The Effect of Disability on Educational, Labor Market, and Marital Outcomes in a Low-Income Context

Yubraj Acharya[1], Di Yang

Abstract

There is limited evidence from low-income countries on the multifaceted effects of disability on an individual's wellbeing. Using a nationally representative sample of 2.8 million individuals, we document the effects of disability on educational, labor market, and marital outcomes in Nepal. We obtain causal estimates by comparing these outcomes for siblings living in the same household. Individuals with disability are at a severe disadvantage in almost all of the outcomes we evaluate. Relative to siblings without disability, siblings with disability are 16.5 percentage points less likely to be enrolled in school, 6.9 percentage points less likely to be at the appropriate grade level, and 21.4 percentage points less likely to be employed. Consistent with the prevalent gender discrimination and stigma on disability, individuals with disability have difficulty getting married, and the adverse effects are more pronounced for girls than for boys.

Key words: Health, Development, Disability, Inequality, Education, Marriage, Least Developed Country

JEL codes: I14, I24, I31

Running title: Effects of Disability in Nepal

Key points:

- The study examines the effect of disability on educational, labor market, and marital outcomes in Nepal.
- Individuals with disability are at a severe disadvantage in almost all of the outcomes we evaluate.
- The adverse effects are more pronounced for girls than for boys.

[1] Corresponding author. Email: yua36@psu.edu. 601L Ford Building, University Park, PA 16801. Acharya: Assistant Professor of Health Policy & Administration, and Demography. The Pennsylvania State University. Yang: Doctoral Candidate in Health Policy and Administration. The Pennsylvania State University. We would like to thank Dhiraj Sharma for providing comments on an earlier version of the manuscript and Nepal's Central Bureau of Statistics for making the data available. All errors are our own.

1. Introduction

Disability is one of the least studied dimensions of disadvantage. One billion individuals, or 15% of the world's population, experience some form of disability, and between 110 million and 190 million individuals experience significant disabilities [1]. Yet, with a few notable exception [2]–[4], the empirical evidence on the effect of disability on wellbeing in low- and middle-income countries (LMICs) is scant. This is an important omission because 80% of the all individuals with significant disabilities worldwide live in LMICs [1]. In these countries, social protection policies and programs for individuals with a disability tend to be weak or lacking altogether [5], and individuals with disability face harsher living conditions and stronger stigma than do their counterparts in high-income countries [6].

From a policy perspective, five out of the 17 Sustainable Development Goals (SDGs) refer to the need to make services—ranging from education, jobs, and political participation—friendly to individuals with disability. A United Nations flagship report argues that the "lack of data and research on the situation of persons with disabilities severely constrains the international community from monitoring the situation of children, youths and adults with disabilities" [7] and calls on countries to "assess the situation of persons with disabilities and the challenges they face" (p.18).

This study responds to that call. We document the causal effects of disability on a wide range of educational, labor market, and marital outcomes in Nepal, a low-income country. In addition to answering a policy question of critical importance, we make two main contributions to the existing literature. First, we compare the outcomes for siblings living in the same household using sibling fixed effects, thus generating plausibly causal estimates of disability on the outcomes. Our approach helps reduce confounding due to household-specific, sibling-invariant factors, such as genetic endowment, parental characteristics, access to education, and

economic opportunities. While establishing causality is no longer a novelty in many areas of development economics, such opportunities in this line of research are rare—as attested by the limited literature examining *effects* of disability on outcomes, as opposed to *associations*.

Second, as discussed in Methods, we move beyond the standard measures of educational attainment and earnings to examine a number of setting-specific outcomes, such as grade-for-age, timing of first marriage, and quality of employment, thus capturing the full extent of the impact of disability at multiple stages of life. In fact, the standard outcomes used in the existing literature (e.g., school enrollment and employment status) may miss many setting-specific nuances, although they provide greater comparability across countries. Capturing the full extent of the effects is critical for designing policies that offset the costs of disability sufficiently. In the study's context, while the government provides a disability allowance, the determination of the amount has so far been *ad hoc*, with limited analysis on its adequacy.

The rest of the paper is organized as follows. In the next section, we provide an overview of the policy context in Nepal, allowing the reader to contextualize our analysis and findings, followed by a description of the data in section 3. We explain our empirical approach in section 4 and summarize the key findings in section 5. We conclude in section 6 with a discussion of the study's key limitations and areas for further research.

2. Study setting

Nepal's policies to protect the rights of individuals with disability have been summarized elsewhere [8]. Briefly, the earliest efforts go back to the *Disabled Protection and Welfare Act* of 1982, although more visible legislative efforts emerged a decade later, with the enactment of *Disabled Protection and Welfare Regulation* in 1994 [9]. In the 1990s, a number of policies in

other areas such as education and child rights envisioned ensuring the rights of children with disability. These policies included the *Education Act* of 1992, *Child Rights Acts* of 1992 and *Local Self-Government Act* of 1999. In 2007, the *National Policy and Plan of Action on Disability* outlined 17 priorities to empower individuals with disability and promote their training and employment.

