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Gender inequality in successful completion of higher education: evidence from a longitudinal study in India

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ABSTRACT

Based on the Young Lives longitudinal study in India, gender differentials in completion of higher education (HE) among 26 year olds are explored in this paper. The binary logistic regression reveals that young women are significantly less likely to complete HE compared to men. Further analysis shows that women and youth from socially disadvantaged caste groups as well as bottom tercile households are lower probability of completing HE. The Fairlie decomposition model explains 32% of the gender gap, with 20% gap explained by type of school attended at age 15 and mathematics score explaining 70% of the gap. This paper is particularly important from a policy perspective as the National Education Policy 2020 is rolled out with a focus on lifelong learning.

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KEYWORDS

gender; inequality; higher education; India

Background

Recognising Higher Education (HE) as a critical lever towards achieving social transformation, SDG target 4.3 aims, by 2030, to ensure equal access for all women and men to affordable and quality technical, vocational and tertiary education, including university or higher education. UIS Database reveals that over 235 million students were enrolled in higher education (HE) in the world in 2020—doubling the 100 million students enrolled in 2000 (UNESCO 2022). Most high-income countries have moved from a phase of ‘elite access’ to ‘mass access’ (Carnoy et al. 2013). In India too, the HE sector has expanded rapidly in terms of the number of institutions and student enrolments in the past decades. It has become one of the largest higher education systems in the world, with around 43.3 million students enrolled in 1,162 universities 42,825 colleges and 10,576 standalone institutions in 2021–22 (MoE 2023a). In the past decade, the growth rate of universities and colleges in India has surged by approximately 82% and 32%, respectively (Appendix Table A1).

All India Survey on Higher Education (AISHE) conducted by the Ministry of Education shows that the Gross Enrollment Ratio (GER) in higher education has shown a steady increase, rising from 20.8 in 2011–12 to 28.4 in 2021–22, with a decadal growth rate of 36.5%. However, the recently adopted National Education

Policy (2020) aims to increase the GER in higher education to 50% by 2035. There is a growing need for young individuals in India to pursue higher education to access and secure lucrative job opportunities (Wheebox 2024). The impressive growth of HE sectors is largely due to the fast-accompanying private sector participation (Tilak 2018). As evident in [Appendix Table A1](#), the Indian government's promotion of the private sector in higher education is evident in the significant 272% decadal growth rate of private universities (Chowdhury 2023). Despite, the education cost being much higher in private universities, enrolment in these institutions continues to rise rapidly (Aithal and Suresh Kumar 2016; Garwe 2016; Sharma 2015), though these are largely confined to urban areas.

The 2016 Global Education Monitoring Report examined disparities in completion of HE between the richest and poorest students across 76 countries and found that 20% of the richest compared to less than 1% of the poorest 25–29 years old had completed at least four years of higher education (UNESCO 2016). Besides, wealth, gender equity in education has also been a focal point of research in HE (Iddrisu et al. 2020; Khajikhan 2021), though most of these studies have focussed on access to HE instead of completion of a university degree (Sánchez and Singh 2018). Using the Young Lives longitudinal data also documented that much of the inequality in access to HE appears early, i.e. during adolescence as seen in the correlational analysis between early learning and later enrolment in HE.

In recent years, women's participation in higher education has been on the rise in India, driven by sociocultural movements aimed at eliminating societal stereotypes and promoting gender equality and equity (Dey and Srivastava 2022; Islam et al. 2023). The Indian government has also launched several fellowship programmes for girls such as 'National Scholarship for Higher Education of ST Girls', 'Post Graduate Indira Gandhi Scholarship for Single Girl Child', 'Pragati Scholarship' and 'TechSaksham Program (TSP) for women' aimed at motivating them to pursue higher education (MoE 2023b; Pal 2019).

In India, despite the overall phenomenal growth in enrolment of young women in HE, constituting half of the total enrolments in 2021–22 (MoE 2023a), several studies find that gender disparities in access to HE persists in rural areas, among socially disadvantaged groups such as Scheduled Caste (SC) and Scheduled Tribe (ST)¹ population, and even amongst low-middle-income families (Datta and Gandhi Kingdon 2019; Ghosh and Kundu 2021; Tilak and Kumar Choudhury 2019, 2021). For example, the Gross Enrolment Ratio (GER) for ST women is only 19.1% compared to the overall GER amongst women of 27.9% (MoE 2023a).

A policy concern despite increasing access to HE is the fact that increased women enrolment is compromised by the persistently high dropout rates of girls relative to boys (Bandyopadhyay and Subrahmanian 2008). A review of past studies indicates that both young men and women are influenced by multiple reasons that account for why they leave HE (Rankin and Aytac 2006). There are both institutional factors, e.g. academic course not of choice, fee being unaffordable, as well as structural factors, e.g. prevailing gender stereotypes, patriarchy, betrothal, and parental aspiration etc., that have been identified.

