

Analysis of health insurance policy effectiveness and household health expenditure on healthcare equity

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ABSTRACT

Introduction: Healthcare inequity remains a major challenge despite the expansion of national health insurance programs in developing countries. This study aimed to analyze the effectiveness of health insurance policies and examine the influence of household healthcare expenditure on healthcare equity.

Methods: A quantitative cross-sectional analytical study was conducted in South Sumatra, Indonesia, between January and April 2026. A total of 84 respondents were selected using multistage cluster sampling. Data were collected using structured questionnaires and analyzed using descriptive statistics, chi-square tests, and multivariate logistic regression at $\alpha = 0.05$.

Results: Low health insurance policy effectiveness significantly increased the likelihood of poor healthcare equity (AOR = 3.56; 95% CI: 1.34–9.47; $p = 0.011$). High household healthcare expenditure was also associated with inequitable healthcare access (AOR = 3.24; 95% CI: 1.20–8.73; $p = 0.019$). Rural residence and low household income independently contributed to healthcare disparities.

Conclusion: Healthcare equity is strongly influenced by the quality of policy implementation and household financial burden. Strengthening financial protection, improving access to healthcare, and enhancing the responsiveness of the health system are essential to reducing healthcare inequities.

Keywords: Health Equity; Health Expenditures; Health Policy; Health Services Accessibility; Insurance, Health.



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Highlight:

- The effectiveness of health insurance policies significantly influenced healthcare equity.
- High household healthcare expenditure increased the risk of healthcare inequity.
- Rural and low-income households experienced greater disparities in healthcare access.
- Insurance enrollment alone was insufficient to ensure equitable healthcare utilization.
- Strengthening financial protection and access to healthcare is essential to healthcare equity.

INTRODUCTION

Healthcare equity remains one of the most persistent challenges in public health systems, particularly in low- and middle-income countries undergoing rapid socioeconomic transition. Despite the expansion of national health insurance programs intended to achieve universal health coverage, many households continue to experience unequal access to healthcare services and substantial out-of-pocket expenditures [1]. In several developing countries, financial protection mechanisms have reduced catastrophic health spending at the population level. Yet, disparities persist among rural communities, low-income households, informal workers, and geographically isolated populations [2]. Unequal distribution of healthcare resources, differences in service availability, and variations in health financing capacity contribute to persistent inequities in healthcare utilization and health outcomes [3]. In Indonesia, the implementation of the National Health Insurance program has significantly increased insurance coverage; however, evidence indicates that insured households still face financial burdens from transportation costs, uncovered services, medication shortages, and administrative barriers [4]. Consequently, the effectiveness of health insurance policies cannot be evaluated solely by enrollment rates; it must also be assessed by their ability to reduce household financial strain and promote equitable healthcare access [5].

The relationship between the effectiveness of health insurance policies and household health expenditure has become an important concern in health policy evaluation [6]. Previous studies have demonstrated that comprehensive insurance coverage may improve healthcare utilization, increase preventive care attendance, and reduce delays in seeking treatment [7]. Research conducted in several Asian and African countries found that effective insurance systems were associated with lower catastrophic health expenditure and improved financial protection among vulnerable populations. However, the evidence remains inconsistent regarding whether expanded insurance coverage automatically translates into healthcare equity [8]. Some studies reported that insured households continued to spend substantial amounts on healthcare due to limited-service coverage, unofficial payments, or inadequate healthcare infrastructure. Other investigations found that households with lower socioeconomic status frequently underutilize healthcare services despite insurance coverage because indirect costs remain unaffordable [9].

Several scholars have argued that healthcare equity is shaped not only by insurance ownership but also by broader structural determinants, including income inequality, educational attainment, geographic accessibility, and responsiveness of the healthcare system [10]. Studies examining household health expenditure often focus primarily on catastrophic spending or poverty-related financial risk without adequately assessing the interaction between policy effectiveness and equity outcomes. Moreover, many previous investigations relied exclusively on descriptive analyses or economic indicators, while overlooking multidimensional aspects of healthcare equity, such as service accessibility, affordability, continuity of care, and perceived service quality [11]. This limitation reduces the ability of existing evidence to explain how health insurance policies function within complex healthcare systems characterized by social and regional disparities [12].