The 2015 Constitution that ushered the country into a federal republic, following a protracted conflict and a peace process, stipulates equal rights for individuals with disability and protection from discrimination. In 2017, the parliament passed the *Rights of Persons with Disabilities Act*, which prohibits discrimination on work and employment based on disability and establishes a disability card system to guide social protection programs [8]. Individuals with disability currently are categorized based on severity and receive disability identity card in four different colors. Individuals with severe disability receive blue and red disability identity cards and are entitled to government disability allowance of 600 and 2000 rupees a month ($6 -$19), respectively [10].

There are a number of other accommodations that extend to individuals with less severe disability (who receive yellow or white disability identity cards). These include free education, free medical care, reservations in civil service jobs, a 50% discount in transportation [9]. The 2018 *Safe Motherhood and Reproductive Health Rights Act of Nepal* requires that the services provided be disability friendly.

Despite these policy efforts, substantial barriers continue to exist for individuals with disability. In education, for example, various difficulties, such as lack of resources for inclusive teaching and bullying from peers, hinder enrolment, attendance and attainment [11]. Furthermore, gender and poverty often compound with disability and exacerbate the educational

marginalization for girls with disability and those from poor households [11]. Stigma against disability is a norm rather than an exception. There are other structural barriers, such as the lack of suitable physical infrastructure (e.g., wheelchair-accessible amenities) that hinder individuals with disability from living to their full potential [12]; a 2018 report finds that, of the 150 public infrastructures in Kathmandu surveyed, 132 were inaccessible, 18 were partially accessible, and none was fully accessible to individuals with disability [12]. To our knowledge, the full extent of these barriers on educational, labor market, and marital outcomes has not been evaluated rigorously before.

3. Data

The data used in this study come from Nepal's National Population and Housing Census 2011 [13], the latest census available. Unlike many censuses, Nepal's census collected information on disability status of all individuals living in the country at the time of the census, in addition to information on demographics, education, housing, asset ownership and employment. We obtained a 15% sample of the census from the Central Bureau of Statistics. Appendix Table A1 shows how we derived the analytic sub-sample from this sample.

The key independent variable is whether an individual has a disability. For each individual, the census asks, "What is the physical and mental disability of (name)?" and provides nine options, including 'Not disabled'. We categorize an individual as having a disability if they indicated having some form of disability, including "mentally disabled" or "speech problem."

We evaluate a range of outcomes to capture the full extent of the impact of disability at multiple stages of an individual's life (see Table 1). A few of the outcomes are based on the

existing literature (e.g., school enrollment and employment status). Others are specific to the setting (e.g., age at first marriage), as the former may miss the setting-specific nuances. For example, grade repetition rates are high in Nepal, although some progress has been made recently [14]. Disability may reduce access to learning resources and increase the likelihood of having to repeat a grade, even if the child maintains enrollment. This makes grade-for-age—whether a child is at the appropriate age for their age—an important outcome to examine. Likewise, child marriage is a major problem, with 1.3 million women married before the age of 15 [15]. Disability can worsen it—parents may get their son with a disability married earlier to bring in extra agricultural labor, and they may marry off their daughter with a disability earlier to reduce strain on household resources. Conversely, with stigma attached to disability, it is reasonable to expect that individuals with disability may experience reduced marital prospects. Therefore, we examine marital status as an outcome for those above age 30 (which is approximately 2 standard deviations above the average age at marriage in the country). Finally, in absence of data on earnings, we assess employment in full-year non-agricultural job as an outcome because employment status by itself may not capture the quality of the job; individuals with disability may be forced to take up jobs that are temporary, pay low wages, and are non-skilled.

4. Methods

In order to estimate the causal effect of disability, we compare the outcomes for siblings using siblings fixed effects. As is now widely understood, this approach helps reduce confounding due to household-specific, sibling-invariant factors, such as access to education and economic opportunities.

Although one can generally assume that siblings face similar external environments, such as parental care and health risks, there are two major threats to identification one needs to address. The first is that, irrespective of their disability status, girls might be treated differently than boys. The discrimination against girls in South Asia and its implications for the girls' health has been widely documented [16]. To account for such differences, we control for the gender of the child and include an interaction term between disability and gender, and comment on the heterogeneous effects by gender. The second threat is that siblings may be exposed to different external environments based on their year of birth. For example, parental employment status and incomes could change over time, altering the time and money investments that parents can make on their children. To account for such differences, we include birth-year fixed effects in all specifications.

