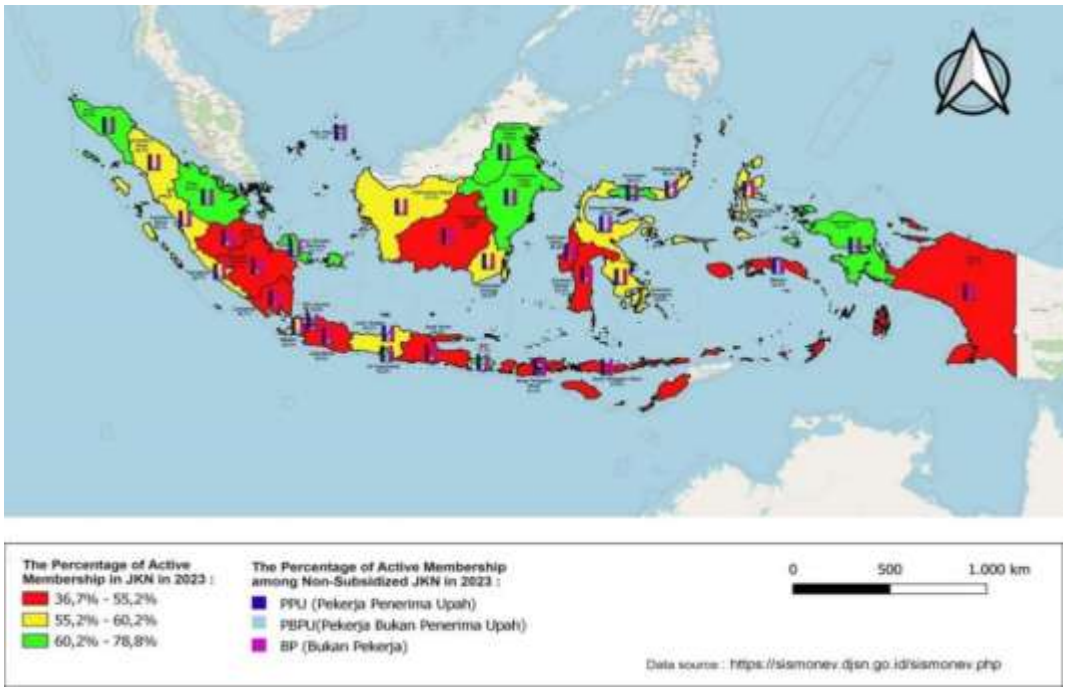

Figure 1. Percentage of Active JKN Membership in 34 Provinces of Indonesia in 2023

Geographical variations in active membership can be used to identify areas that require further attention and interventions to increase membership in the JKN program. In Indonesia, 10 provinces exhibit active membership rates ranging from 60.2% to 78.8%, while 12 provinces have rates between 55.2% and 60.2%, and another 12 provinces range from 36.7% to 55.2%. Notably, all provinces in Java, Bali, and Nusa Tenggara demonstrate suboptimal levels of active membership. This aligns with findings from a previous study (5), indicating that the Java region has yet to achieve maximum active membership in the JKN program.

Primary Outcome Measures

Linear Regression Analysis

The study applied multiple linear regression to examine the influence of variables: literacy, employment, illness history, and household expenditure on the dependent variable of JKN active membership. The mathematical regression model is as follows: active membership = 12.99 + 0.14 literacy + 0.64 employment + 0.01 illness history - 0.00 household expenditure + e.

Classic Assumption Tests

The Shapiro-Wilk test indicates that the regression model did not meet the assumption of normality for this study, with a p-value of 0.00 < 0.05. Based on the Breusch-Pagan test, there is significant evidence that the model's residual variance is not constant, indicating the presence of heteroscedasticity with a p-value of 0.03 < 0.05. This outcome did not satisfy a classical assumption of regression, where the variance of the residuals (errors) should be constant across all levels of the predictors or there is homoscedasticity. Table 2 presents the results of the multicollinearity test.

Table 2. The Variance Inflation Factor (VIF) for Multicolinearity Test

Variable	VIF	1/VIF
Literacy	1.09	0.92
Employment	1.16	0.86
Illness history	1.03	0.97
Household expenditure	1.29	0.78
Mean VIF	1.14	

The Variance Inflation Factor (VIF) is employed to detect multicollinearity among predictors in regression. If the VIF value < 10 or tolerance value > 0.01, it is stated that there is no multicollinearity. The VIF test results of <10 for all variables in this study suggest that there is no significant problem with multicollinearity in the model, fulfilling the classical assumption that independent variables should be largely independent for reliable regression results.

According to the results of the classical assumption tests, including normality, heteroscedasticity, and multicollinearity tests, only the assumption of multicollinearity was met. Hence, it is essential to perform a further robust linear regression analysis.

Simultaneous Test (F-Test)

The F-test in robust linear regression is used to test the significance of the overall regression model. If the F-test value is significant (p-value < significance level), then the regression model is considered good and at least one independent variable shows a significant relationship with the dependent variable. With an F-statistic of 9.58 and a p-value of 0.00, the overall multiple linear regression model is significant at the 5% level. Therefore, there is strong evidence that at least one of the independent variables significantly influences the dependent variable.