Only a limited number of studies have focused on the determinants of entering higher education in India (Guerrero and Rojas 2020; Singh, Mukherjee, and Kumar 2023), but the interaction of gender with other socioeconomic as well as individual and school-related variables to determine the gender gap in completion of higher education still remains largely unexplored, especially amongst socio-economically deprived population. Given this backdrop, the specific objective of this paper is to address the evidence gap by moving beyond mere enrolment and examine how individual, socioeconomic and education-related factors interact with gender to determine HE completion among a pro-poor sample of young adults in Andhra Pradesh and Telangana, two southern states of India. The recent Education Policy 2020 envisions a structured framework for classes based on different ages with students entering higher education institutes after age 18 (Appendix Figure A1) (MHRD 2022). We therefore focus on HE completion of the Young Lives Index children post-age 22 years i.e. when they were most likely to have completed the first HE degree, while drawing upon various related variables from earlier rounds.

This paper aims to answer the following two questions:

- (i) What are the determinants of completion of higher education?
- (ii) Does a gender gap exist, and what factors explain the gap?

Data and method

Data

We draw upon the rich quantitative longitudinal data from the Young Lives study in India. Young Lives longitudinal study on childhood poverty has been following 3,008 children since 2002.² Two cohorts of children, i.e. Older Cohort (eight years old in 2002) and Younger Cohort (one year old in 2002),³ have been followed in four districts of Andhra Pradesh and five districts of Telangana. To date, the survey has collected data from seven rounds at the child, household and community levels in 2002 (Round 1), 2005 (Round 2), 2009 (Round 3), 2013 (Round 4), 2016 (Round 5) 2020–21 (Round 6) and 2023–24 (Round 7).⁴

For this paper, we use quantitative data from first six rounds pertaining only to the Older Cohort. As previously mentioned, according to the educational guidelines, students are expected to complete their higher education by the age of 21. So, we limit this paper only to the Older Cohort children who were 8 years old in Round 1 and turned 26 years old in Round 6 (2020–21) by which time they would have been able to complete HE.

To calculate the higher education completion rate, we have included data from both the 5th and 6th rounds, thereby taking into account those students who completed their university degree after the age of 22 (Round 5), whereas relevant background variables have been drawn from all six rounds of the Young Lives panel data. After dropping observations with missing values across all variables chosen for the analysis, the final sample was 851.

Dependent variable

We construct a dependent variable, ‘successful completion of higher education’, i.e. a dummy variable with a value of ‘1’ if the young adult had completed higher education⁵ and ‘0’ if otherwise. The variable is created based on the response to a question asked to Older Cohort children in Round 5 and Round 6, namely, ‘What is the highest education level that you have completed?’ Only those who responded that they had completed at least an undergraduate degree ($N = 403$, coded as ‘1’) were considered to have completed higher education, and those who attained any other level of education below an undergraduate degree ($N = 448$, coded as ‘0’) were taken as not completing HE. It is important to note that we do not include individuals who reported having a technical or vocational education since these are not equivalent to a three-year higher education graduate degree ($N = 47$, Share = 5.5%). As the latter category included, those leaving school at various levels of education including leaving before completing a higher education degree, this is acknowledged as a limitation.

Independent variables

Very few studies around the globe have examined factors affecting the completion of higher education (Light and Strayer 2000; Ocener 2017). Therefore, as presented in Figure 1, we select control/explanatory variables based on available literature. We also take into consideration the fact that gender seems to mediate all the factors in

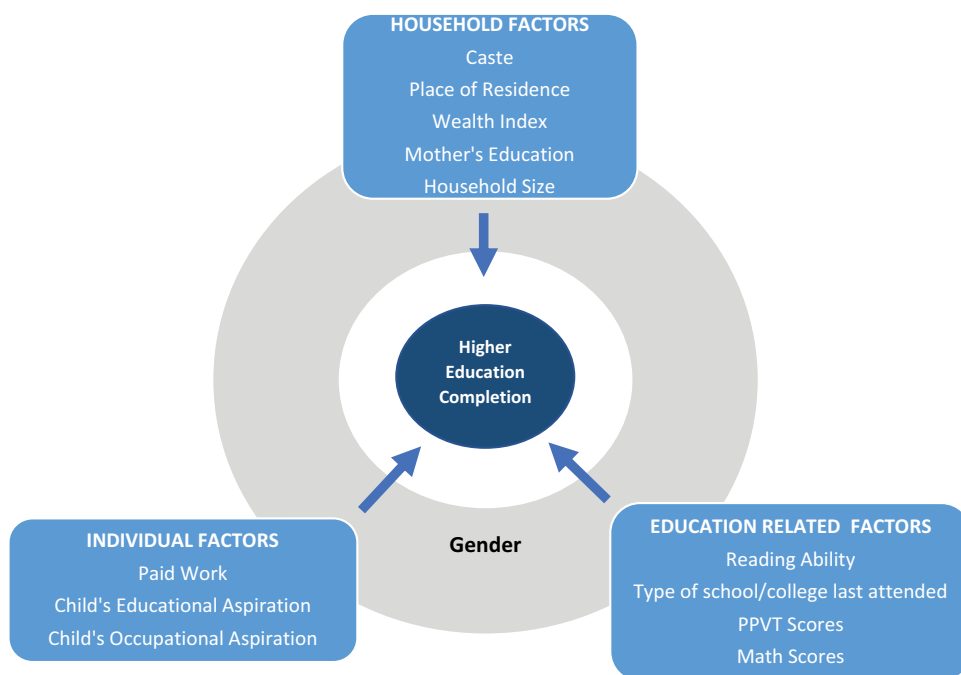


Figure 1. Factors influencing completion of higher education. Source: Compiled by the authors based on literature.

determining educational trajectories of young people, particularly in the Indian context where a strong son preference exists. Gender in this paper is viewed as a social construct which is which complex and makes distinction between women and men via formal and informal power processes (van den Brink et al. 2016).

