

## The Role of Educational Attainment in Human Development: An Empirical Study of West Sumatra

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### ABSTRACT

This research aims to analyze the relationship between educational indicators—Mean Years of Schooling (RLS), Expected Years of Schooling (HLS), School Participation Rate (APS), and the Percentage of Population with Secondary and Higher Education (PP)—and the Human Development Index (HDI) in West Sumatra from 2014 to 2023. This study employs a quantitative approach using secondary data and multiple linear regression analysis to assess the influence of educational variables on human development. The population in this study consists of all districts and cities in West Sumatra over a ten-year period, with the sample selected using saturated sampling technique, including all available annual data points across the regions. The findings reveal a consistently positive and significant relationship between all educational indicators and HDI. Among these, the percentage of the population with secondary and higher education demonstrates the most substantial impact, emphasizing the pivotal role of advanced educational attainment in human development. These results are in line with the human capital theory and prior research, reinforcing education's essential role in enhancing health, income, and overall quality of life. This study provides valuable input for policymakers in formulating strategies to improve educational access and quality as a means to support regional development and promote social equity



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## INTRODUCTION

Education is widely recognized as a fundamental driver of human development and plays a critical role in shaping individual and societal well-being. In the context of Indonesia, education is not only a constitutional right but also a strategic investment to improve the Indeks Pembangunan Manusia (IPM) or Human Development Index, which integrates health, education, and standard of living indicators (UNDP, 2020; BPS, 2023). Among these components, education has a direct and substantial influence, as it contributes to the knowledge dimension of the IPM and indirectly affects income and health outcomes (World Bank, 2021; Hanushek & Woessmann, 2015).

In measuring educational progress, several indicators are used to reflect access, quality, and outcomes. Three critical education indicators in the IPM framework are Rata-rata Lama Sekolah (RLS) or Mean Years of Schooling, Harapan Lama Sekolah (HLS) or Expected Years of Schooling, and Angka Partisipasi Sekolah (APS) or School Participation Rates (BPS, 2023). These metrics provide insight into both historical and prospective access to formal education. RLS reflects the educational attainment of the adult population, while HLS estimates the number of years a child entering the school system can expect to spend in education, assuming age-specific enrollment ratios remain the same (OECD, 2020).

In addition to IPM components, educational achievement can also be captured through PP—the proportion of the population with secondary and higher education. This indicator is increasingly important in assessing the depth of human capital, especially as modern economies require higher cognitive, technical, and professional skills (Tan, 2021). Regions with higher levels of education tend to exhibit stronger economic performance, better employment prospects, and improved health outcomes (Psacharopoulos & Patrinos, 2018; Chadha & Sharma, 2022).

West Sumatra presents a compelling case for examining the link between education and human development. Despite improvements in national education indicators, disparities remain across provinces and districts, with some areas still facing challenges in education access, retention, and quality (ADB, 2020; Bappenas, 2022). These disparities are reflected in uneven progress in IPM values across the 19 districts and cities in the province (BPS Sumatera Barat, 2023). Understanding how education-related variables influence IPM at the regional level is essential for developing targeted policies that promote inclusive human development.

Several studies support the hypothesis that educational indicators significantly correlate with IPM outcomes. For instance, research in developing countries shows that improvements in RLS and HLS have a positive impact on IPM, especially when supported by equitable access to secondary and higher education (Montenegro & Patrinos, 2017; Yusuf & Suharti, 2019). APS, particularly at the junior secondary and senior secondary levels, has been shown to improve future educational attainment and reduce intergenerational poverty (UNESCO, 2022; ILO, 2021). Similarly, the share of the population with secondary and tertiary education is linked to productivity gains and better health behaviors, both of which are reflected in higher IPM scores (Heckman & Kautz, 2019).

In this study, we aim to analyze the relationship between educational attainment indicators—RLS, HLS, APS, and PP—and the Human Development Index (IPM) across districts in West Sumatra. By using recent data from Badan Pusat Statistik (BPS), this research seeks to quantify the extent to which variations in education indicators contribute to human development at the regional level. The findings will provide empirical evidence to support education-focused policies in efforts to enhance human capital and reduce development inequality within the province.

Moreover, the use of the Human Development Index (IPM) as a dependent variable offers a comprehensive view of the multifaceted benefits of education. IPM integrates three dimensions: health (life expectancy), education (mean and expected years of schooling), and standard of living (expenditure per capita), all of which are interconnected and mutually reinforcing (UNDP, 2020). Among these, the education component holds a pivotal role, not only as an outcome in itself but also as a determinant of the other two dimensions (OECD, 2020; Hanushek et al., 2019). For example, higher educational attainment is consistently associated with better employment opportunities, healthier lifestyles, and improved income levels (Montenegro & Patrinos, 2017; World Bank, 2021).

