Advance Journal of Econometrics and Finance
Vol-4, Issue-1, 2026

Advance Journal of Econometrics and Finance

Online ISSN
2959-8990
Print ISSN
2959-8982
https://ajeaf.com/index.php/Journal/About

Name of Publisher: SCHOLAR CRAFT EDUCATION & RESEARCH HUB

Review Type: Double Blind Peer Review

Journal Frequency: Quarterly Research Journal (4- Issue)

Socioeconomic Determinants of Female Educational Attainment in Pakistan: Stage-Specific Evidence from a Multinomial Logit Analysis

[1]Aroosa Andleeb

Aroosa Andleeb
Research Scholar, Department of Economics, Gomal University, Pakistan. Email: aroosaandleeb507@gmail.com

Abstract

Gender disparities in educational attainment remain a defining structural impediment to human capital formation in South Asia. Despite constitutional commitments to universal schooling, Pakistan exhibits severe and cumulative female attrition across every educational transition, with tertiary participation among women among the lowest in the region. This study investigates the socioeconomic and demographic determinants of female educational attainment using nationally representative household data from the Pakistan Social and Living Standards Measurement (PSLM) Survey 2018–19 (N = 22,314 female respondents). A multinomial logistic regression framework models female educational outcomes across five hierarchical categories—primary, middle, secondary, higher secondary, and higher education—with higher education as the reference category. Six predictors are examined: age, residential region, marital status, annual household income, distance from institution, and educational expenditure. Results reveal that educational expenditure is the most pervasive barrier, exercising significant negative effects across three of four educational comparisons. Rural residence exerts an intensifying constraint that peaks at the higher secondary to tertiary transition. Household income becomes a binding and significant determinant specifically from the secondary level onward, while marital status constrains progression at the middle level only and distance matters exclusively at the tertiary threshold. These stage-specific findings carry direct implications for targeted scholarship design, rural institutional investment, and early marriage legislation in Pakistan. The 2018–19 data constitutes the most recent nationally representative provincial-level PSLM/HIES release with complete income, expenditure, and distance modules; the forthcoming HIES 2024–25 microdata will enable post-COVID comparison in future work.

Keywords: Female education, multinomial logistic regression, educational attainment, gender disparity; rural-urban divide, educational expenditure

Introduction

Investment in female education generates some of the highest social returns available to developing economies—through lower fertility, improved child health, greater female labour force participation, and stronger intergenerational human capital transmission (Schultz, 1961; Becker, 1964; Duflo, 2012). Yet the gap between this evidence and policy reality remains wide in South Asia. Pakistan is a particularly stark case: with an overall literacy rate of approximately 60 percent and a 21-percentage-point gender gap between male and female literacy, the country recorded the world's second-largest population of out-of-school children at the time of this study, with girls disproportionately excluded at every stage (UNICEF, 2019; Pakistan Economic Survey, 2019–20). The United Nations SDG 4 (quality education) and SDG 5 (gender equality) set 2030 targets that Pakistan remains far from meeting.

Female attrition in Pakistan is both severe and cumulative. Approximately 32 percent of primary school-age girls were out of school compared to 21 percent of boys; by Grade 6, female dropout rates approached 59 percent (UNICEF, 2019). Pakistan's gross enrolment ratio in higher education stood at only 10 percent in 2015–16, trailing India (24%), Sri Lanka (21%), and Bangladesh (13%) (HEC, 2016). Public education spending remained at 2.7 percent of GNP—below the UNESCO-recommended 4 percent threshold—leaving institutional deficits largely unaddressed. The COVID-19 pandemic subsequently compounded these structural disadvantages: school closures disproportionately burdened girls with domestic care responsibilities and heightened early-marriage risks, with evidence from Punjab suggesting that girls' household chore burden nearly doubled during lockdowns (World Bank/SMS Girl Data, 2022; Malala Fund, 2020).

Despite a rich qualitative literature documenting these barriers, the quantitative evidence base on the relative magnitude of specific determinants across different educational transitions remains thin. Most existing Pakistan studies use geographically limited primary surveys, binary logit specifications that collapse all educational distinctions into a single threshold, or restrict attention to enrolment rather than attainment (Quayes & Ramsey, 2015; Maqsood et al., 2012). Pasha (2024), using PSLM panel data from 2005–2019, is a recent exception—employing an ordered logit with two-stage residual inclusion to address income endogeneity—but does not disaggregate determinants by educational transition stage, which is where the policy-actionable variation lies. Kalani and Pe Symaco (2025) similarly document access barriers for rural girls but rely on qualitative methods that cannot quantify the relative magnitude of competing factors.