Individual factors

We include three variables under this category. (i) Participation in paid work at age 15 (Round 3), is one of the variables we include since several studies have concluded that participation in work negatively affects a child's academic achievement (Ahmed 2011; Ramachandra and Ekbote 2016). In addition, we include children's educational and occupational aspirations at age 15 (Round 3), since these are expected to significantly affect investment in human capital and completion of HE, as found in several studies (Flouri et al. 2015; Lee, Hill, and David Hawkins 2012).

Household characteristics

In terms of household variables, we include the following: (i) Caste inequalities in higher education in India have been studied widely in the literature (Khan 2018; Madan 2020) and reveal inequalities based on caste despite seat reservation for disadvantaged groups.⁶ (ii) As far as investment in human capital is concerned, an individual's educational attainment is significantly influenced by their household's economic status (UNESCO (2022); Tilak and Kumar Choudhury 2019). We draw upon the Young Lives data related to household wealth index⁷ as an explanatory variable to mark wealth status of the household. (iii) Likewise, studies have found varying effects of parental education on their offspring's education (Gürler and Demiroglari 2020; Minello and Blossfeld 2017), so we draw upon mother's education level from Round 2 of the longitudinal survey. (iv) Further, the place of residence also determines educational outcomes among young adults (Agarwal 2009; Azam and Blom 2008), therefore we add location as a variable. (v) Household size is yet another variable included in the analysis since research evidence shows that it plays a significant role in attending as well as completion of higher education, especially for girls in large families (Diprete and Buchmann 2006; Tilak and Kumar Choudhury 2021).

Education-related factors

Seminal work by Bean (1985) as well as Duque, Duque, and Suriñach (2013), had highlighted that poor academic achievement was the main reason for students falling behind in their studies and successful transition through HE. The Young Lives India study has employed various standardised measures to assess children's cognitive achievement outcomes across various rounds based on the age of the index children.

We add four education-related variables in our analysis, which includes three prior achievement scores: (i) reading ability at age 8 since the early reading ability is known to have long-term effects on learning and academic development (Abadzi 2006; Singh and Mukherjee 2015). (ii) Similarly mathematical ability of the Index children was assessed in various rounds. These maths assessments encompass a range of mathematical concepts such as computational skills, problem-solving skills, and numerical reasoning. Children's performance on these assessments is quantified as mathematics scores and we adopt the mathematics assessment scores in Round 3. (iii) Another measure which is a proxy for

cognition used in the Young Lives study is the Peabody Picture Vocabulary Test (PPVT)⁸ which has been translated and adapted for India (McKinlay 2011). This test evaluates a child's receptive vocabulary, indicating their ability to understand and comprehend words. All the scores have been categorised into two groups: below average and above average. (iv) Lastly, we examine the type of school i.e. public or private, attended by the Index children in Round 3. This is due to the fact that several authors have pointed out that inter-institutional disparities lead to inequity in successful educational transitions in India (Singh and Bangay 2014; Singh and Mukherjee 2015; Tilak and Kumar Choudhury 2019).

Empirical design

Bivariate analysis was conducted to examine the factors associated with successful completion of HE, separately for young men and young women. Pearson Chi-square test of association was utilised to determine the significance of the bivariate associations. We also employed a t-test to examine the statistical significance of the gender gap in HE completion rates. Further, as bivariate analysis did not allow us to control for explanatory variables, a binary logistic regression model was utilised to examine the determinants of successful completion of HE among young adults. The econometric specification of the model is as follows:

$$Y = \alpha + \beta \text{gender} + \theta X + \varepsilon \quad (1)$$

where,

α is the intercept,

β is the coefficient of the main explanatory variable 'gender'

θ is the coefficient vector

X is the vector of the other control variables, and

ε is the error term.

Since the main variable of interest in our analysis is gender. We use several predictor variables to explain gender inequality in the successful completion of higher education. The summary statistics of the variables chosen for the logistic model are given in [Appendix Table A2](#).

We estimate three logit equations to examine the heterogeneity in the odds ratios indicating successful completion of higher education. We start by considering the overall sample (*Model 1*) followed by young men (*Model 2*) and young women (*Model 3*). The logit estimates for models 1 to 3 are presented in [Table 2](#).

Decomposition method

Fairlie's non-linear decomposition method is then applied to examine the gender gap in HE completion (Fairlie 2005). The method is an extension to Blinder-Oaxaca decomposition technique to logit and probit models and is used to calculate the gap in the binary dependent variable, i.e. completion of HE. Fairlie's decomposition method provides the contribution level of various predictor variables in explaining the gender gap in terms of the characteristics of the explanatory variables (known as the explained part or endowment) and

coefficients of exogenous covariates. It also captures the immeasurable endowments and any direct explanation for the unexplained gap, which is difficult to find.