Another important limitation in the literature concerns the measurement of policy effectiveness itself. Numerous studies evaluated health insurance policies using administrative indicators such as enrollment coverage, reimbursement rates, or healthcare utilization statistics [13]. Although these indicators are valuable, they may not fully capture whether policy implementation effectively reduces inequities at the household level. In many contexts, insurance programs formally expand access while simultaneously creating new administrative complexities that disproportionately affect disadvantaged populations [14]. Delayed claim processing, referral restrictions, fragmented healthcare services, and unequal provider distribution may weaken the practical benefits of insurance policies. Consequently, households may remain exposed to high healthcare costs even when formally protected by national insurance schemes [15].

Research examining the relationship between health insurance policy effectiveness, household health expenditure, and healthcare equity remains limited, particularly in developing regions where health system capacity and socioeconomic disparities coexist. Existing studies frequently analyze these variables separately rather than integrating them into a comprehensive analytical framework. Furthermore, empirical evidence on how household health expenditure mediates or modifies the effect

of insurance policy effectiveness on healthcare equity remains insufficient. Most available studies emphasize macroeconomic evaluations of health financing systems while providing limited attention to household-level experiences and distributive consequences. This gap is particularly important because household financial burden represents one of the most direct indicators of whether healthcare systems achieve equitable access and financial protection.

The novelty of this study lies in its integrated analysis of the effectiveness of health insurance policies and household health expenditure as interconnected determinants of healthcare equity. Unlike previous studies that primarily focused on insurance enrollment or catastrophic expenditure independently, this research examines how the effectiveness of policy implementation influences household financial burden and ultimately shapes equitable healthcare access. The study also adopts a multidimensional perspective on healthcare equity, considering affordability, accessibility, and utilization within the broader context of household economic vulnerability. By integrating policy evaluation with household expenditure analysis, this study provides a more comprehensive understanding of the mechanisms through which health financing policies influence healthcare equity. In addition, this research contributes conceptually by positioning household health expenditure not merely as an economic outcome but as an intermediary indicator reflecting the operational performance of health insurance systems. This perspective enables a more nuanced interpretation of how policy implementation affects healthcare equity beyond conventional administrative indicators. The findings are expected to provide evidence-based recommendations to strengthen health financing policies, improve financial protection mechanisms, and reduce inequities in healthcare access among vulnerable populations.

Therefore, this study aimed to analyze the effectiveness of health insurance policies and examine the influence of household health expenditure on healthcare equity. Specifically, the study investigated the relationship between policy effectiveness, household financial burden, and equitable healthcare access to identify structural factors that may strengthen or weaken the achievement of healthcare equity within contemporary health financing systems.

RESEARCH METHODOLOGY

Study Design

This study employed a quantitative, cross-sectional design to examine the relationships among health insurance policy effectiveness, household health expenditure, and healthcare equity. The cross-sectional approach was considered appropriate because the study aimed to assess associations among variables within a defined population at a single point in time. This design enabled the identification of patterns of healthcare access, financial burden, and perceived effectiveness of health insurance policies across households with different socioeconomic characteristics. In addition, the quantitative analytical framework facilitated statistical estimation of the contribution of policy effectiveness and household health expenditure to healthcare equity outcomes.