Table 3. Model Summary and Simultaneous Test (F-Test)

Source	df	F	p-value	R^2	RMSE
Model	4	9.58	0.00<0.05	0.08	7.16
Residual	474				
Total	479				

Note: df: degree of freedom; R^2: R-squared; RMSE: root mean squared error

Partial Test (t-test)

The t-test in robust linear regression analyzes the significance of each regression coefficient by comparing the coefficient to its standard error. If the p-value is smaller than the significance level (0.05), the independent variable is considered statistically significant in influencing the dependent variable. Table 4 below is the t test result.

Table 4. Model Summary and Partial Test (t-Test)

Variable	Coefficients	Robust std. error	t	p-value
Intercept	72.55	1.75	41.52	0.00
Literacy	0.15	0.02	5.66	0.00
Employment	1.95	0.69	2.84	0.01
Illness history	-0.38	0.66	-0.58	0.56
Household expenditure	-1.49	0.70	-2.14	0.03

The table illustrates that the variables literacy and employment significantly influence the active membership of JKN, with literacy being positively related (coefficient 0.15, p-value 0.00) and employment also positively related (coefficient 1.95, p-value 0.01). Household expenditure shows a significant negative relationship (coefficient -1.49, p-value 0.03). In contrast, illness history has no significant effect on the dependent variable (coefficient -0.38, p-value 0.56). The robust regression equation is active membership = 72.55 + 0.15 literacy + 1.95 employment - 0.38 illness history -1.49 household expenditure + e.

Both literacy and employment positively impact membership, with an increase in the literacy development index raising the membership percentage by 0.15 in a district and municipality. Districts and municipalities with higher employment rates boost active JKN membership by 1.95 times compared to those with lower employment rates. In contrast, higher household expenditure negatively impacts membership, reducing it by 1.49 for each unit increase in expenditure. The illness history variable does not have a significant effect on active JKN membership. The intercept of 72.55 represents the predicted membership percentage when all other variables are set to zero.

Goodness of Fit Test

The coefficient of determination (R^2) in the robust regression model summary table reflects the degree to which the independent variables together account for the variability in the dependent variable. This value is presented in the R square column. It reveals the model's goodness of fit and the relationship degree between the independent and dependent variables. The R-squared value of 0.08 indicates that the model explains 8.47% of the variation of active membership. The root mean square error (RMSE) is 7.16, reflecting the average prediction error as 7.16% of the predicted values. Other unobserved factors, such as regional healthcare infrastructure or local government policies, may influence active membership. A more comprehensive dataset could provide better insights.

DISCUSSION

Interpretation of Key Findings

Multiple linear regression was conducted to examine the influence of literacy, employment, illness history, and household expenditure on active membership in Indonesia's JKN program. The coefficient of determination ($R^2 = 0.08$) indicates that these variables account for 8% of the variability in active membership, indicating a moderate level of model fit.

Comparison with Previous Studies

The literacy variable exhibits a highly significant association with active membership in the JKN program. A p-value of 0.00 suggests a strong correlation between regional literacy levels and active membership in JKN. Specifically, higher literacy levels are associated with greater membership in the program. Enhanced literacy can raise awareness about the importance of health insurance and promote active engagement in JKN. A previous systematic review and meta-analysis included fifteen studies with a total of 8,418 participants. The study stated that the Community-Based Health Insurance (CBHI) scheme knowledge (OR = 4.35, 95% CI 2.69, 6.01) significantly influences CBHI enrollment (6). Another study in Ethiopia revealed that the utilization rate of Community-Based Health Insurance (CBHI) among informal workers was 49.8%. Monthly income less than 1,500 Ethiopian Birr and adequate knowledge were statistically significant factors correlated with the CBHI utilization by informal workers in Ethiopia (7). Moreover, a lack of CBHI knowledge and unaffordable premium costs were determinants for dropping out of CBHI membership (8). The majority of respondents (63.2%) did not comply with JKN contribution payments, consistent with the findings of this study. Statistical analysis of the previous study identified that knowledge ($p = 0.016$) and compliance with JKN contribution payments ($p = 0.001$) were significant variables (9). Additionally, inadequate information was identified as a factor related to the health insurance discontinuation in Lumbini Province, Nepal (10). Knowledge about CBHI (AOR = 1.93, 95% CI: 1.32, 2.82) was associated with the dropout rate in the CBHI scheme in Ethiopia (11).

The employment variable also showed a significant association with active membership in JKN, with a p-value of 0.01. This means that employment status or the percentage of the working population in districts and municipalities has an impact on the level of membership in JKN. Stable employment and sufficient income tend to make individuals more able and willing to participate in health insurance programs. Thus, policies to increase employment opportunities may have a positive impact on increasing membership in JKN. In previous studies, the willingness to pay for social health insurance among civil servants in Ethiopia was low. The willingness to pay for social health insurance is significantly associated with monthly salary (12). Furthermore, the results of a meta-analysis study revealed that the dropout rate from health insurance schemes is 34.0% (95% CI: 23-44%), with a renewal rate of 66.0%. This dropout rate was associated with socioeconomic variables such as employment (13).

