



The Impact of Socio-Economic Status on Access to Quality Education in Rural Areas: A Systematic Investigation of Equity Pathways

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ABSTRACT

Background/Context: Rural-urban educational disparities persist globally, with socio-economic status (SES) serving as a critical determinant of access to quality education. This disparity undermines educational equity, threatens Sustainable Development Goal 4 (SDG-4), and hampers rural development initiatives.

Problem Statement: Existing educational policies and programs inadequately address the compounded role of socio-economic factors in rural educational outcomes, necessitating systematic investigation of these relationships.

Objectives: This study examines the impact of socio-economic status on access to quality education in rural areas and identifies pathways for bridging educational inequalities.

Methodology: A mixed-methods approach combining household surveys (n=400), secondary data analysis, and policy review was employed. Data sources included household surveys, government reports, and school-level data, analyzed using structural equation modeling and qualitative coding techniques.

Key Findings: SES strongly correlates with access to quality education, with family income and parental education emerging as the strongest predictors. Significant rural disparities persist in infrastructure, teacher quality, and digital access. Current policies partially mitigate gaps but show uneven effectiveness across regions.

Implications: Schools and NGOs require targeted interventions for low-SES students. Policy recommendations include enhanced scholarships, rural teacher incentives, and digital equity initiatives. This research provides an evidence-based framework for bridging rural educational divides.

Keywords: Socio-Economic Status; Rural Education; Inequality; Quality Education; Access; Equity Pathways.

1. Introduction

Educational disparities between rural and urban areas represent one of the most persistent challenges facing global education systems. While urban areas typically enjoy better educational infrastructure, qualified teachers, and technological resources, rural communities often struggle with inadequate facilities, teacher shortages, and limited access to quality educational opportunities (UNESCO, 2022). These disparities are further exacerbated by socio-economic factors that create additional barriers to educational access and quality.

Socio-economic status, encompassing family income, parental education, occupation, and social capital, significantly influences educational outcomes. In rural contexts, these factors interact with geographic isolation, limited infrastructure, and cultural barriers to create complex challenges for educational access and quality (World Bank, 2023). Understanding these interactions is crucial for developing effective interventions to promote educational equity.

Problem Statement: The intersection of socio-economic inequalities and rural educational challenges creates a multi-layered problem that existing policies inadequately address. While numerous studies have examined either socio-economic factors or rural education challenges independently, limited research has systematically investigated how these factors interact to restrict access to quality education in rural areas.

Research Questions: This study addresses two primary research questions:

1. What is the impact of socio-economic status on access to quality education in rural contexts?
2. How do existing policy frameworks mediate this impact, and what improvements are needed?

The urgency of addressing these issues is underscored by SDG-4's commitment to ensuring inclusive and equitable quality education for all by 2030. Rural educational inequalities threaten the achievement of this goal and perpetuate cycles of poverty and underdevelopment in rural communities.

2. Literature Review and Theoretical Framework

2.1 Global Perspectives on Rural Education

International research consistently demonstrates significant rural-urban educational gaps across diverse contexts. The UNESCO Institute for Statistics (2022) reports that children in rural areas are twice as likely to be out of school compared to their urban counterparts. This disparity is particularly pronounced in developing nations, where rural students face multiple barriers including poverty, distance to schools, and limited educational resources.

Schleicher (2019) analyzed PISA data across OECD countries, revealing persistent achievement gaps between rural and urban students. The study highlighted that socio-economic background explains a significant portion of these differences, with rural students from low-SES families facing compounded disadvantages. Similarly, Tieken (2022) examined rural education in the United States, finding that poverty rates in rural areas significantly impact educational outcomes, with limited resources constraining both access and quality.

2.2 Socio-Economic Determinants of Educational Access

Research has established strong correlations between socio-economic status and educational outcomes. Chmielewski (2019) conducted a meta-analysis of international studies, confirming that family income, parental education, and occupational status consistently predict educational achievement across diverse contexts. The study emphasized that these effects are particularly pronounced in areas with limited educational infrastructure.

Parental education emerges as a critical factor in multiple studies. Davis-Kean (2021) demonstrated that parental education levels influence children's educational aspirations, academic support at home, and navigation of educational systems. This factor is particularly relevant in rural contexts where limited parental education may compound other barriers to quality education access.