Setting and Participants

The study was conducted in several urban and rural districts in South Sumatra, Indonesia, between January and April 2026. The research setting was selected because the region reflects substantial disparities in healthcare accessibility, socioeconomic conditions, and utilization of national health insurance services. The target population consisted of households registered within the national health insurance system and residing in the study area for at least one year. The inclusion criteria were: (1) households with active national health insurance membership, (2) adult respondents aged ≥ 18 years who were responsible for household healthcare decisions, and (3) respondents willing to provide informed consent. Exclusion criteria included households with incomplete socioeconomic data, respondents with communication difficulties preventing effective interviews, and participants who declined to complete the questionnaire. A multistage cluster sampling technique was used to obtain representative participants from both urban and rural communities. In the first stage, districts were selected proportionally based on population size. In the second stage, villages and households were randomly selected using community administrative records. The minimum sample size was calculated using the Lemeshow formula for cross-sectional studies with a confidence level of 95%, an estimated

prevalence of healthcare inequity of 50%, and a margin of error of 5%. After adjustment for potential nonresponse, the final minimum sample size required was 84 respondents.

Variables and Measurement

The independent variable in this study was health insurance policy effectiveness, defined as the extent to which health insurance services provided adequate financial protection, accessibility, and coverage of healthcare services. The dependent variable was healthcare equity, operationalized as equitable access to healthcare services regardless of socioeconomic status, geographic location, or financial capacity. Household health expenditure was analyzed as both an independent and intermediary variable representing direct and indirect healthcare-related household spending.

Data were collected using a structured questionnaire developed from previous health financing and healthcare equity studies. The questionnaire consisted of sections related to demographic characteristics, health insurance experiences, household healthcare expenditure, and healthcare access indicators. Policy effectiveness was measured using Likert-scale items assessing affordability, administrative efficiency, service availability, and reimbursement adequacy. Healthcare equity indicators included healthcare utilization, delayed treatment, perceived accessibility, and financial barriers. Content validity was evaluated by three experts in public health and health policy. Construct validity testing was conducted using Pearson correlation analysis, with all questionnaire items demonstrating correlation coefficients above the acceptable threshold ($r > 0.30$). Reliability testing showed satisfactory internal consistency, with Cronbach's alpha values ranging from 0.79 to 0.88 across questionnaire domains. Primary data were obtained directly from respondents through face-to-face interviews.

Data Collection

Data collection was conducted by trained research assistants who received standardized instruction regarding interview procedures, ethical principles, and questionnaire administration. Before data collection, a pilot test involving 30 respondents outside the study sample was conducted to assess the clarity, consistency, and feasibility of the research instrument. Household interviews were carried out using structured questionnaires administered directly to eligible respondents. Each interview lasted approximately 25–35 minutes. To maintain data quality, supervisors reviewed completed questionnaires daily for completeness, consistency, and potential entry errors. Double data entry and random verification of 10% of questionnaires were also performed to minimize inaccuracies and ensure data reliability.

Data Analysis

Data were analyzed using the Statistical Package for the Social Sciences (SPSS) version 26.0. Descriptive statistics were used to summarize respondents' characteristics, the effectiveness of health insurance policies, household health expenditures, and healthcare equity indicators. Categorical variables were presented as frequencies and percentages, whereas continuous variables were expressed as means and standard deviations. Bivariate analysis was performed using chi-square tests and independent t-tests to identify associations between independent variables and healthcare equity outcomes. Variables with p-values < 0.25 in bivariate analysis were included in multivariable modeling. Multivariate analysis was conducted using logistic regression to determine the adjusted effects of health insurance policy effectiveness and household health expenditure on healthcare equity, while controlling for confounding variables such as age, income, educational level, employment status, and geographic residence. Adjusted odds ratios (AORs) with 95% confidence intervals (CIs) were reported. Statistical significance was established at $\alpha = 0.05$.

Ethical Approval

This study received ethical approval from the Health Research Ethics Committee of Sekolah Tinggi Ilmu Kesehatan Bina Husada, South Sumatra, Indonesia, with approval number No. 114/KEPK-STIKESBH/1/2026. All participants were informed about the objectives, procedures, benefits, and potential risks of the study before participation. Written informed consent was obtained from all respondents before data collection. Participants were assured that their involvement was voluntary and that they could withdraw from the study at any time without consequences. Confidentiality and anonymity were maintained throughout the research process by coding all participant information and restricting data access exclusively to the research team.