This study contributes to this gap in three ways. First, it applies multinomial logistic regression to a nationally representative sample of 22,314 female respondents from PSLM 2018–19, modelling educational outcomes across the full five-level hierarchy simultaneously. Second, it identifies which specific socioeconomic determinants are statistically significant at which transitions—producing stage-specific rather than aggregate evidence. Third, it translates these stage-specific findings into a lifecycle policy framework for female education in Pakistan. Section 2 reviews the relevant literature. Section 3 describes data and methodology. Sections 4 and 5 present descriptive and regression results. Section 6 concludes with targeted policy recommendations and directions for future research.

Literature Review

The determinants of female educational attainment in developing countries span household economic capacity, institutional geography, matrimonial norms, and individual lifecycle factors. This section synthesizes the most relevant evidence, integrating recent literature from 2020–2025 alongside established studies.

Household Income and the Cost Structure of Schooling

Income constrains female educational access through both direct costs—fees, uniforms, textbooks, transport—and indirect opportunity costs of foregone domestic labour and income contributions. Arif et al. (1999) demonstrated that household economic status exerted stronger positive effects on girls' enrolment than boys' in Pakistan, consistent with income-constrained families applying gender-selective rationing. Pasha (2024), using pooled PSLM data from 2005 to 2019 with endogeneity correction, confirmed that income facilitates significant transitions from primary to tertiary level, with income effects larger for boys than girls—suggesting that income relaxation primarily benefits male children first, and female students only when household economic conditions improve substantially. Ahmad (2024) traced the policy failure embedded in this dynamic across seven decades of Pakistan education policy, concluding that gender-neutral income transfer policies have systematically failed to reach girls in the poorest income quintiles. The implication for the current study is that income effects are likely to be stage-specific and to emerge most powerfully at high-cost educational transitions.

Rural Residence, Institutional Density, and the Spatial Trap

Geographic location is a powerful and compounding stratifier of female education. Smits and Huisman (2013), analyzing six Arab countries, found that contextual and institutional factors could account for up to 70 percent of gender differences in educational participation for older girls. In Pakistan, this spatial trap is especially acute: as of 2021, urban literacy stood at 80 percent while rural female literacy was only 42 percent (Wikipedia/PBS data, 2021). Kalani and Pe Symaco (2025), studying rural girls across all four

Pakistani provinces, identified weak institutional supply, inadequate female teaching staff, and entrenched purdah norms as jointly responsible for rural dropout, particularly at the post-primary transitions where girls' mobility becomes a constraining social norm. The World Bank (2024) similarly identifies rural girls as the group most likely to exit the education system permanently after primary school. The urban-rural gap in Pakistan is not merely one of household income but reflects the spatial concentration of secondary and tertiary institutions in district headquarters and metropolitan centres, imposing effective geographic exclusion on rural students absent reliable transport or residential facilities.

Early Marriage as an Educational Attrition

Child marriage constitutes one of the most direct mechanisms suppressing female education in Pakistan. Marriage reassigns girls' time toward domestic and reproductive obligations, withdraws family financial support for schooling, and in many communities renders continued education socially unacceptable. Hasan et al. (2024), in a panel study published in World Development, document that financial shocks—including income losses of the type associated with economic downturns and the COVID-19 recession—significantly increase the probability of early marriage for Pakistani girls, creating a channel through which macroeconomic stress accelerates educational dropout. Ali et al. (2015) identified patriarchal cultural attitudes and security concerns around daughters' independent travel as the dominant barriers to tertiary participation among Pakistani women. The COVID-19 pandemic appears to have intensified these risks: Malala Fund (2020) documented increased early-marriage negotiations in rural Pakistan during school closures, suggesting that the pandemic-period may have reversed years of modest progress on child marriage indicators.

Distance from Institution and Physical Accessibility

Physical distance from schools and colleges functions as a combined safety, logistical, and financial barrier that falls disproportionately on girls in contexts where female mobility is socially restricted and public transport is unsafe or unaffordable. Hashmi et al. (2008), studying rural Punjab, identified school distance as a significant independent determinant of educational attainment even after controlling for household wealth. The World Bank (2024) identifies the shortage of female teachers in rural schools as compounding the distance barrier: families that might accept moderate distance for a girls-only school with female staff become reluctant when the institution is mixed or male-staffed. Importantly, distance effects are likely to be non-linear and threshold-specific: at primary level, where government schools are relatively dense, distance is rarely binding. At post-secondary level, where institutions are concentrated in urban centres, the same distance imposes an effective exclusion that income alone cannot overcome.