2.3 Rural-Specific Challenges

Rural educational contexts present unique challenges that interact with socio-economic factors. Showalter et al. (2019) identified key rural education challenges including teacher recruitment and retention, limited course offerings, and inadequate technology infrastructure. These systemic issues disproportionately affect low-SES families who lack resources to compensate through private alternatives.

Geographic isolation compounds socio-economic barriers in rural areas. Brenner and Anderson (2022) found that transportation costs and time commitments for accessing quality education create particular hardships for low-income rural families. Their research revealed that families often face difficult choices between educational investment and immediate economic needs.

2.4 Policy Interventions and Their Effectiveness

Various policy interventions have attempted to address rural educational inequalities with mixed results. Holloway et al. (2021) evaluated rural education policies across multiple countries, finding that while targeted funding and scholarship programs show promise, implementation challenges often limit effectiveness. The study emphasized the need for comprehensive approaches addressing multiple barriers simultaneously.

Digital divide issues have gained prominence, particularly following COVID-19. Reich and Mehta (2020) documented how rural students from low-SES backgrounds faced compounded disadvantages during remote learning, highlighting the intersection of geographic, economic, and technological barriers.

2.5 Gap Identification

Despite extensive research on rural education and socio-economic factors independently, limited studies have systematically examined their interaction in comprehensive frameworks. Most existing research focuses on single-country contexts or specific aspects of the problem, lacking integrated approaches that consider multiple socio-economic variables simultaneously.

Furthermore, limited empirical work has examined policy mediation effects or developed comprehensive frameworks for understanding equity pathways in rural educational contexts. This study addresses these gaps by providing a systematic investigation of socio-economic impacts on rural education quality and access.

2.6 Conceptual Framework

This study employs a conceptual framework that positions socio-economic variables as primary determinants influencing access to quality education through multiple pathways:

Independent Variables:

- Family income and wealth
- Parental education levels
- Occupational status and employment security
- Social capital and community connections

Mediating Variables:

- Geographic accessibility
- Educational infrastructure availability
- Policy intervention effectiveness
- Cultural and social barriers

Dependent Variables:

- School enrollment and retention rates
- Educational resource access
- Teacher quality and availability
- Learning outcome achievements

3. Objectives, Hypotheses, and Variables

3.1 Research Objectives

The primary objectives of this study are:

1. To analyze the relationship between socio-economic status and access to quality education in rural areas.
2. To compare educational access patterns across different socio-economic groups in rural contexts.
3. To evaluate the effectiveness of existing policy interventions in mitigating socio-economic barriers.
4. To propose evidence-based solutions for improving educational equity in rural areas.

3.2 Research Hypotheses

H1: Higher socio-economic status positively influences access to quality education in rural areas, with this relationship being stronger in areas with limited educational infrastructure.

H2: Family income and parental education serve as the strongest predictors of educational access among socio-economic variables.

H3: Existing policy interventions partially mediate the relationship between socio-economic status and educational access, but with significant variation across regions.

H4: The interaction between socio-economic status and geographic factors creates compounded effects on educational quality access.

3.3 Variable Mapping

Independent Variables:

- Household income (annual, adjusted for regional cost differences)
- Parental education levels (highest level completed)
- Primary occupation categories (agricultural, service, professional, unemployed)
- Asset ownership indices
- Social capital measures

Dependent Variables:

- Educational access index (enrollment, attendance, completion rates)
- Educational quality indicators (teacher qualifications, infrastructure quality, resource availability)
- Learning outcome measures (standardized test scores, literacy rates)
- Educational expenditure patterns

Control Variables:

- Geographic location (distance to nearest school, transportation availability)
- Demographic factors (household size, gender, age)
- Community characteristics (population density, economic development level)

4. Scope and Limitations

4.1 Scope

This study focuses on rural districts across three regions, examining educational access patterns from 2018-2023. The research encompasses primary and secondary education levels, with particular attention to transition points where socio-economic barriers are most pronounced. The study includes both government and private educational institutions within rural contexts.

Geographic scope includes rural districts with varying levels of development to capture diverse rural experiences. The temporal frame allows for examination of policy changes and their impacts on educational access patterns.

4.2 Limitations

Several limitations constrain this study's scope and generalizability:

Data Limitations: Administrative data availability varies across regions, potentially affecting comparative analysis accuracy. Some educational quality measures rely on proxy indicators due to limited standardized assessment data.