Bivariate analysis

The gender difference in the completion of HE is clearly visible from the bivariate analysis (Figure 2). Overall 46.8% of young adults aged 26 years have completed HE in Andhra Pradesh and Telangana, however, the completion rate significantly varied between young men (55.3%) and women (39.7%). Although the completion rate of elementary and secondary education is higher among women, the gender gap is evident as very few women compared to men were able to transition and complete HE.

The bivariate results (Table 1) indicate that individuals aspiring to complete HE at age 15 are more likely to complete HE (58.4%) compared to their counterparts (37.1%). Similarly, the HE completion rate is higher among those aspiring to secure a future professional job at age 15 (54.3%), with a gender gap of 10.7 percentage points in favour of men (men: 61.5% vs. women: 50.8%). A greater percentage of HE completion rate is observed among those who were not involved in paid work (52.4%) at age 15 with a gender gap of 16.7 percentage points for HE completion (men: 61.2% vs. women: 44.5%). As per the education policy, students start higher education after the age of 18. So, involvement in paid work in late adolescence clearly has a negative correlation with HE completion. Additionally, an increasing proportion of HE completion amongst young people with increasing educational levels of mothers is noticed. This is apparently in conformity with the view that the significance of higher education is better appreciated among better-educated parents, who might also be less biased in the decision-making of

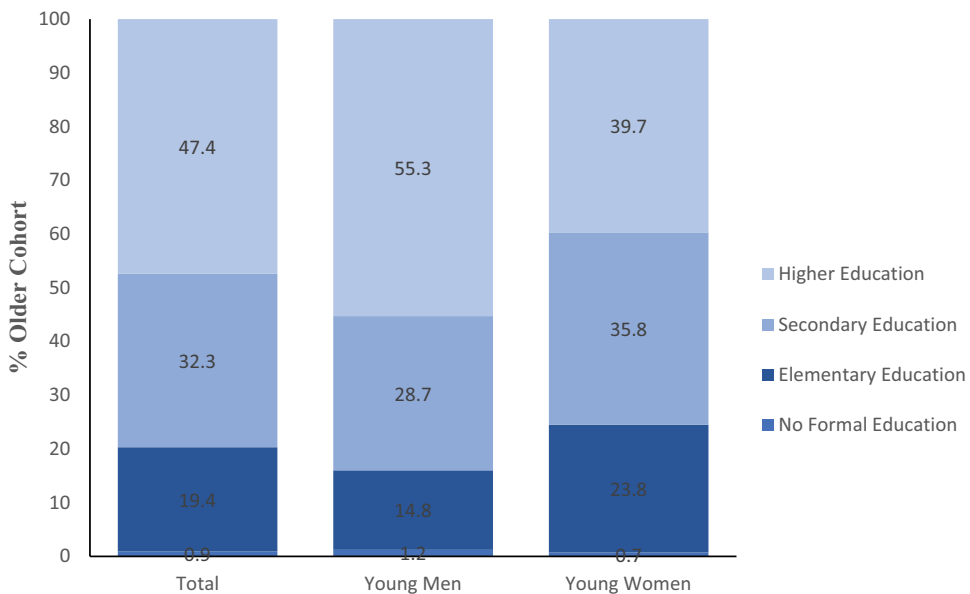


Figure 2. Education attainment of young adults at age 26.

Table 1. Share of individuals who have completed higher education at age 26.

	Total	Young Men	Young Women	Gender Gap
<i>Child's educational aspiration (R3)^{###}</i>				
Below graduation	37.1	46.8	30.1	16.7***
Graduation & above	58.4	62.1	53.7	8.4*
<i>Child's occupational aspiration (R3)^{###}</i>				
Non-professional job	42.0	52.7	24.6	28.1***
Professional job	54.3	61.5	50.8	10.7**
<i>Paid work (R3)^{###}</i>				
Not engaged	52.4	61.2	44.5	16.7***
Engaged	22.8	31.3	11.3	20.0***
<i>Mother's education (R2)^{###}</i>				
No formal education	36.9	46.0	28.1	17.9***
Up to elementary	54.0	64.2	43.6	20.6***
Above elementary	80.9	80.0	81.7	-1.7
<i>Household Size (R4)^{###}</i>				
Less than 5	52.4	60.4	44.1	16.3***
5 and above	41.4	48.6	35.0	13.6***
<i>Reading ability (R1)^{###}</i>				
None	31.4	37.3	26.7	10.6**
Able to read sentences	61.4	68.5	53.3	15.2***
<i>PPVT test score (R3)^{###}</i>				
Below average	36.0	44.4	30.1	14.3**
Above average	60.5	64.1	55.5	8.6***
<i>Math test score (R3)^{###}</i>				
Below average	28.1	34.3	23.9	10.4***
Above average	66.4	69.9	61.5	8.4**
<i>Cloze test score (R3)^{###}</i>				
Below average	28.1	34.3	23.9	10.4**
Above average	66.4	69.9	61.5	8.4*
<i>Type of school last attended (R3)^{###}</i>				
Private	73.7	74.7	72.4	2.3
Government	35.7	44.9	27.8	17.1***
Overall ^{###}	47.4	55.3	39.7	15.6

R = Young Lives survey rounds.

Note: t-test significant at: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Chi-square test of association significant at: ### $p < 0.01$, ## $p < 0.05$, # $p < 0.1$.

education of their offspring based on gender (Dubow, Boxer, and Rowell Huesmann 2009).