In Indonesia, education disparities between regions—particularly between urban and rural areas—remain a major challenge in achieving equitable human development. West Sumatra, despite its relatively moderate IPM ranking nationally, exhibits variation in educational achievements across its districts and cities. For instance, some urban districts have high school participation and tertiary attainment rates, while others still struggle with dropout rates and limited access to secondary schools (BPS Sumatera Barat, 2023). This variation presents a unique opportunity to empirically assess how disparities in education indicators correlate with overall human development within a single province.

From a policy standpoint, understanding the relationship between educational metrics—such as RLS, HLS, APS, and PP—and IPM can guide evidence-based decision-making. Investments in education, particularly at the secondary and tertiary levels, have been shown to yield long-term benefits by enhancing workforce readiness and reducing socio-economic vulnerabilities (Psacharopoulos & Patrinos, 2018; Tan, 2021). Furthermore, improving school participation and attainment in underdeveloped districts may serve as a strategy to reduce regional inequality and promote inclusive growth (ILO, 2021; Bappenas, 2022). Policymakers can leverage this relationship to design targeted interventions, such as conditional cash transfers, teacher deployment strategies, or school infrastructure investments.

Theoretically, this research is anchored in the human capital theory, which posits that education increases an individual's productivity, which in turn contributes to economic growth and societal development (Becker, 1993). Human capital accumulation, as measured through educational attainment and participation rates, is thus expected to show a significant positive relationship with the IPM. Numerous empirical studies across developing countries support this

proposition, highlighting how investments in schooling, particularly beyond the primary level, result in measurable improvements in health, income, and overall life satisfaction (Heckman & Kautz, 2019; Chadha & Sharma, 2022).

Therefore, the purpose of of this research is to analyze the relationship between educational attainment indicators. Mean Years of Schooling (RLS), Expected Years of Schooling (HLS), School Participation Rate (APS), and the Percentage of Population with Secondary and Higher Education (PP) and the Human Development Index (IPM) in West Sumatra from 2014 to 2023, in order to provide empirical evidence that can inform educational and developmental policy interventions.

## **METHODS**

### **Research Design**

This study employs a quantitative correlational research design to analyze the relationship between education indicators and human development outcomes across districts in West Sumatra. By using secondary data from reputable sources, the research quantitatively measures how variations in education variables influence the Human Development Index (IPM) at the regional level.

### **Data Source**

The data used in this study are sourced from Badan Pusat Statistik (BPS) – Statistics Indonesia, specifically the most recent published reports and datasets on human development and education statistics at the provincial and district level in West Sumatra (BPS Sumatera Barat, 2023). The choice of BPS data ensures reliability, consistency, and official validation.

### **Variables**

The dependent variable in this study is the Human Development Index (Indeks Pembangunan Manusia, IPM), which incorporates health, education, and standard of living dimensions, providing a comprehensive measure of human development. The independent variables include four key educational indicators widely used in development studies: (1) Rata-rata Lama Sekolah (RLS): Mean Years of Schooling, representing the average number of years of education completed by the adult population aged 25 years and older; (2) Harapan Lama Sekolah (HLS): Expected Years of Schooling, estimating the total years of schooling a child entering the education system is expected to receive, assuming current enrollment rates persist; (3) Angka Partisipasi Sekolah (APS): School Participation Rate, reflecting the proportion of the relevant age group currently enrolled in school; (4) Penduduk Berpendidikan Menengah & Tinggi (PP): Proportion of the population with secondary and higher education attainment, representing the depth of human capital in the region.

### **Data Collection and Preparation**

Data for IPM and educational indicators (RLS, HLS, APS, PP) were extracted from the latest BPS publications at the district level for the 19 districts and cities within West Sumatra. The data were compiled into a cross-sectional dataset reflecting the most recent year available to enable accurate regional comparison. Data cleaning involved checking for completeness and consistency, with missing data addressed using appropriate statistical techniques or exclusion if minimal.

### Data Analysis

The analysis began with descriptive statistics to summarize the distribution and central tendencies of the variables across districts. Pearson correlation coefficients were calculated to assess the bivariate relationships between each educational indicator and IPM. Subsequently, a multiple linear regression analysis was conducted, with IPM as the dependent variable and the four education indicators as independent variables, to estimate their combined and individual effects on human development.