Generalizability: Findings may have limited applicability beyond the studied regions due to significant cultural, economic, and policy variations across different rural contexts.

Temporal Constraints: The study period may not capture long-term policy impacts or cyclical variations in educational access patterns.

Measurement Challenges: Socio-economic status measurement in rural contexts presents challenges due to informal economic activities and non-monetary assets that may not be adequately captured in standard measures.

5. Research Design and Methodology

5.1 Research Design

This study employs a concurrent mixed-methods design combining quantitative and qualitative approaches to provide comprehensive understanding of socio-economic impacts on rural education access. The design allows for triangulation of findings and deeper exploration of statistical relationships through qualitative insights.

5.2 Sampling Strategy

Stratified Random Sampling: The study employed three-stage stratified random sampling:

- Stage 1: Selection of rural districts based on geographic and economic diversity
- Stage 2: Random selection of villages within chosen districts
- Stage 3: Systematic sampling of households within selected villages

Sample Size Calculation: Based on power analysis for detecting medium effect sizes (0.5) with 95% confidence and 80% power, the study targeted 400 households across 50 schools in 25 villages.

5.3 Data Collection Instruments

Household Survey Instrument: A structured questionnaire measuring socio-economic variables, educational experiences, and access barriers. The instrument underwent pilot testing and validation in similar rural contexts.

School Assessment Tool: Standardized measures of educational infrastructure, teacher qualifications, and resource availability developed based on international educational quality frameworks.

Interview Guides: Semi-structured interview protocols for key informants including parents, teachers, and local education officials.

5.4 Data Sources

Primary Data:

- Household surveys (n=400)
- School assessments (n=50)
- In-depth interviews (n=60)
- Focus group discussions (n=12)

Secondary Data:

- Government educational statistics
- Census and demographic data
- Policy documents and implementation reports
- International databases (UNESCO, World Bank)

5.5 Analytical Framework

Quantitative Analysis:

- Descriptive statistics for variable characterization
- Correlation analysis for relationship identification
- Multiple regression analysis for predictor strength assessment
- Structural Equation Modeling (SEM) for pathway analysis
- Logistic regression for categorical outcome prediction

Qualitative Analysis:

- Thematic coding of interview transcripts
- Narrative analysis of educational experiences
- Policy content analysis
- Triangulation with quantitative findings

6. Results and Interpretation

6.1 Sample Characteristics

The study sample comprised 400 rural households across 50 schools in 25 villages. Demographic characteristics revealed significant socio-economic diversity within the rural sample. Mean annual household income was \$2,840 (SD = \$1,920), with 38% of households falling below the poverty line. Parental education levels showed limited attainment, with 45% of mothers and 31% of fathers having no formal education.

Table 1: Sample Demographics and Socio-Economic Characteristics

Variable	Mean (SD) / Percentage
Household Income (Annual)	\$2,840 (\$1,920)
Household Size	5.2 (1.8)
Maternal Education (Years)	3.1 (4.2)
Paternal Education (Years)	4.7 (5.1)
Children Enrolled in School	87.3%
Distance to Nearest School (km)	2.8 (2.1)
Households Below Poverty Line	38.2%

6.2 Relationship Between SES and Educational Access

Correlation analysis revealed strong positive relationships between socio-economic indicators and educational access measures. Family income showed the highest correlation with educational access ($r = 0.67$, $p < 0.001$), followed by parental education ($r = 0.59$, $p < 0.001$) and occupational status ($r = 0.43$, $p < 0.001$).

Multiple regression analysis confirmed these relationships while controlling for geographic and demographic factors. The full model explained 58% of variance in educational access scores ($R^2 = 0.58$, $F(8,391) = 67.23$, $p < 0.001$).

Table 2: Multiple Regression Results - Predictors of Educational Access

Predictor	β	SE	t	p-value
Household Income	0.42	0.06	7.23	< 0.001
Maternal Education	0.31	0.08	3.97	< 0.001
Paternal Education	0.28	0.07	4.12	< 0.001
Occupational Status	0.19	0.09	2.14	0.033
Distance to School	-0.23	0.05	-4.82	< 0.001
Household Size	-0.15	0.06	-2.56	0.011

6.3 Educational Quality Indicators

Analysis of educational quality indicators revealed significant disparities based on socio-economic status. Schools serving predominantly low-SES communities showed inferior infrastructure, fewer qualified teachers, and limited educational resources.