The HE completion rate is double among individuals who were able to read sentences at 8 years, standing at 61%, with a 15-percentage points gender gap, notably higher among males (men: 68.5% vs. women: 53.3%). Across all tests, individuals with higher scores (above average) exhibit a higher rate of HE completion. The gender gap is more pronounced among individuals with below-average PPVT scores (men: 44.4% vs. women: 30.1%) while the gap was 10.4 percentage points for mathematics test score. We also find that 73.7% of students completed HE among those attending secondary private schools, compared to 35.7% of government secondary school students. A 17 percentage point gender gap in higher education completion is observed among government school students, with 44.9% completion rate among men and 27.8% among women.

Among all the social groups, the gender gap is most pronounced amongst Backward Class (32 percentage points), with completion rates of about 60% among men and 34% among women (Figure 3). A significant disparity in HE

Table 2. Odds Ratio predicting the likelihood of higher education completion.

	<i>Model 1</i> Overall	<i>Model 2</i> Young men	<i>Model 3</i> Young women
Gender (R1)			
Young women ^{Ref}			
Young men	1.961*** (.357)	—	—
<i>Individual factors</i>			
Child's educational aspiration (R3)			
Below graduation ^{Ref}			
Graduation & above	1.944*** (.326)	1.454 (.347)	2.482*** (.638)
Child's occupational aspiration (R3)			
Non-professional job ^{Ref}			
Professional job/university student	1.879*** (.335)	1.665** (.428)	2.094*** (.566)
Paid work (R3)			
Not engaged ^{Ref}			
Engaged	.491*** (.121)	.565* (.175)	.295** (.143)
<i>Household factors</i>			
Caste (R1)			
Other caste ^{Ref}			
Scheduled caste	.717 (.196)	.776 (.304)	.834 (.334)
Scheduled tribe	.691 (.223)	.944 (.458)	.619 (.287)
Backward class	.652* (.148)	1.231 (.406)	.355*** (.119)
Place of residence (R4)			
Urban ^{Ref}			
Rural	1.089 (.249)	1.282 (.440)	.710 (.233)
Wealth index tercile (R4)			
Bottom ^{Ref}			
Middle	.882 (.186)	.796 (.230)	.912 (.299)
Top	.945 (.239)	.678 (.255)	1.330 (.491)
Mother's education (R2)			
No formal education ^{Ref}			
Up to elementary	1.100 (.213)	1.470 (.398)	.761 (.373)
Above elementary	2.943*** (.926)	2.514** (1.122)	2.955** (1.363)
Household size (R4)			
Less than 5			
5 and above ^{Ref}	.791 (.132)	.828 (.195)	.795 (.202)
<i>Education related factors</i>			
Reading ability (R1)			
None ^{Ref}			
Able to read sentences	1.729** (.304)	2.431*** (.601)	1.187 (.328)
PPVT score (R3)			
Below average ^{Ref}			
Above average	1.320 (.238)	1.187 (.303)	1.266 (.349)
Maths test score (R3)			
Below average ^{Ref}			
Above average	2.512*** (.461)	2.768** (.703)	2.908*** (.872)
Type of school last attended (R3)			

(Continued)

Table 2. (Continued).

	Model 1 Overall	Model 2 Young men	Model 3 Young women
Private ^{Ref}			
Government	.401*** (.082)	.431*** (.125)	.388*** (.119)
Constant	.428*** (.171)	.485*** (.287)	.383*** (.119)
Prob > Chi ²	0.000	0.000	0.000
Pseudo R ²	.248	.205	.311
Observations	851	418	433

R = Young Lives survey rounds.

^{Ref}: Reference category.

Dependent variable: Completion of higher education, '1' Yes, '0' No.

Note: Standard errors in parentheses; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

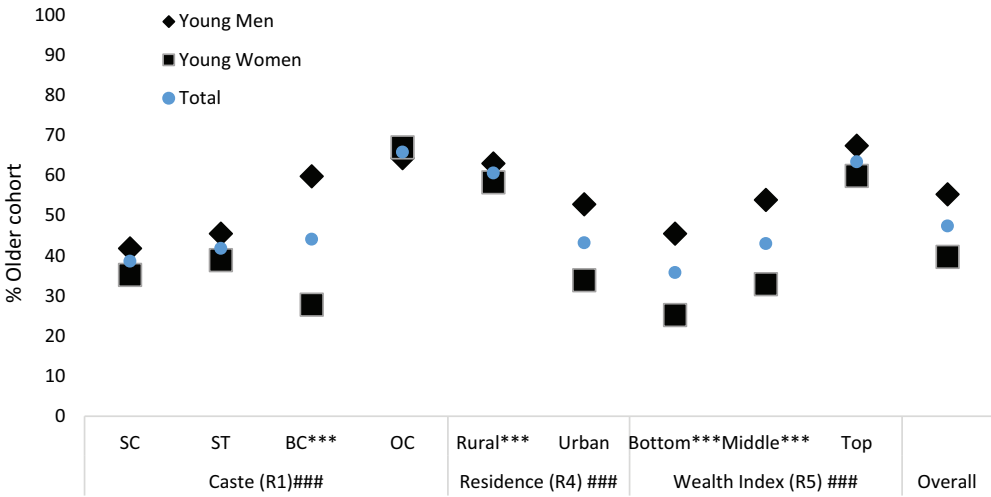


Figure 3. Share of individuals who have completed higher education at age 26. R = Young Lives survey rounds. Note: t-test Significant at: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Chi-square test of association significant at: ### $p < 0.01$, ## $p < 0.05$, # $p < 0.1$. Could we add Total legend in Fig 3, I am mailing the word document with the figure 3 since I am unable to load it here