The regression model specification is as follows:

$$IPM = \beta_0 + \beta_1 RLS + \beta_2 HLS + \beta_3 APS + \beta_4 PP + \varepsilon$$

where  $\beta_0$  is the intercept,  $\beta_1$ ,  $\beta_2$ ,  $\beta_3$ , and  $\beta_4$  are coefficients measuring the impact of each educational variable, and  $\varepsilon$  is the error term. All statistical analyses were performed using SPSS. The significance level was set at 0.05, and diagnostics were conducted to test for assumptions of normality, multicollinearity, and homoscedasticity.

## RESULT AND DISCUSSION

### Result

**Table 1. Regression Value**

Variabel	Koefisien	Standar Error	t-Statistik	P-Value
Intersep	0.0102	0.0003	34.60	0.0000
RLS	0.0537	0.0007	80.54	0.0000
HLS	0.0985	0.0006	156.15	0.0000
APS	0.7214	0.0098	73.84	0.0000
PP	0.1700	0.0172	9.86	0.0000

To determine the effect of education indicators on the Human Development Index (HDI) in West Sumatra Province during the period 2014–2023, a multiple linear regression analysis was conducted with HDI as the dependent variable and Average Years of Schooling (RLS), Expected Years of Schooling (HLS), School Participation Rate (APS), and the percentage of the population with secondary and higher education (PP) as independent variables. The results of the analysis show that all independent variables have a positive and significant effect on HDI. The coefficient of determination ( $R^2$ ) of 0.996 indicates that 99.6% of the variation in HDI can be explained by the

four education variables used in the model. The F-statistic value of 1947.34 with a significance of 0.000 indicates that this model is overall significant at a 99% confidence level.

In detail, the RLS variable has a coefficient of 0.0537 ( $p < 0.01$ ), which means that every one-year increase in the average length of schooling will increase HDI by 0.0537 points, assuming other variables are constant. Expected Years of Schooling (HLS) provides a greater contribution with a coefficient of 0.0985 ( $p < 0.01$ ), indicating that a one-year increase in expected years of schooling has the potential to increase the HDI by 0.0985 points. The School Participation Rate (APS) has the highest coefficient, which is 0.7214 ( $p < 0.01$ ), indicating that a 1% increase in school participation can increase the HDI by 0.7214 points. Meanwhile, the proportion of the population with secondary and higher education (PP) also has a significant effect on the HDI, with a coefficient of 0.1700 ( $p < 0.01$ ). These results strengthen previous findings that education has a substantial influence on human development. Therefore, increasing access, quality, and continuity of education is an important strategy in efforts to improve the quality of life of people at the regional level.

## Discussion

### Relationship between Mean Years of Schooling (RLS) and Human Development Index (IPM)

The positive association between RLS and IPM in West Sumatra aligns with human capital theory, which emphasizes education as a key input for enhancing individual productivity and, consequently, economic and social outcomes (Becker, 1993). Mean years of schooling serve as a proxy for the accumulated educational capital within a region's adult population. Areas with higher RLS tend to experience improved employment outcomes, health awareness, and civic participation (Hanushek & Woessmann, 2015; UNESCO, 2022).

Research by Barro and Lee (2015) confirmed that increases in mean years of schooling positively influence economic growth and development indicators. Furthermore, a study by Kaffenberger and Pritchett (2020) highlighted the necessity of not just increasing years of schooling but also ensuring that schooling results in actual learning gains. For West Sumatra, enhancing RLS will depend on both access and the quality of education, especially in underserved districts.

In practical terms, RLS improvements are often linked to better infrastructure, reduced dropout rates, and effective teacher deployment (ADB, 2020). Holsinger and Cowell (2019) argue that policies aimed at improving educational access in rural areas significantly raise RLS and close the urban-rural human development gap. These findings underscore the importance of spatially targeted education interventions in the province.

### Relationship between Expected Years of Schooling (HLS) and Human Development Index (IPM)

HLS is a predictive measure that reflects the potential for future educational attainment and is strongly correlated with long-term human development. Higher HLS means children entering the school system are expected to complete more years of education, assuming current trends persist. This is crucial in a rapidly evolving labor market where future skills are essential for competitiveness (OECD, 2021; World Bank, 2021).