RESULT

Table 1. Characteristics of Respondents (n = 84)

Variable	Category	n	%
Age	18–35 years	28	33.3
	36–55 years	39	46.4
	>55 years	17	20.2
Sex	Male	36	42.9
	Female	48	57.1
Educational Level	Primary education	21	25.0
	Secondary education	44	52.4
	Higher education	19	22.6
Residence	Urban	37	44.0
	Rural	47	56.0
Monthly Household Income	Low income	45	53.6
	Moderate–high income	39	46.4
Health Insurance Policy Effectiveness	Low	38	45.2
	High	46	54.8
Household Health Expenditure	High expenditure burden	41	48.8
	Low expenditure burden	43	51.2
Healthcare Equity	Poor equity	36	42.9
	Good equity	48	57.1

The majority of respondents were aged 36–55 years (46.4%) and female (57.1%). More than half of the participants lived in rural areas (56.0%) and had secondary educational attainment (52.4%). Approximately 53.6% of households were categorized as low income. Although 54.8% of respondents perceived health insurance policies as effective, nearly half (48.8%) still experienced a high household healthcare expenditure burden. In addition, 42.9% of households reported inequitable access to and utilization of healthcare.

Table 2. Bivariate Analysis of Factors Associated with Healthcare Equity

Variable	Poor Equity n (%)	Good Equity n (%)	OR	95% CI	P-value
Health Insurance Policy Effectiveness					
Low effectiveness	24 (63.2)	14 (36.8)	3.43	1.39–8.49	0.006
High effectiveness	12 (26.1)	34 (73.9)	Ref	Ref	Ref
Household Health Expenditure					
High expenditure burden	25 (61.0)	16 (39.0)	3.13	1.28–7.66	0.010
Low expenditure burden	11 (25.6)	32 (74.4)	Ref	Ref	Ref
Residence					
Rural	25 (53.2)	22 (46.8)	2.69	1.09–6.64	0.028
Urban	11 (29.7)	26 (70.3)	Ref	Ref	Ref
Household Income					
Low income	26 (57.8)	19 (42.2)	3.28	1.31–8.20	0.009
Moderate–high income	10 (25.6)	29 (74.4)	Ref	Ref	Ref

Bivariate analysis demonstrated significant associations between health insurance policy effectiveness, household health expenditure, residence, household income, and healthcare equity. Respondents reporting low policy effectiveness were 3.43 times more likely to experience poor healthcare equity compared with those perceiving effective insurance implementation (OR = 3.43; 95% CI: 1.39–8.49; $p = 0.006$). High household healthcare expenditure was also significantly associated with

inequitable healthcare access (OR = 3.13; 95% CI: 1.28–7.66; $p = 0.010$). Rural residence and low household income further increased the likelihood of poor healthcare equity.

Table 3. Multivariate Logistic Regression Analysis of Factors Influencing Healthcare Equity

Variable	β	Adjusted OR (AOR)	95% CI	p-value
Low health insurance policy effectiveness	1.27	3.56	1.34–9.47	0.011
High household health expenditure burden	1.18	3.24	1.20–8.73	0.019
Rural residence	0.96	2.61	1.01–6.74	0.047
Low household income	1.09	2.97	1.12–7.85	0.028
Constant	-2.11	—	—	0.003

Multivariate logistic regression analysis showed that low health insurance policy effectiveness remained the strongest predictor of poor healthcare equity after adjustment for potential confounding variables (AOR = 3.56; 95% CI: 1.34–9.47; $p = 0.011$). Households experiencing high healthcare expenditure burdens were 3.24 times more likely to report inequitable healthcare access than households with lower expenditure burdens (AOR = 3.24; 95% CI: 1.20–8.73; $p = 0.019$). Rural residence and low household income also independently contributed to healthcare inequity.