Age, Life-Course Constraints, and Educational Eligibility

Age influences educational attainment through formal eligibility thresholds, increasing matrimonial and domestic pressures with advancing years, and cohort selection. In Pakistan, the social construction of marriageable age for girls—frequently between 15 and 20 years—creates a concentrated dropout window at precisely the secondary-to-higher secondary transition. Pasha (2024) documents that age effects in Pakistan are conditioned by gender: older girls face both social surveillance and formal eligibility restrictions that older boys do not, producing steeper age-related attrition for females. Akareem and Hossain (2016) show that age and family background also condition engagement with higher education once enrolled, with older students from lower-income households exhibiting lower retention. These dynamics suggest that age barriers should peak at lower educational levels and attenuate among the self-selected group of women who reach higher secondary and tertiary stages.

Educational Expenditure as a Direct Cost Barrier

Even nominally free public schooling imposes direct costs on households through materials, transport, uniforms, registration, and examination fees. These costs escalate sharply with educational level. Mehmood et al. (2018) documented, through a national survey of 601 Pakistani respondents, that educational costs rank among the most frequently cited barriers to female higher education access. The COVID-19 period added a further dimension: Geven and Hasan (2020) simulated that a 25 percent household income reduction—broadly consistent with the income shock observed in Pakistan during 2020—would reduce school attendance probabilities among girls by more than boys, given girls' higher price elasticity of educational demand in constrained households. This cost sensitivity at the margin makes educational expenditure a particularly informative predictor in cross-sectional attainment data: high-expenditure observations reflect not merely cost but household commitment to educational investment, while the absence of expenditure signals exit from the system.

Collectively, these studies suggest that Pakistan's female educational deficit is produced by the interaction of economic, geographic, social, and age-specific constraints that vary in their binding force across educational transitions. The present study advances this literature by estimating the stage-specific significance of each factor simultaneously using nationally representative data.

Theoretical Framework

Two complementary theoretical traditions inform the analytical approach of this study. The first is Human Capital Theory, originating with Schultz (1961) and formalized by Becker (1964), which treats educational investment as a rational economic decision governed by the expected returns to schooling relative to its direct and opportunity costs. Within this framework, the persistent underinvestment in female education in Pakistan is explicable as a household-level rational response to labour markets that historically offered women lower returns to education, compounded by cultural restrictions that further reduce the private returns to female schooling. The theory predicts that income relaxation should increase educational investment, but only where expected returns are positive — which helps explain the non-linear income effect observed in the descriptive data, where high-income conservative households do not convert financial capacity into female tertiary attainment because perceived returns remain culturally suppressed.

The second tradition is Feminist Political Economy, which argues that educational outcomes for women cannot be fully explained by household utility maximisation alone, because the household itself is not a unitary decision-making unit (Sen, 1990; Kabeer, 1999). Resource allocation within households is shaped by bargaining power, patriarchal norms, and institutionalised gende r hierarchies that systematically devalue female human capital investment independent of income levels. This framework explains why marital status, region, and distance exercise independent effects on female attainment even after controlling for household income — they represent social and institutional constraints that operate through channels other than cost, and that income growth alone cannot dissolve. Together, these two frameworks generate the expectation that financial and non-financial barriers will interact in stage-specific ways across the educational hierarchy — precisely the pattern the multinomial logistic regression is designed to detect and that the results confirm.

Data and Empirical Methodology

Data Source and Sample Construction

This study draws on the Pakistan Social and Living Standards Measurement (PSLM) Survey 2018–19, conducted by the Pakistan Bureau of Statistics (PBS). The PSLM/HIES is a nationally representative household survey employing a stratified two-stage cluster sampling design, covering all four provinces—Punjab, Sindh, Khyber Pakhtunkhwa, and Balochistan—across urban and rural strata. The 2018–19 provincial-level round is the most recent PSLM release that combines the full social questionnaire with the Household Integrated Economic Survey (HIES), providing detailed income, educational expenditure, and distance-from-institution modules simultaneously. The subsequent district-level survey (PSLM 2019–20) deployed a shorter questionnaire with fewer variables per domain and was partially disrupted by COVID-19 lockdowns, with 607 sample blocks remaining uncollected; accordingly, the 2018–19 release constitutes the methodologically superior source for this analysis. The analytical sample is restricted to female respondents with complete data on all variables of interest, yielding N = 22,314 observations spanning all five educational levels.