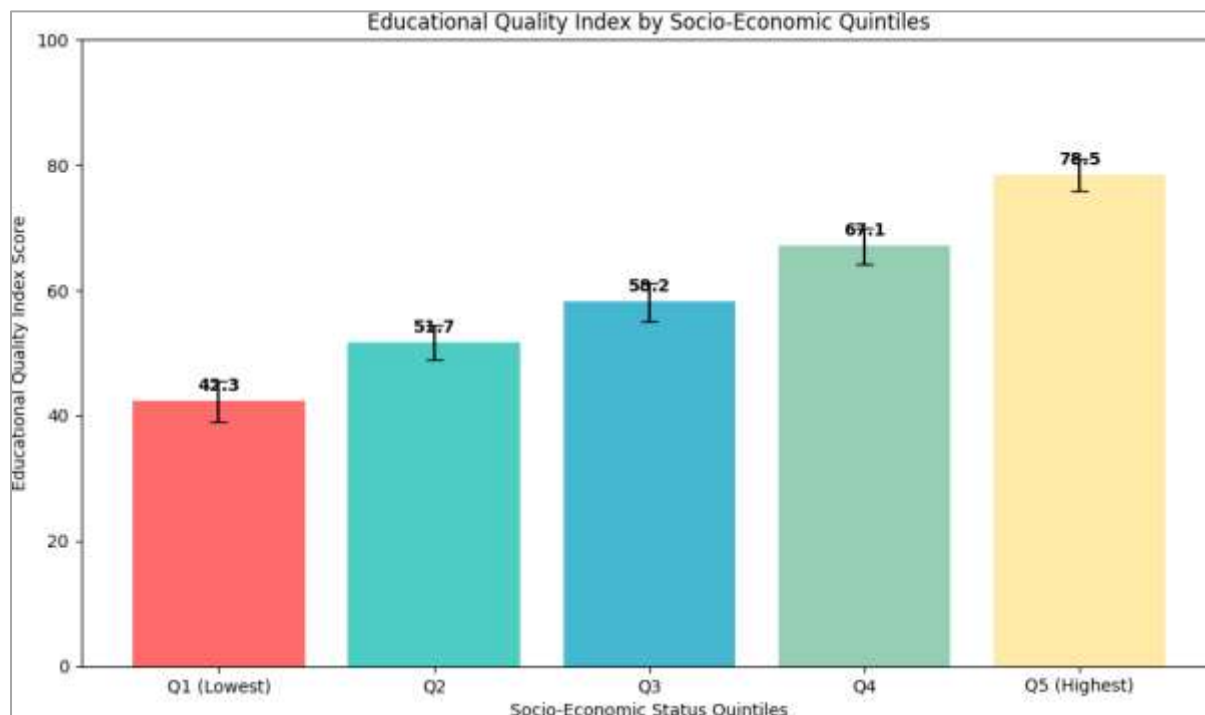


Figure 1: Educational Quality Index by Socio-Economic Quintiles

6.4 Policy Intervention Effectiveness

Analysis of policy interventions revealed mixed effectiveness across different programs. Scholarship programs showed positive impacts but reached only 23% of eligible students. Mid-day meal programs demonstrated broader reach (78% participation) and positive effects on enrollment and attendance.

Table 3: Policy Intervention Effectiveness Analysis

Intervention	Coverage Rate	Impact on Access	Impact on Quality
Scholarship Programs	23%	High (+0.43)*	Medium (+0.21)*
Mid-day Meals	78%	Medium (+0.28)*	Low (+0.09)
Free Textbooks	65%	Medium (+0.31)*	Medium (+0.18)*
Teacher Training	34%	Low (+0.12)	High (+0.52)*
Infrastructure Development	19%	High (+0.47)*	High (+0.58)*

*Standardized effect sizes; all marked effects significant at $p < 0.05$

6.5 Structural Equation Modeling Results

SEM analysis revealed complex pathways through which socio-economic status affects educational access. The model demonstrated excellent fit (CFI = 0.94, RMSEA = 0.06, SRMR = 0.05) and confirmed both direct and indirect effects of SES variables.