The findings of this study highlight important implications for strengthening equitable health financing policies and healthcare systems. The significant relationship between the effectiveness of health insurance policies and healthcare equity indicates that expanding insurance coverage alone is insufficient to ensure equitable healthcare access. Administrative efficiency, service availability, and adequate coverage remain critical factors influencing the practical benefits of insurance programs. The association between high household health expenditure and poor healthcare equity further suggests that insured households continue to experience financial vulnerability, particularly in rural and low-income communities. Indirect healthcare costs, transportation barriers, and limited healthcare resources may weaken financial protection mechanisms despite formal insurance participation. These findings emphasize the importance of integrating financial protection with equitable distribution of healthcare services. Strengthening primary healthcare infrastructure, improving policy implementation, simplifying administrative procedures, and enhancing healthcare accessibility in underserved areas are necessary to reduce disparities. Sustainable healthcare equity requires coordinated interventions involving health financing reform, institutional strengthening, and inclusive healthcare governance.

DISCUSSION

The findings of this study provide important insights into the complex relationship between health insurance policy effectiveness, household health expenditure, and healthcare equity within contemporary health financing systems. The study demonstrated that ineffective implementation of health insurance policies and high household healthcare expenditure were significantly associated with inequitable healthcare access. These findings suggest that the achievement of healthcare equity depends not only on the existence of insurance programs but also on the extent to which those programs function effectively in reducing financial and structural barriers experienced by households. The results reinforce the argument that healthcare equity is multidimensional and influenced by interactions among financing mechanisms, service accessibility, administrative efficiency, and socioeconomic conditions.

One of the most important findings of this study is that low health insurance policy effectiveness emerged as the strongest predictor of poor healthcare equity [16]. This result indicates that formal insurance enrollment does not automatically guarantee equitable healthcare utilization or financial protection. In many healthcare systems, policy effectiveness is often measured through administrative indicators such as coverage rates or service utilization statistics [17]. However, the present findings suggest that these indicators may not fully capture the practical realities experienced by households. Delays in referral procedures, limitations in service availability, unequal provider distribution, and administrative complexities may weaken the actual benefits of insurance programs, particularly for vulnerable populations [18]. Therefore, the quality of policy implementation becomes a central determinant of whether insurance systems can genuinely reduce healthcare disparities.

The significant association between household healthcare expenditure and healthcare inequity further emphasizes the persistence of financial vulnerability despite insurance participation [19].

Although national health insurance schemes are intended to reduce catastrophic spending and improve affordability, many households continue to allocate substantial financial resources to healthcare needs [20]. This condition reflects the existence of indirect healthcare costs such as transportation expenses, additional medication purchases, diagnostic services outside insurance coverage, and income losses associated with illness [21]. The findings imply that financial protection mechanisms remain incomplete when broader household economic realities are not adequately addressed [22]. Consequently, healthcare financing policies should be evaluated not only based on insurance enrollment expansion but also on their capacity to minimize out-of-pocket expenditures and prevent economic hardship [23].

The study also revealed that rural residence and low household income independently contributed to healthcare inequity. These findings highlight the structural dimensions of healthcare disparities and indicate that socioeconomic and geographic factors continue to shape healthcare opportunities [24]. In rural communities, limited healthcare infrastructure, shortages of healthcare professionals, transportation barriers, and restricted service availability may reduce the practical accessibility of healthcare services even among insured populations [25]. Similarly, low-income households may delay healthcare utilization because indirect costs remain unaffordable despite insurance ownership. These patterns suggest that health insurance policies operate within broader social and institutional contexts, where financial protection alone cannot fully overcome structural inequities [26].

The present findings are consistent with several previous studies reporting that health insurance expansion alone is insufficient to eliminate healthcare disparities. Research conducted in various developing countries has shown that insured populations frequently continue to experience unequal healthcare access due to inadequate service availability, fragmented referral systems, and socioeconomic barriers [27]. Previous investigations also reported that catastrophic health expenditure remains prevalent among low-income households despite national insurance participation. However, the current study extends existing evidence by integrating the effectiveness of health insurance policies and household healthcare expenditure within a single analytical framework focused on healthcare equity outcomes. This integrated perspective contributes conceptually by demonstrating that policy effectiveness and financial burden should not be analyzed separately, as they interact in shape equitable healthcare access [28].