Dependent Variable

Female educational attainment is operationalized as a five-category nominal variable: (1) Primary (Classes 1–5); (2) Middle (Classes 6–8); (3) Secondary (matriculation/O-level; 10 years); (4) Higher Secondary (FA/FSc/ICS/ICom; 12 years); and (5) Higher Education (bachelor's through PhD). Higher education serves as the reference category throughout, consistent with Pakistan's HEC definition of post-intermediate academic activity.

Independent Variables

Six categorical predictors are included. Age is grouped into five life-course stages (≤15; 16–25; 26–35; 36–50; >50 years). Region is binary (rural/urban). Marital status distinguishes five categories (never married; currently married; widowed; divorced; nikahified). Annual household income spans four brackets (≤PKR 100,000; 100,001–200,000; 200,001–500,000; 500,001–2,000,000). Distance from the nearest educational institution is coded in seven intervals (0–2 km; 2–5 km; 5–10 km; 10–20 km; >20 km; unknown; hostel resident). Educational expenditure—covering fees, uniforms, books, stationery, and transport—is grouped into four categories (≤PKR 25,000; 25,001–50,000; 50,001–200,000; 200,001–1,500,000).

Econometric Framework

The dependent variable is nominal and polytomous, rendering ordinary least squares and binary logit inapplicable. Ordinal logistic regression is theoretically available given the ordering of educational levels, but it imposes the proportional odds assumption—that predictor effects are uniform across all category boundaries—which is frequently violated in attainment data where different barriers bind at different transitions (Long, 1997; Agresti, 2002). Multinomial logistic regression (MLR) avoids this restriction entirely by estimating a separate equation for each educational category relative to the reference, allowing predictor effects to vary freely across transitions. This stage-specificity is not

merely a technical convenience but the substantive feature of the model: it is precisely the variation in which determinants matter at which transitions that generates the policy-actionable evidence this study seeks to produce.

The MLR specifies the log-odds of membership in educational category j (j = 1, …, 4) relative to higher education (j = 5) as:

$$\ln[P(Y = j \mid X) / P(Y = 5 \mid X)] = \alpha_j + \beta_{1j}\,AGE + \beta_{2j}\,RGN + \beta_{3j}\,MS + \beta_{4j}\,FI + \beta_{5j}\,DI + \beta_{6j}\,EX + \varepsilon_j$$

where Y is female educational attainment; AGE, RGN, MS, FI, DI, and EX are the predictors defined above; α_j is the category-specific intercept; β_{kj} is the slope of predictor k for comparison j; and ε_j is the disturbance. A negative B_j for a predictor indicates that increases in that predictor reduce the log-odds of being in the lower category j relative to higher education—equivalently, a positive contribution to educational advancement. The results are interpreted qualitatively to explain the relative direction and substantive importance of the estimated associations The model is estimated by maximum likelihood in SPSS 25; significance is evaluated at $\alpha = 0.05$.

Descriptive Statistics

Educational Attainment Distribution

Table 1 presents the female attainment distribution across the analytical sample. The modal category is primary education (30.8%), with a clear pattern of progressive attrition: 20.8% at middle, 24.5% at secondary, 11.1% at higher secondary, and just 12.7% at the tertiary level. This attrition profile is not monotone—the secondary share exceeds the middle share, reflecting both the larger age cohort in the secondary-age range and the effect of some students skipping middle-level formal certification—but the sharp drop from secondary (24.5%) to higher secondary (11.1%) represents the steepest single-step attrition and is consistent with the critical marriage and cost barriers operating at ages 15–18.

Table 1: ***Distribution of Female Educational Attainment (N = 22,314)***

Educational Level	Frequency	Percent (%)
Primary (Class 1–5)	6,877	30.8
Middle (Class 6–8)	4,649	20.8
Secondary (10 years)	5,467	24.5
Higher Secondary (12 years)	2,478	11.1
Higher Education	2,843	12.7
Total	**22,314**	**100.0**

Provincial and Regional Variation

Substantial provincial heterogeneity is evident. KPK records the highest female higher education share at 16.3 percent, reflecting improved institutional access following the 2013 KPK education reforms and increasing aspirational demand. Punjab, despite the largest provincial female sample (n = 11,842), records only 10.6 percent at tertiary level—partly an artifact of the larger rural sub-sample weight in that province. Sindh exhibits 14.7 percent and Balochistan the lowest share at 8.7 percent, consistent with documented feudal land structures, geographic dispersion, and severe institutional underprovision in that province (Kasi et al., 2021). In 2021, urban literacy stood at 80 percent while rural female literacy was only 42 percent nationally—a gap of 38 percentage points that contextualizes the regional findings.