completion rates between the rich and poor is also evident in the sample. A positive association between poorer households and a higher gender gap is observed, with a gender gap in HE completion rates of 20.3 percentage points among those belonging to the bottom tercile compared to 7.5 percentage points gap among those in the top tercile. We also observe a significant gender gap of 19 percentage points among those living in rural areas, with a significantly higher university completion rate among rural men (52.8%) than women (33.9%). The results of the chi-square test indicate that all individual, household, education-related, and socioeconomic factors considered in the bivariate analysis are significantly associated with the completion of higher education.

Multivariate analysis

Table 2 presents the odds ratios (OR) for the likelihood of successfully completing HE among young adults in Andhra Pradesh and Telangana, after controlling for other variables. The results from the pooled model indicate significant gender disparity in completion of HE even after adjusting for effects of relevant control variables. Young men are two times more likely to complete HE compared to young women, a finding that is statistically significant at one per cent significance level.

The pooled model further shows that adolescents who expressed a desire to pursue higher education at age 15 were six times more likely to complete HE than those who did not express such aspirations (Table 2). Similarly, young adults who aimed to secure a future professional job at age 15 were 1.9 times more likely to complete HE than those who aspired to non-professional jobs. Additionally, engagement in paid work at age 15 was negatively associated (OR: 0.49) with the likelihood of completing HE.

Youth from Backward Class families were less likely to complete HE than those from more advantageously placed Other Caste families (OR: 0.65). The results further show that young adults whose mothers had completed education beyond the elementary level were 2.9 times significantly more likely to complete HE compared to young adults with mothers having no formal education.

Factors related to educational related variables including prior academic performance, were found to be significantly correlated with HE completion. Young people with higher reading ability at age 8 were 1.7 times more likely to complete HE. Young adults with above-average mathematics scores at age 15 (Round 3) have higher chances of completing HE (OR: 2.5) compared to those with below-average scores.

Gendered logistic models

Findings reveal that educational aspiration at younger age remains a significant factor for completing HE for young women though not significant for young men, young women with educational aspiration of completing graduation and above at age 15 were 2.5 times more likely to complete HE compared to young women with no such aspiration. On the other hand, occupational aspiration to have a professional job has significant effects on the completion of HE for both young men (OR: 1.67) and women (OR: 2.09) with a higher effect observed among women.

Not being engaged in paid work at early ages has also emerged as a significant contributing factor to completing HE for both men and women. Those who were engaged in paid work at age 14 were significantly less likely to complete HE compared to those who were not engaged in paid work (Men OR: 0.57, women OR: 0.29) with a higher negative effect observed for women.

Young women from the Backward Class are found to be significantly less likely to complete HE (OR: 0.36) compared to young women from the Other Caste group. No such association is observed among young men. Mother's educational level above elementary grade is found to be a positive and significant factor for completing HE for both men (OR: 2.51) and women (OR: 2.95). Place of residence, wealth index and household size have not emerged as significant predicting factors for completing HE for both young men and women.

Whereas PPVT scores at age 15 do not appear as a significant predicting factor for completing HE, mathematics scores at age 15 is found to be positively and significantly linked with completion of HE for both men (OR:2.77) and women (OR: 2.91). However, a significant effect of early reading skills at age 8 on completing HE is only observed among young men, who are 2.4 times more likely to complete HE compared to men with no such reading ability.

The type of school attended at age 15 was also found to be significantly associated with HE completion for both young men and women. Young men and women at age 15 who attended government schools were significantly less likely to complete HE at later age compared to those who attended private schools at age 15 (men OR: 0.43, women OR: 0.39).

Decomposition analysis

Table 3 presents the aggregate findings of Fairlie's decomposition. This decomposition breaks up the total gender gap into two components: explained part and unexplained part. Our model explains approximately 32% of the gender gap in HE completion based on the independent variables examined.

Prior mathematics test score at age 15 emerges as the most significant contributor to the gender gap in HE completion, accounting for 70% of the explained gap, followed by the reading ability at age 8 which contributes 33.6% (Table 4) of the gender gap in HE. Additionally, the type of school attended by young adults at age 15 has a significant contribution to the gender gap, while engagement in paid work at age 15 explains 12% of the gender gap in the completion of higher education.

Conclusion

We explored the role of gender in explaining the variations in the successful completion of higher education among young adults in Andhra Pradesh and Telangana. Both bivariate and multivariate results reveal that individual factors (child's educational and occupational aspiration and paid work), socioeconomic and education-related factors (reading ability at age 8, maths test score at age 15 and type of education school last attended at age 15) are significantly associated with gender differentials in HE completion.