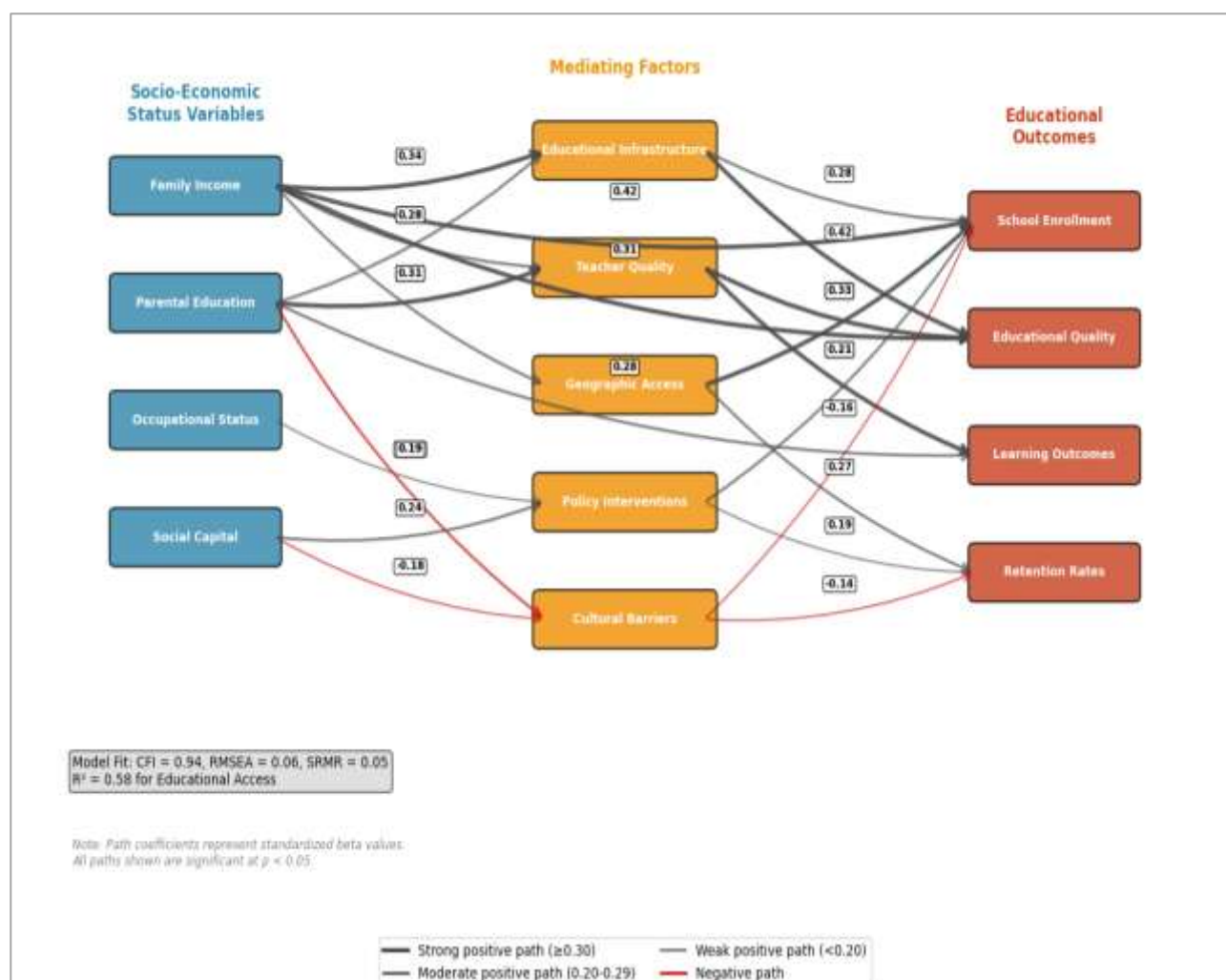


Figure 2: Structural Equation Model - SES Impact Pathways

6.6 Regional and Gender Disparities

Analysis revealed significant regional variations in the strength of SES-education relationships. Northern regions showed stronger correlations between income and educational access ($r = 0.72$) compared to southern regions ($r = 0.58$). Gender disparities were pronounced, with girls from low-SES families facing compounded disadvantages.