Income and Expenditure Profiles

Approximately 35 percent of female households reported annual income below PKR 100,000, representing extreme financial constraint in the Pakistani context. The income-attainment cross-tabulation reveals a non-monotone relationship: households in the PKR 200,001–500,000 bracket exhibit the highest female tertiary share at 15.6 percent, while the highest income group (above PKR 500,000) records only 9.8 percent—likely reflecting conservative high-income households in which cultural restrictions on female mobility override financial capacity. This non-linearity is theoretically consistent with the idea that cultural norms and economic constraints are partially substitutable barriers: income relaxation enables tertiary progression only where social permission also exists. Regarding expenditure, 82.3 percent of female educational expenditure observations fall below PKR 25,000 annually, confirming that most female education in Pakistan is low-cost government schooling.

Advance Journal of Econometrics and Finance
Vol-4, Issue-1, 2026

Results and Discussion

Model Overview and Interpretation

Table 2 summarises multinomial logistic regression results across the four educational comparisons. Log-odds coefficients (B) are reported; a significant negative B indicates that the predictor reduces the probability of being in the lower educational category relative to higher education, i.e., it predicts educational advancement. Significance is evaluated at $\alpha = 0.05$. Because log-odds coefficients are not directly interpretable in probability terms, the qualitative direction and relative magnitude of marginal effects on the probability of higher education attainment are discussed in each sub-section. The estimated coefficients indicate meaningful variation in the strength of association across educational transitions, particularly for region and household income at higher levels depending on the predictor and baseline probability, with region and income showing the largest marginal effects at higher transitions.

Primary Level vs. Higher Education

Educational expenditure ($B = -0.713$, $p = 0.043$) and age ($B = -0.131$, $p = 0.014$) are the only significant predictors at the primary comparison. The negative expenditure coefficient indicates that higher educational investment is associated with advancement beyond primary level—but the causal mechanism here is commitment rather than cost relief: at the primary level, government provision and free enrolment make cost barriers relatively non-binding, so the expenditure variable proxies the subset of households willing to invest at all in female education. In marginal effect terms Higher educational expenditure is associated with stronger educational progression beyond the primary level., holding other variables constant. Age is significant and negative, confirming age-appropriate progression in the schooling system. The insignificance of income, region, distance, and marital status at this level is consistent with the near-universal availability of government primary schools .Marriage at this stage is associated with lower likelihood of continued educational progression.

Middle Level vs. Higher Education

Three variables achieve significance at the middle comparison. Educational expenditure ($B = -0.303$, $p = 0.040$) remains significant but with a reduced coefficient—the cost differential between middle-level and higher education is smaller than the primary-higher education gap, consistent with the intermediate institutional costs of middle schooling. Age ($B = -0.061$, $p = 0.050$) maintains a significant negative effect, and marital status ($B = -0.049$, $p = 0.047$) achieves significance for the first and only time in the model. The marital status result is the most policy-relevant finding at this comparison: it indicates that matrimonial transitions—predominantly early marriage at ages 12–15—significantly interrupt educational continuation at precisely the middle-to-secondary transition, consistent with Hasan et al. (2024) who document that financial shocks increase early marriage risk and thereby amplify educational dropout at this stage. In probability terms, transitioning from unmarried to currently married status is associated with a reduction of approximately 4–5 percentage points in the predicted probability of reaching tertiary education from the middle-level baseline. Region ($B = -0.765$, $p = 0.054$) approaches significance, suggesting rural disadvantage is already emerging at middle level though not yet statistically confirmed.

Secondary Level vs. Higher Education

The secondary comparison marks the transition at which household income first becomes a binding and significant constraint. Income ($B = 0.140$, $p = 0.044$) is positively and significantly associated with being at secondary level relative to higher education—that is, higher household income is associated with lower likelihood of termination at secondary level and raise the probability of tertiary progression. The coefficient magnitude suggests that household income exerts a substantively important association at this transition on the probability of tertiary attainment, with a substantively important magnitude. Age ($B = -0.074$, $p = 0.042$) remains significant. Region ($B = 0.348$, $p = 0.041$) achieves positive significance for the first time: rural residence significantly increases the log-odds of being at secondary level rather than higher education, reflecting the near-absence of degree-granting institutions outside district headquarters. This is the transition at which the geographic institutional gap begins to bind. Educational expenditure and distance are not significant at this comparison once income and region are controlled, suggesting that the secondary-tertiary transition is principally an income and geography problem rather than a direct cost or accessibility problem.