The bivariate result shows that young women belonging to the higher wealth tercile are more likely to complete higher education compared to poorest and BC social group. As we have mentioned before, the GER in higher education among women is increasing in India, but this scenario is reversed among lower wealth tercile. Most school dropouts occur due to lack of family support, especially for girls and women in poorer (Chugh

Table 3. Aggregate Fairlie decomposition result.

Terms of decomposition	$P(Y = 1 \text{Men}) - P(Y = 1 \text{Women})$	Percentage
Total Gap	0.155	
Explained	0.049	31.6
Unexplained	0.106	68.4

Note: p = Probability, Y = completion of higher education.

Table 4. Fairlie's decomposition[#] of gender gap in completion of higher education.

Boys-completion of higher education	55.3			
Girls-completion of higher education	39.7			
Gender gap	15.6			
Completed higher education	Coefficient	Percentage	Standard Error	z
<i>Individual factors</i>				
Child educational aspiration (R3)	0.0101	21.0	0.0065	1.54
Child occupational aspiration (R3)	-0.0264**	-55.1	0.0122	-2.16
Paid work (R3)	-0.0058*	-12.2	0.0032	-1.8
<i>Household factors</i>				
Caste (R1)	-0.0010	-2.0	0.0009	-1.11
Place of residence (R4)	0.0007	1.4	0.0011	0.63
Wealth index tercile (R4)	0.0030	6.2	0.0027	1.11
Mother's education (R2)	0.0018	3.7	0.0011	1.57
Household size (R4)	0.0007	1.6	0.001	0.76
<i>Education-related factors</i>				
Reading ability (R1)	0.0161***	33.6	0.0047	3.4
PPVT score (R3)	0.0057	11.9	0.0088	0.65
Maths test score (R3)	0.0335***	70.0	0.0082	4.1
Type of school last Attended (R3)	0.0095***	19.9	0.0033	2.92
Total explained	0.049	100		

[#]To perform the decomposition, a logit regression model on a pooled sample was run.

R = Young Lives survey rounds.

Significant at: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

2011; Inkane and Petkar 2023). Daughters in India are still seen as 'paraya dhan' or 'belonging to another family' and families show a strong son preference, because of the additional load of paying dowry for a daughter. Thus, a significant gender disparity among children from rural areas and BC social group can be observed in the completion of higher education, as indicated by our findings.

The decomposition analysis indicates that the largest significant contributor to the gender gap in HE completion is mathematics test score at age 15, contributing to 70% of the explained gap, followed by future occupational aspiration, type of school attended and involvement in paid work at age 15 and reading ability at age 8. It is well established that even in developing countries girls score less than boys in mathematics and are victims of 'stereotype threat hypothesis,' which negatively stereotypes girls mathematics capabilities and negatively impacts their maths scores (Downey and Vogt Yuan 2005; Steele 1997). Strong mathematics skills are often associated with critical thinking, problem-solving abilities, and overall academic success. Students who perform well in mathematics may have a solid foundation in analytical thinking and logical reasoning, which are valuable skills for pursuing higher education (Cresswell and Speelman 2020). A similar result is also observed for early reading ability as a factor contributing to the gender gap in the completion of higher education. The results establish the relevance of cognitive theory that explains how intra-household gender inequalities affect the learning abilities of girls.

The analysis also highlights the significant effect of the type of school attended at age 15 on HE completion, particularly in explaining the gender gap. As seen in the literature, intra-household inequality in education exists as parents are more likely to send their male child to a private educational institute than the girl child (McLoughlin 2013; Rashmi et al. 2022; Sahoo 2017). The quality and infrastructure of private institutions are generally superior to public institutions (Hegde 2022), but more expensive since

government institutes are free (Gupta 2008; Rashmi et al. 2022), which is the reason more girls are enrolled in government schools.

On the policy front, findings indicate the existence of gender inequality in HE completion by various socioeconomic and education-related factors, and therefore, policy changes are needed to address these inequalities. The recently adopted National Education Policy (2020) targets to increase the GER in higher education to 50% by 2035, which is currently at 27.3%. As NEP (2020) targets to minimise gender inequality in educational opportunities, our analysis of gender inequality in HE completion contributes significantly to policy-making (MHRD 2022). Given that education-related factors largely explain the gender gap in HE completion, it requires policy attention. Addressing parental preference for providing better quality education to sons (Himaz 2009; Saha 2013) through media and local governance mechanisms such as Panchayati Raj Institutions, is important to achieve gender equality in education. Furthermore, improving the quality of education in public educational institutes through regular monitoring as well as ensuring girls are encouraged to excel in subjects such as mathematics and early reading and providing scholarships as incentives is necessary since the poorest girls are more likely to be enrolled in public/government schools.

It is important to underscore that HE in India is not a homogenous category. It is, in fact, highly stratified and uses diverse business models with a great deal of fees and quality differentials (Hegde 2022; Patel 2022). Therefore, future research could examine the magnitude of gender inequalities reproduced by costly professional courses. Since the survey was conducted in selected districts of Andhra Pradesh and Telangana, the findings cannot be generalised to all of India or even to the representative states. The study acknowledges this as a limitation. Thus, it would be interesting to undertake an all-India analysis on gender inequality in HE completion and broaden the scope to other states.