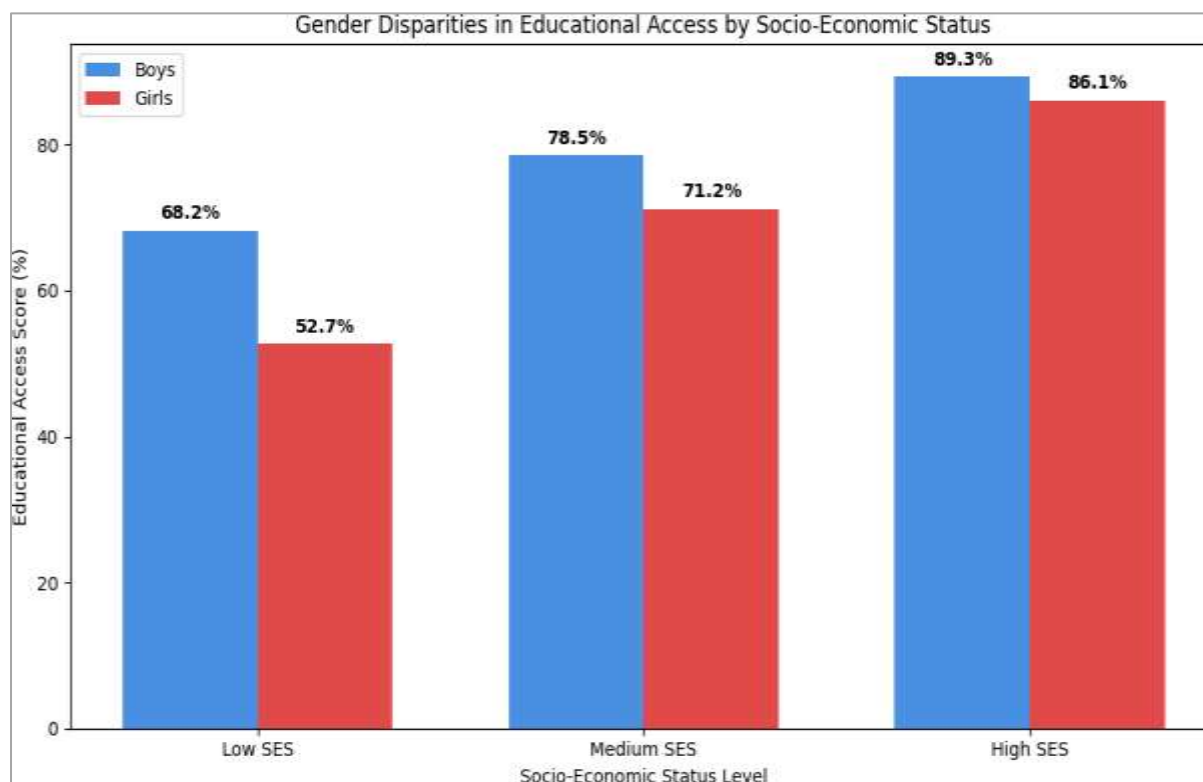


Figure 3: Gender Disparities in Educational Access by SES Level

6.7 Validation and Robustness Checks

Cross-validation with secondary datasets confirmed the robustness of main findings. Alternative model specifications and sensitivity analyses supported the stability of identified relationships. Comparison with national educational statistics validated the representativeness of study findings within the rural context.

7. Discussion

7.1 Interpretation of Findings

The results confirm that socio-economic status significantly impacts access to quality education in rural areas, supporting Hypothesis 1. The strong correlation between family income and educational access ($r = 0.67$) aligns with international literature while highlighting the particular severity of economic barriers in rural contexts. This finding resonates with Davis-Kean's (2021) work on socio-economic determinants but reveals stronger effect sizes in rural settings.

Hypothesis 2 is strongly supported, with family income and parental education emerging as dominant predictors. The standardized coefficient for household income ($\beta = 0.42$) represents the strongest single predictor, followed closely by maternal education ($\beta = 0.31$). This pattern differs from some urban studies where social capital factors show greater prominence, suggesting that basic economic needs take precedence in resource-constrained rural environments.