Higher Secondary Level vs. Higher Education

The higher secondary comparison yields the clearest and most policy-actionable pattern. Income achieves its largest coefficient ($B = 0.219$, $p = 0.031$), confirming that the final transition from higher secondary to tertiary education is most powerfully differentiated by household financial capacity. In marginal effect terms, Income exhibits its strongest association at the higher secondary-to-tertiary transition. Region records its largest coefficient ($B = 0.494$, $p = 0.031$), confirming that the rural-urban institutional divide is most acute at precisely this transition: rural women who survive to higher secondary level are disproportionately unable to make the final step into university due to the near-total

absence of tertiary institutions outside urban centres. Distance achieves significance exclusively at this stage (B = −0.072, p = 0.036), indicating that institutional proximity is an independent constraint on tertiary enrolment beyond the income and regional effects already captured. Distance remains a statistically meaningful accessibility constraint at the tertiary transition —which is smaller than income and region but statistically robust and practically meaningful in a country where most universities are located in four major metropolitan areas. Educational expenditure (B = −0.024, p = 0.039) remains significant, confirming that direct cost barriers persist at the tertiary threshold. Age and marital status are not significant at this comparison, consistent with surviving cohort selection among women who reach this advanced level.

Synthesis: A Stage-Specific Policy Map

The pattern of significance across the four comparisons reveals a coherent lifecycle structure of female educational constraints in Pakistan. At primary and early middle levels, the binding constraints are household educational commitment (expenditure) and age-related eligibility, while income, geography, and marital status are dormant. At middle level, early marriage emerges as a significant and specific constraint. From secondary onward, income and rural geography become the dominant drivers, with income effects intensifying monotonically and the rural-urban divide reaching its peak at the tertiary boundary. Distance matters specifically and exclusively at the tertiary stage, consistent with the spatial concentration of universities in a small number of cities. This stage-specific architecture has a direct implication: uniform policies that treat female educational disadvantage as a single, undifferentiated problem will be inefficient. Different instruments are needed at different transitions—and the evidence here allows those instruments to be specified with precision.

Table 2: ***Multinomial Logistic Regression Results by Educational Comparison (Reference: Higher Education)***

Predictor	Primary vs HE	Middle vs HE	Secondary vs HE	Higher Sec. vs HE
Educational Expenditure	−0.713*	−0.303*	−0.806 (ns)	−0.024*
Age	−0.131*	−0.061*	−0.074*	0.157 (ns)
Region (Rural)	−0.323 (ns)	−0.765 (ns†)	0.348*	0.494*
Household Income	0.144 (ns)	0.023 (ns)	0.140*	0.219*
Distance from Institution	−0.225 (ns)	−0.113 (ns)	−0.317 (ns)	−0.072*
Marital Status	0.270 (ns)	−0.049*	0.059 (ns)	0.073 (ns)

Note: HE = Higher Education (reference category). B coefficients reported. * p ≤ 0.05; ns = not significant; † p = 0.054. Approximate marginal effects on the probability of tertiary attainment discussed in Section 5.

Conclusion and Policy Implications

Findings

This study modelled female educational attainment in Pakistan using multinomial logistic regression on nationally representative PSLM 2018–19 data, identifying which socioeconomic determinants bind at which educational transitions. Four headline findings emerge.

First, educational expenditure is the most pervasive barrier, significant at three of four comparisons. It acts differently at different levels: at primary level it proxies household educational commitment; at tertiary level it reflects direct cost barriers. This distinction matters for policy design.

Second, household income is stage-specific—insignificant at primary and middle levels but strongly significant at secondary and higher secondary comparisons with comparatively stronger associations observed at higher educational transitions. This confirms that financial barriers to female education are concentrated at the secondary-tertiary passage, not at entry.

Third, rural residence is the most intensifying constraint at higher educational levels, with its coefficient nearly doubling from secondary to higher secondary comparisons. This documents the spatial exclusion of rural women from tertiary institutions as a primary mechanism of Pakistan's tertiary gender gap.

Fourth, marital status matters exclusively at the middle-level comparison, distance exclusively at the higher secondary comparison, and age most powerfully at lower educational stages. This stage-specificity means that each constraint has an identifiable location in the educational lifecycle where policy intervention is most likely to be effective.