The absence of a notable correlation between illness history and active membership in JKN could be due to several factors. One of the main reasons is the dominance of economic factors influencing individual decisions to pay premiums. Economic constraints lead individuals to prioritize daily basic needs over health insurance premium payments. Additionally, an illness history that may require intensive care is not always a driving factor for regular premium payments. Furthermore, low health risk perception among the population and dissatisfaction with the accessibility and quality of JKN services contribute to this lack of correlation. Perception of inadequate healthcare services is a major factor contributing to the non-renewal of health insurance (14). Healthcare service factors, such as low availability of medicines, lack of diagnostic tests, absence of specialist doctors, and unfriendliness of healthcare workers **,** contribute to high dropout rates in insurance (15). Moreover, a lack of information about the

JKN benefits and the availability of alternative health insurance options may explain why an illness history does not influence increased active membership. Other research indicates that high health insurance dropout rates are often attributed to infrequent illness within the household (16). Similarly, a study in China revealed that individuals who view themselves as healthy are more likely to cancel their insurance policies (17). This study highlighted several factors influencing households' decisions to withdraw from CBHI, including personal illness experiences and frequent health facility visits (18). It reported a dropout rate of 28.2% (95% CI: 23.6%-33.2%). No chronic illness in the family (aOR: 1.95, 95% CI: 1.07-3.59) and the perception of good family health status (aOR: 4.21, 95% CI: 1.21-14.65) were statistically significant variables associated with withdrawing from Social Health Insurance (SHI) (19). Both the decision to enroll and withdraw are significantly associated with the presence of chronic illness. Chronic illness positively influences both enrollment and continued membership in the scheme (20).

The household expenditure variable showed a significant association with active membership in JKN, with a p-value of 0.03. Higher household expenditure, for both food and non-food items, may indicate better welfare, which in turn may increase an individual's ability to pay JKN contributions and participate more actively in the program. To support participation, it is crucial to strengthen contribution assistance for low-income groups. Our findings are consistent with those from Ghana, where the insurance dropout rate ranged from 41% to 53% between 2014 and 2016, with indigenous (poor) populations being the primary contributors (21). Similarly, the renewal rate in Uganda is strongly associated with household wealth status (22). One cause of payment discontinuation is also the inability to pay the required contributions (8,23). This study identifies that having a stable monthly income increases the probability of health insurance payment (24). The research results indicate that financial difficulties are significantly associated with non-compliance among informal workers in paying NHI contributions (25). The prevalence of community-based health insurance registration in Ethiopia is 20.2%. At the individual level, the wealth index is significantly associated with community-based health insurance registration (26). Non-compliance among JKN participants in paying premiums is influenced by factors originating from the participants themselves, particularly their financial capability (27).

Implications for Public Health

The F-test confirms the overall model significance ($F = 9.58$, $p = 0.00$), underscoring that at least one independent variable significantly affects active membership. However, individual t-tests reveal that literacy, employment, and household expenditure have a significant impact on JKN membership ($p < 0.05$). This highlights the need for focused interventions to enhance JKN membership, potentially emphasizing financial factors and other socioeconomic variables, like literacy and employment.

Limitations and Cautions

This study has several limitations, including its focus on district and municipality-level factors, which may not capture individual or household-level factors. The use of categorical variables and secondary data from provincial reports and JKN monitoring systems may limit the analysis's accuracy and detail. Additionally, as the data is from 2023, the results may not reflect subsequent changes.

Recommendations for Future Research

The findings highlight the importance of literacy, employment, and household expenditure in influencing active JKN membership. Additional analysis should include individual, household, and district-level data. Further research is needed to better understand how socioeconomic and health-related factors influence active membership and JKN coverage.

CONCLUSION

This study identified the factors influencing active membership in the Indonesian National Health Insurance (JKN) program across 479 districts in 2023. Multiple linear regression analysis identified literacy, employment, and household expenditure as significant determinants. The model demonstrated statistical reliability and significance. Enhancing literacy, employment stability, and economic well-being through educational programs and policy interventions can boost JKN membership. Specific strategies such as targeted outreach campaigns in underserved regions or policy adjustments on subsidizing premiums, can be proposed. These initiatives would further strengthen

efforts to increase active JKN membership, ensuring broader and more equitable access to healthcare services. Further multilevel research is recommended for a deeper understanding of influencing factors.

AUTHORS' CONTRIBUTION STATEMENT

Asmaripa Ainy contributed in conceptualization, methodology, data collection, data analysis, and writing the original manuscript; Pujiyanto contributed in writing, reviewing, and editing the manuscript. All authors have read and agreed to the published version of the manuscript.

CONFLICTS OF INTEREST

The authors declare no conflict of interest regarding the publication of this study.

DECLARATION OF GENERATIVE AI AND AI-ASSISTED TECHNOLOGIES IN THE WRITING PROCESS

The authors declare that they did not use Generative AI or AI-Assisted Technologies during the writing of this manuscript.

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