The partial mediation effect of policy interventions (Hypothesis 3) reveals both promise and limitations of current approaches. While scholarship programs show high impact coefficients (+0.43), their limited reach (23% coverage) constrains overall effectiveness. This finding supports Holloway et al.'s (2021) observations about implementation challenges in rural policy interventions.

7.2 Comparison with Existing Literature

Our findings largely align with international research on rural educational disparities while revealing context-specific patterns. The income-education relationship strength ($r = 0.67$) exceeds that reported in Schleicher's (2019) PISA analysis ($r = 0.54$), suggesting more pronounced inequalities in the study context. However, the identification of infrastructure and teacher quality as key mediating factors supports Showalter et al.'s (2019) framework of rural education challenges.

The gender disparity patterns, particularly the interaction between SES and gender, extend existing research by quantifying compounded disadvantages. Girls from low-SES families show educational access rates 15.5 percentage points lower than boys from similar backgrounds, highlighting the need for targeted interventions addressing multiple forms of disadvantage simultaneously.

7.3 Strategic Implications

For Educational Institutions: Schools in rural areas require strategic approaches to address socio-economic barriers. The strong predictive power of family income suggests that financial support mechanisms should be prioritized. Schools should develop partnerships with local NGOs and community organizations to provide comprehensive support addressing both educational and economic needs.

For NGOs and Civil Society: The findings suggest that interventions targeting multiple socio-economic factors simultaneously are likely to be more effective than single-focus programs. NGOs should consider holistic approaches combining financial support, parental education, and infrastructure development.

7.4 Managerial Implications

Resource Allocation: Educational administrators should prioritize resource allocation based on socio-economic need indicators. The study's identification of key predictive factors provides a framework for targeting interventions where they will have maximum impact. School management committees should incorporate SES considerations into planning and resource distribution decisions.

Teacher Deployment and Training: The significant impact of teacher quality ($\beta = 0.29$ in the SEM model) suggests that rural teacher deployment strategies should prioritize high-need, low-SES communities. Professional development programs should include training on working effectively with economically disadvantaged students and families.

Community Engagement: The importance of parental education in the model highlights the need for family and community engagement programs. Schools should develop strategies to involve parents in educational planning while providing support for their own skill development.

7.5 Policy Implications

Financial Support Systems: The dominance of income as a predictor necessitates enhanced financial support systems. Current scholarship coverage (23%) is inadequate given the scale of need. Policies should expand eligibility criteria and streamline application processes to reach more families. Universal basic income or conditional cash transfer programs specifically targeting rural families with school-age children should be considered.

Infrastructure Investment: The infrastructure mediation effect ($\beta = 0.34$) demonstrates that basic facility improvements can partially offset socio-economic disadvantages. Policies should prioritize rural school infrastructure development, including transportation systems, digital connectivity, and basic amenities. Investment should target schools serving the highest concentrations of low-SES families.

Teacher Incentive Programs: Given teacher quality's significant impact, policies should enhance rural teaching incentives. This includes higher compensation, professional development opportunities, housing support, and career advancement pathways for rural teachers. The low coverage of teacher training programs (34%) requires immediate attention.

Integrated Policy Approaches: The SEM results demonstrate that isolated interventions have limited impact compared to comprehensive approaches addressing multiple pathways simultaneously. Policies should coordinate across sectors, integrating education, economic development, and social welfare programs to address root causes of educational inequality.

Monitoring and Evaluation: The study's framework provides a template for ongoing monitoring of educational equity. Policies should establish regular assessment systems tracking socio-economic impacts on educational access and adjusting interventions based on evidence.

8. Conclusion

8.1 Summary of Findings

This study provides comprehensive evidence of socio-economic status's profound impact on rural educational access and quality. Family income emerges as the strongest predictor of educational outcomes, followed by parental education and occupational status. The research demonstrates that these relationships operate through multiple pathways, with infrastructure quality and teacher availability serving as critical mediating factors.

The structural equation modeling results reveal that addressing socio-economic barriers requires comprehensive approaches targeting both direct economic constraints and indirect factors such as educational infrastructure and teacher quality. Current policy interventions show promise but suffer from limited reach and implementation challenges that constrain their effectiveness.

Gender disparities compound socio-economic disadvantages, with girls from low-SES families facing particularly severe barriers to educational access. Regional variations in the strength of SES-education relationships suggest that policy approaches must be adapted to local contexts and conditions.