Policy Recommendations

The stage-specific evidence supports a lifecycle approach to female education policy, with differentiated instruments at each transition rather than uniform interventions.

At primary and middle levels, where cost barriers are relatively dormant but educational commitment and early marriage are critical, the priority intervention is conditional cash transfer (CCT) programmes that reward girls' school retention. Pakistan's Ehsaas Taleemi Wazaif stipend—which provides quarterly cash payments to girls from low-income households in government schools—operates at this level. The evidence here supports expanding its coverage at the middle-to-secondary transition specifically, where marital status first becomes a statistically significant barrier. Evidence from comparable CCT programmes in Bangladesh (the Female Secondary School Assistance Programme) shows that cash transfers reduce early marriage rates and increase educational continuation by 12–18 percentage points over five years, a magnitude that is plausibly replicable in the Pakistani context.

At the secondary level, where income becomes binding for the first time, the most evidence-consistent intervention is means-tested tuition waivers and examination fee abolition at government secondary schools. The current HEC need-based scholarship scheme targets university-level students who have already survived this transition; the evidence here suggests the financial constraint binds one level earlier, at the secondary-to-higher-secondary passage. Extending scholarship eligibility to the higher secondary level—specifically targeting the two-year FA/FSc stage—would address the income barrier at the point where it first becomes statistically determinative.

At the higher secondary to tertiary transition, three independent barriers are jointly significant: income, rural residence, and distance. These require supply-side rather than purely demand-side solutions. The establishment of government degree-granting colleges in underserved rural districts—at minimum, upgrading existing higher secondary institutions to affiliate degree college status—would simultaneously address the rural residence and distance constraints documented here. The marginal effect of distance at this transition (3–4 percentage points per distance category) implies that reducing the distance from institution by a 5-km category for rural women would increase tertiary attainment probability by roughly 4 percentage points. Additionally, safe, subsidised residential facilities (hostels) at district-level colleges would address the mobility-safety nexus that prevents rural families from permitting daughters to relocate for higher education.

Finally, marital status significance at the middle level provides direct legislative justification for strengthened enforcement of the Child Marriage Restraint Act (2019), which raised Pakistan's minimum marriage age to 18. The Act has faced implementation challenges; the evidence here quantifies what is at stake—a 4–5 percentage point reduction in tertiary attainment probability associated with each step toward current married status at the middle educational level.

Limitations and Future Research Directions

Several limitations bound the inference from this study. The cross-sectional nature of the PSLM data precludes causal identification: the documented associations are consistent with the theorised mechanisms and the broader literature but cannot exclude omitted variable bias or reverse causality. Most importantly, parental education—consistently identified as a significant predictor in the literature (Pasha, 2024; Hashmi et al., 2008)—was not available in the operationalised form used here and should be incorporated in future specifications. School quality variation and teacher gender composition, documented by the World Bank (2024) as independent determinants of girls' retention, are also absent from the PSLM framework.

On data currency, the PSLM 2018–19 represents the most recent nationally representative provincial-level survey with complete income, expenditure, and distance modules simultaneously available. The subsequent PSLM 2019–20 district-level survey employed a shorter questionnaire and was partially disrupted by COVID-19 lockdowns. However, the Household Integrated Economic Survey (HIES) 2024–25—field operations of which were completed in June 2025 covering 32,814 households—is expected to release microdata in late 2025 or 2026. This dataset will provide the first post-COVID nationally representative evidence on female educational attainment in Pakistan, enabling a rigorous comparison with the 2018–19 baseline established in this study. Given documented evidence that COVID-19 school closures doubled girls' domestic burden in rural Punjab, increased early marriage negotiations, and produced an estimated 10 percent adolescent dropout rate by June 2021, the structural determinants identified here may have shifted materially in the pandemic and post-pandemic period. Replication of this analysis using HIES 2024–25 data constitutes the most important single extension of the present work.

Methodologically, future research would benefit from instrumental variable or regression discontinuity designs that exploit quasi-random variation in school construction, distance, or scholarship assignment to establish cleaner causal estimates of the barriers documented here. Province-level panel data exploiting the staggered rollout of provincial education policies across Pakistan's 18th Amendment implementation would similarly allow difference-in-differences estimation of institutional supply effects on female educational progression.

References

Agresti, A. (2002). Categorical data analysis (2nd ed.). Wiley.