Notes




1. In India, there are four official categories of caste. While the Indian constitution recognises Scheduled Castes (SCs), Scheduled Tribes (STs) and Backward Classes (BCs) as historically disadvantaged, Other Castes (OCs) are socially and educationally advantaged castes.
2. See Kumra (2008) for detailed information regarding the Young Lives sampling.
3. The initial sample size of Younger and Older Cohorts were 2000 and 1008 respectively in Round 1 (2002). For the purpose of the present paper, we utilised data related to the Older Cohort only. With an attrition rate of 14.3%, the sample size of Older Cohort children has reduced to 864 in Round 6 (2020–21).
4. Round 6 (2020–21) consisted of five telephone surveys conducted during the pandemic.
5. Education conducted after secondary education and before postgraduate education, usually in a college or university.
6. There are three categories of castes that receive affirmative action in HE in the form of reservation of seats: Scheduled Castes (SC), Scheduled Tribes (ST) and Other Backward Classes (OBC) students.
7. Household wealth index is a composite measure that shows how well-off the household member are in terms of use of durable goods and access to basic services.
8. The test consists of different vocabulary items arranged in order of increasing difficulty. Each item has four simple illustrations arranged in a multiple-choice format. The person

being examined is asked to select or point to the picture that best illustrates the meaning of a word presented orally by the examiner. The test is untimed.

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Appendix

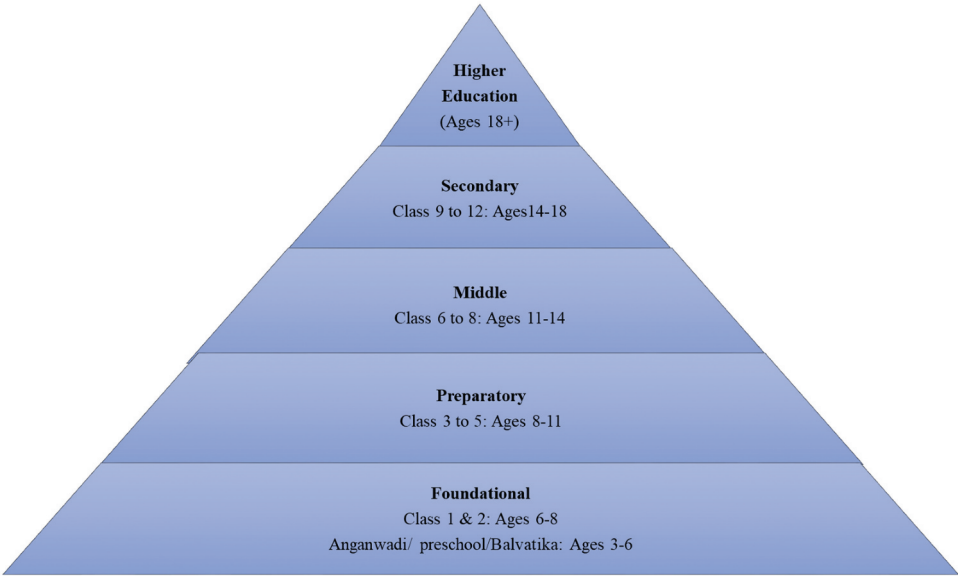


Figure A1. the education structure envisioned in the National education policy 2020 with age groups of The students. Source: National Education Policy 2020, Ministry of Human Resource Development, Government of India.

Table A1. Number of institutes in higher education in last decade in India.

Year	University	Colleges	Stand Alone Institute	Private University	GER in HE
2011–12	642	34852	11126	105	20.8
2021–22	1168	45473	12002	391	28.4
Decadal growth rate	81.9	30.5	7.9	272.4	36.5

Source: All India survey on higher education reports, Ministry of Education, Government of India. GER; Gross Enrollment Ratio and HE; Higher education.

Table A2. Sample characteristics.

Variables	N	Percent
<i>Gender</i>		
Male	418	49.12
Female	433	50.88
<i>Completion of higher education</i>		
No	448	52.64
Yes	403	47.36
<i>Child's educational aspiration (R3)</i>		
Below graduation	442	51.94
Graduation & above	409	48.06
<i>Child's occupational aspiration (R3)</i>		
Non-professional job	479	56.29
Professional job	372	43.71
<i>Paid work (R3)</i>		
Not engaged	706	82.96
Engaged	145	17.04
<i>Caste (R1)</i>		
Scheduled caste	179	21.03
Scheduled tribe	98	11.52
Backward class	390	45.83
Other caste	184	21.62
<i>Place of residence (R4)</i>		
Urban	203	23.85
Rural	648	76.15
<i>Wealth index (r4)</i>		
Bottom	274	32.2
Middle	298	35.02
Top	279	32.78
<i>Mother's education (R2)</i>		
No formal education	504	59.22
Up to elementary	237	27.85
Above elementary	110	12.93
<i>Household size (r4)</i>		
Less than 5	462	54.29
5 and above	389	45.71
<i>Reading ability (R1)</i>		
None	398	46.77
Able to read sentences	453	53.23
<i>PPVT test score (R3)</i>		
Below average	456	53.58
Above average	395	46.42
<i>Math test score (R3)</i>		
Below average	474	55.7
Above average	377	44.3
<i>Type of institution last attended (R3)</i>		
Private	262	30.79
Government	589	69.21

Source: Young Lives Longitudinal Survey, 2002–21.