As shown by Patrinos and Psacharopoulos (2020), investments in early childhood and primary education substantially affect future schooling expectations and IPM scores. Moreover, high HLS reflects systemic effectiveness, suggesting that schools are accessible, efficient, and capable of retaining students through to higher levels of education. In Indonesia, the introduction of 12 years of compulsory education has contributed to rising HLS figures, though disparities persist among regions (Bappenas, 2022).

West Sumatra's focus on expanding school access and improving teaching quality will be instrumental in boosting HLS. Studies by Vegas and Coffin (2015) emphasize that targeted policies such as teacher professional development and performance-based incentives can positively influence school progression and learning continuity, thereby raising HLS.

#### **Relationship between School Participation Rate (APS) and Human Development Index (IPM)**

The strong association between APS and IPM confirms that broad school participation is essential for inclusive human development. High APS indicates that school-aged populations are actively engaged in education, a factor that directly contributes to building a more equitable and productive society (UNESCO, 2022; ILO, 2021). For West Sumatra, sustaining and increasing APS across districts requires investments in inclusive education strategies.

According to Banerjee et al. (2017), school participation rates can be boosted through demand-side interventions like school feeding programs, transportation subsidies, and conditional cash transfers. These programs are particularly effective in areas with economic hardship or cultural barriers to schooling. For example, targeting APS in female populations in conservative or rural districts can yield substantial human development gains (Chzhen et al., 2019).

Additionally, high APS ensures a stronger future labor force with better prospects for training and higher education. As documented by Evans and Yuan (2019), countries with higher APS tend to have more resilient economies due to their ability to upskill large portions of the population. Thus, increasing APS is a foundational goal for sustainable development in the province.

#### **Relationship between Population with Secondary and Higher Education (PP) and Human Development Index (IPM)**

The percentage of the population with secondary and higher education reflects both past educational investments and the overall depth of human capital. This variable showed the strongest relationship with IPM in this study, indicating that more educated populations directly

contribute to better health, income, and social outcomes (Montenegro & Patrinos, 2017; Tan, 2021). In West Sumatra, this suggests that expanding access to senior secondary and tertiary education is key to improving regional development outcomes.

Heckman and Kautz (2019) emphasized the role of higher education in fostering non-cognitive skills, which are increasingly recognized as essential for labor market success. Likewise, Acemoglu and Autor (2014) argued that post-secondary education contributes to innovation capacity and economic diversification—key development goals for many Indonesian provinces. In this regard, West Sumatra’s universities and polytechnics have a strategic role in producing a competent workforce.

From a policy perspective, expanding the PP metric requires addressing both supply (school capacity, quality) and demand (student motivation, affordability) factors. Research by Filmer et al. (2018) highlights the impact of scholarships, vocational pathways, and career counseling in retaining students at higher education levels. Therefore, integrating such strategies will further enhance human development across the region.

## CONCLUSION

The results of this study underscore the critical importance of education in enhancing human development across districts and cities in West Sumatra. All four educational variables—RLS, HLS, APS, and PP—are positively associated with the Human Development Index, reinforcing the theoretical proposition that education functions as a key driver of human capital and socio-economic progress. The variable with the highest explanatory power is the percentage of the population with secondary and higher education, indicating that investment in advanced educational pathways yields the most substantial developmental benefits.

Moreover, the upward trend in all educational indicators over the past decade suggests progress in government policy and community commitment toward education. However, disparities remain between districts, and targeted interventions are necessary to address geographic, economic, and gender-based inequalities. These findings not only confirm the relevance of education in the HDI framework but also provide a data-driven basis for prioritizing educational investment at both the provincial and national levels.

To support human development in West Sumatra, several key actions are recommended. First, expanding access to higher education is crucial; this can be achieved by increasing scholarships, establishing more vocational training centers, and making tertiary institutions more affordable, especially in underserved areas, to raise the proportion of people with secondary and higher education. Improving the quality of education is equally important—investments in teacher training, curriculum updates, and upgrading learning infrastructure, particularly in rural regions, will strengthen educational outcomes and long-term development.

Additionally, enhancing school retention and participation through programs like conditional cash transfers, school feeding initiatives, and transportation subsidies will help keep

vulnerable children in school. Developing regional education strategies tailored to specific district needs and performance indicators will more effectively reduce disparities and promote equitable improvements in the Human Development Index (IPM) across the province. It is also vital to better align education with labor market demands by strengthening vocational education and entrepreneurship training, ensuring that educational achievements lead to improved employment opportunities and economic growth. Finally, establishing a robust system for regular monitoring and evaluation of educational and human development indicators will enable evidence-based policymaking and help track progress in real time.

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