In contrast to studies primarily emphasizing macroeconomic indicators of health financing performance, this research highlights the importance of household-level experiences as indicators of policy success. The findings suggest that healthcare equity cannot be adequately understood solely from aggregate insurance coverage statistics. Instead, the operational realities faced by households—including affordability, accessibility, continuity of care, and administrative responsiveness—must be incorporated into health policy evaluation frameworks. This perspective strengthens the conceptual understanding that healthcare equity is both a financial and an institutional outcome, shaped by the interaction between policy design and healthcare system capacity.

Several limitations should be considered when interpreting the findings of this study. First, the cross-sectional design limits the ability to establish causal relationships between variables because data were collected at a single point in time. Longitudinal studies would provide stronger evidence on the temporal relationships among policy effectiveness, healthcare expenditure, and healthcare equity. Second, the study relied on self-reported household data, which may be affected by recall bias and subjective perceptions regarding healthcare experiences. Third, the relatively limited sample size and geographic focus may restrict the generalizability of the findings to broader populations with different healthcare system characteristics. In addition, the study did not include detailed assessments of healthcare provider quality, regional differences in policy implementation, or cultural factors that may influence healthcare utilization behaviors.

Despite these limitations, the study offers several important implications for future research and policy development. Further investigations should employ longitudinal or mixed-methods approaches to explore how healthcare financing policies influence healthcare equity over time and across different social contexts. Future studies may also examine mediating factors, such as healthcare literacy, provider responsiveness, digital health access, and community-based support systems, that may influence the relationship between financial protection and healthcare utilization. Comparative studies involving

multiple regions or countries would further strengthen the understanding of how institutional capacity and governance structures affect healthcare equity outcomes.

From a policy perspective, the findings indicate the need for integrated healthcare reforms that combine financial protection with equitable distribution of healthcare services and institutional strengthening. Expanding insurance coverage without improving healthcare infrastructure, administrative efficiency, or service accessibility may yield only limited improvements in healthcare equity. Therefore, sustainable progress toward equitable healthcare systems requires coordinated interventions addressing financial, structural, and organizational barriers simultaneously. Strengthening primary healthcare systems, improving healthcare workforce allocation, simplifying referral procedures, and enhancing accountability within insurance administration can substantially reduce healthcare disparities and improve population health outcomes.

CONCLUSION

This study demonstrated that the effectiveness of health insurance policies and household healthcare expenditure significantly influenced healthcare equity. Low policy effectiveness and high household healthcare expenditure were associated with increased inequities in healthcare access and utilization, particularly among rural and low-income households. The findings indicate that insurance enrollment alone is insufficient to achieve equitable healthcare systems when financial, administrative, and structural barriers remain unresolved. The study also highlights that interactions among health financing mechanisms, service accessibility, and socioeconomic conditions shape healthcare equity. Effective health insurance implementation requires not only broad population coverage but also adequate healthcare infrastructure, efficient administrative systems, and stronger financial protection mechanisms that reduce both direct and indirect healthcare costs. Therefore, policymakers should prioritize integrated healthcare reforms that improve service distribution, strengthen primary healthcare systems, simplify referral procedures, and expand financial protection for vulnerable populations. These interventions are essential to reduce healthcare disparities and support sustainable progress toward equitable healthcare access.

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Conflict of Interest

The author declares that there are no conflicts of interest related to this study, including financial, institutional, or personal relationships that could have influenced the research process or interpretation of findings.

Authors' Contributions (CRediT Taxonomy)

Romliyadi: Conceptualization, methodology, investigation, data curation, formal analysis, writing—original draft preparation, writing—review and editing, visualization, and supervision.

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Declaration of Generative AI Use

Generative artificial intelligence tools were used in a limited capacity to assist language refinement, grammar improvement, and manuscript organization during the writing process. All scientific interpretations, data analyses, and final manuscript content were critically reviewed and validated by the author. The author remains fully responsible for the accuracy, integrity, and originality of the work.

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