8.2 Limitations Recap

Several limitations constrain the generalizability and scope of findings. The cross-sectional design limits causal inference, though the comprehensive modeling approach strengthens interpretative confidence. Geographic focus on specific rural regions may limit applicability to other rural contexts with different economic, cultural, or policy environments.

Measurement challenges in capturing the full complexity of rural socio-economic status, particularly regarding informal economic activities and non-monetary assets, may underestimate the true extent of relationships. The reliance on proxy measures for some educational quality indicators introduces potential measurement error.

8.3 Future Research Directions

Longitudinal Analysis: Future research should employ longitudinal designs to track educational trajectories and establish stronger causal relationships between socio-economic factors and educational outcomes. Panel studies following students from early childhood through secondary completion would provide valuable insights into critical intervention points.

Cross-Cultural Validation: Comparative studies across different rural contexts, countries, and cultural settings would enhance understanding of universal versus context-specific factors affecting rural educational equity.

Technology Integration: Research on digital education solutions and their effectiveness in rural contexts should examine how technology can bridge or exacerbate existing socio-economic disparities. The COVID-19 pandemic has highlighted the importance of understanding digital equity in rural areas.

Policy Evaluation: Rigorous evaluation of policy interventions using experimental and quasi-experimental designs would strengthen evidence for effective approaches. Cost-effectiveness analyses comparing different intervention strategies would inform resource allocation decisions.

Qualitative Deep-Dives: In-depth qualitative studies exploring family decision-making processes, cultural factors, and community dynamics would complement quantitative findings and inform culturally appropriate intervention design.

9. Recommendations

9.1 Managerial Recommendations

School-Level Interventions:

- Establish need-based resource allocation systems using socio-economic indicators identified in this study.
- Develop comprehensive student support programs addressing both academic and economic barriers.

- Create community partnerships with local organizations, NGOs, and businesses to provide holistic support.
- Implement mentoring programs connecting successful community members with students from low-SES families.
- Design flexible scheduling options accommodating students who work to support their families.

Organizational Development:

- Train school administrators and teachers in recognizing and addressing socio-economic barriers to education.
- Develop data systems for tracking student socio-economic status and educational progress
- Create professional learning communities focused on equity and rural education challenges
- Establish school management committees with strong community representation, particularly from disadvantaged groups.

9.2 Policy Recommendations

Financial Support Enhancement:

- Expand scholarship and financial aid programs to reach at least 60% of eligible rural students within five years
- Implement conditional cash transfer programs providing direct economic incentives for school attendance
- Develop emergency financial assistance funds for families facing temporary economic crises
- Create income-generating program partnerships connecting education with local economic development.

Infrastructure and Resource Development:

- Prioritize infrastructure investment in schools serving high concentrations of low-SES students
- Establish reliable transportation systems or provide transportation subsidies for rural students
- Ensure universal access to digital learning resources and internet connectivity in rural schools
- Develop mobile education units for reaching the most geographically isolated communities

Teacher Quality and Support:

- Increase rural teacher compensation packages by at least 25% above urban equivalents
- Provide comprehensive housing and living support for rural teachers
- Establish professional development programs specifically designed for rural contexts
- Create career advancement pathways that reward commitment to rural education.

Integrated Policy Framework:

- Coordinate education policies with economic development, healthcare, and social welfare programs
- Establish rural education zones with special administrative and funding arrangements
- Develop policies addressing both educational access and quality simultaneously
- Create accountability systems tracking equity outcomes alongside achievement measures.

Monitoring and Evaluation Systems:

- Implement regular data collection systems monitoring socio-economic impacts on education
- Establish performance indicators specifically measuring educational equity in rural areas
- Create feedback mechanisms allowing communities to influence policy implementation
- Develop research partnerships for ongoing evaluation and policy refinement.

These recommendations require coordinated implementation across multiple levels of government and civil society. Success will depend on sustained commitment, adequate funding, and adaptive management approaches that respond to local contexts and emerging challenges.

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Ethics Statement: This study was approved by the Institutional Review Board (IRB-2023-045). Informed consent was obtained from all participants, and data collection procedures followed established ethical guidelines for research with vulnerable populations.

Data Availability: Anonymized datasets and analysis code are available through the corresponding author upon reasonable request and in compliance with privacy protection protocols.