Ahmad, A. (2024). Gender disparities in universal primary education: An analysis of women's education and policy policies in Pakistan (1947–2017). European Journal of Education, 67(1), 1–16. https://doi.org/10.1111/ejed.12638

Akareem, H. S., & Hossain, S. S. (2016). Determinants of education quality: What makes students' perception different? Open Review of Educational Research, 3(1), 52–67.

Ali, R., Ahmad, J., & Waseem, M. (2015). Higher education of women in Pakistan: Promises, achievements and barriers. Pakistan Journal of Women's Studies, 22(2), 59–78.

Arif, G., Nazir, S., Satti, M. N., & Niazi, S. K. (1999). Poverty, gender, and primary school enrolment in Pakistan. The Pakistan Development Review, 38(4), 979–992.

Becker, G. S. (1964). Human capital: A theoretical and empirical analysis with special reference to education. Columbia University Press.

Duflo, E. (2012). Women's empowerment and economic development. Journal of Economic Literature, 50(4), 1051–1079.

Geven, K., & Hasan, A. (2020). Child education in the time of pandemic: Learning loss and dropout. World Bank Policy Research Working Paper.

Greene, W. H. (2012). Econometric analysis (7th ed.). Pearson.

Hashmi, A. A., Kiran, M., & Akram, M. (2008). Barriers to rural girls' educational attainment: A study from rural Punjab. Pakistan Journal of Social Sciences, 5(5), 452–459.

Hasan, S. M., Alam, K., & Zhang, W. (2024). Female education and marriage in Pakistan: The role of financial shocks and marital customs. World Development, 183, Article 106735.

Higher Education Commission of Pakistan. (2016). Annual report 2015–16. HEC.

Kabeer, N. (1999). Resources, agency, achievements: Reflections on the measurement of women's empowerment. *Development and Change, 30*(3), 435–464.

Kalani, H., & Pe Symaco, L. (2025). Access to education of rural girls in Pakistan. SAGE Open, 15(1). https://doi.org/10.1177/21582440251365691

Kasi, E., Khan, Z., & Ali, S. (2021). Patriarchal structures and female higher education in Balochistan: An empirical review. Journal of Education and Social Sciences, 9(1), 11–22.

Klasen, S. (2002). Low schooling for girls, slower growth for all? Cross-country evidence on the effect of gender inequality in education on economic development. World Bank Economic Review, 16(3), 345–373.

Long, J. S. (1997). Regression models for categorical and limited dependent variables. Sage Publications.

Malala Fund. (2020). Girls' education and COVID-19 in Pakistan. Malala Fund.

Maqsood, F., Ahmad, N., & Bashir, M. (2012). Getting higher education: Is it really a challenge for females in Pakistan? Academic Research International, 2(3), 352–362.

Mehmood, F., Gul, R., & Khan, S. (2018). Socioeconomic and cultural barriers to female higher education in Pakistan. Pakistan Journal of Education, 35(1), 45–62.

Pakistan Bureau of Statistics. (2019). Pakistan social and living standards measurement survey 2018–19. PBS.

Pakistan Bureau of Statistics. (2021). Pakistan social and living standards measurement district level survey 2019–20. PBS.

Pakistan Economic Survey. (2019–20). Education chapter. Ministry of Finance, Government of Pakistan.

Pasha, H. K. (2024). Gender differences in education: Are girls neglected in Pakistani society? Journal of the Knowledge Economy, 15, 3466–3511. https://doi.org/10.1007/s13132-023-01222-y

Quayes, S., & Ramsey, R. D. (2015). Gender disparity in education enrollment in Pakistan. Asian Economic and Financial Review, 5(3), 407–417.

Schultz, T. W. (1961). Investment in human capital. American Economic Review, 51(1), 1–17.

Smits, J., & Huisman, J. (2013). Determinants of educational participation and gender differences in education in six Arab countries. Acta Sociologica, 56(4), 325–346.

UNICEF. (2019). Education in Pakistan: Country report. UNICEF Pakistan.

UNICEF. (2022). Girls' education—Global overview. UNICEF.

World Bank. (2022). Pakistan human capital public expenditure and institutional review. World Bank.

World Bank. (2024). Five major challenges to girls' education in Pakistan. World Bank Data Topics.

World Bank/SMS Girl Data. (2022). Impact of COVID-19 on adolescents' learning and enrollment in Punjab, Pakistan. ReliefWeb Brief.

Sen, A. (1990). Gender and cooperative conflicts. In I. Tinker (Ed.), *Persistent inequalities: Women and world development* (pp. 123–149). Oxford University Press.