Therefore, the linear relationship we estimate for each outcome takes the following form:

$$Y_{ij} = \pi_1 Disability_{ij} + \pi_2 Female_{ij} + \pi_3 (Disability_{ij} \times Female_{ij}) + \theta_j + \eta_t + \delta \boldsymbol{X} + v_{ij} \ldots\ldots\ldots (1)$$

In this equation, Y_{ij} is the outcome for a sibling *i* in sibling-pair *j*. *Disability* is a binary variable which equals one if the individual reported having a disability. θ_j and η_t are sibling-pair and birth-year fixed effects, respectively. **X** represents potential covariates. In all equations, we include the "generation" of the individual within the household; given the structure of the data, this ensures that someone identified as a son is not compared to someone identified as a granddaughter—the "generation" variable takes values 0, 1 or 2 for grandparents, parents, and children, respectively. In equations with the employment outcomes, we also include educational attainment as a covariate, as some of the difference in employment status and the type of job

between siblings may originate in the difference in their educational attainment. v_{ij} is the usual error term.

π_1 is the key coefficient of interest and captures the relationship between disability status and the outcome. The expected sign on π_1 depends on the outcome. We expect $\pi_1$to be negative for educational and labor market outcomes; for example, a child with a disability is less likely to be enrolled relative to their sibling without disability. We have no a priori expectations about the sign of π_1 for the marital outcomes. On the one hand, parents may try to marry off their child with disability earlier—either to bring in extra labor to the household or to reduce burden on household resources, depending on the gender (in Nepal, the convention is for married women to move in with their husband's household). On the other hand, given stigma, individuals with disability may be difficulty finding someone to marry.

Given the inclusion of gender and birth year in the regressions, the key identifying assumption is that, without disability, two siblings who are of the same gender and born in the same year would have similar outcomes. In the discussion section, we discuss potential threats to this assumption.

To rule out the possibility that some associations may appear to be significant simply due to the high number of hypotheses (eight) we tested, we use Bonferroni-corrected p-values to determine statistical significance of the coefficients. In effect, this means using 0.0125, 0.00625, 0.000125 as the p-value cutoffs for 10%, 5% and 1% significance levels, respectively.

5. Key results

The descriptive characteristics of the analytic sample, which varies by outcome, are in Table 2. Consistent with what previous studies and the census report have documented,

approximately 2% of the population has some form of disability. However, this is likely underreported significantly, given the low availability of diagnosis services, stigma associated with disability, and the framing of the question in the question which is geared toward not capturing mild forms of disability.

Nearly 86% of all children between ages 5 to 18 are currently enrolled. However, only 49% of them are in the appropriate grade for their age, reflecting late start in schooling and high rates of grade repetition, particularly in rural areas. For those who are no longer in school, the average years of education is eight (equivalent to first year of high school in the US). Approximately, 82% individuals not currently in school report currently being employed. While this may seem high, a significantly share of these individuals are under-employed or employed in seasonal agriculture. Among those not in school and currently employed, about 44% individuals report being employed in a full-year, non-agriculture job. Nearly 7% individuals are married before the age of 15, and nearly 97% individuals are married by age 30. Among those married, they were married at an average age of 20 years.

Results from estimating coefficients in equation (1) show that individuals with disability are at a severe disadvantage in almost all educational and labor market outcomes we evaluate (Table 3). On average, disability leads to 16.5 percentage points reduction in the probability of being enrolled in school (row 1; column 1). Among those who are enrolled, individuals with disability are 6.9 percentage points less likely to be at the appropriate grade level for their age. Among those who are no longer in school, those with disability have approximately half a year (=0.43 x 12 = 5.2 months) lower attainment than those without disability.

After adjusting for educational attainment, individuals with disability are 21.4 percentage points less likely to be employed. For the overall sample, we find no effect of disability in the likelihood of having a full-year salaried job, after education is accounted for.

In terms of the marital outcomes, disability seems to reduce the chances of early marriage (marriage before age 15), by approximately 1.1 percentage points. Among individuals above age 30, individuals with disability are 30 percentage points less likely to be married. Among those who are married, individuals with disability are married approximately 5.3 months (=0.44 ×12) later. While we make no judgement as to whether getting married is a better outcome, the results here—from a setting in which almost everyone gets married—suggest a central role of stigma in affecting the lives of individuals with disability. Disability seems to reduce one's chances of getting married.

Consistent with gender discrimination in Nepal, girls are 1.7 percentage points less likely to be enrolled (row 2 of Table 3). Strikingly, they are more likely to be at an appropriate grade for their age than boys. They have an attainment disadvantage of approximately eight months (=0.65 × 12) relative to boys. Girls are also less likely to be employed than boys (by 18.8 percentage points) and hold a full-year, non-agriculture job (by 10.4 percentage points). Girls are 11.7 percentage points more likely to be married before age 15 than boys. On average, they are married 2.8 years earlier than boys.

Based on the coefficients on the interaction term (row 3 of Table 3), the adverse effect of disability on one of the three educational outcomes—attainment—is more pronounced for girls than for boys. We find no such effects in employment-related measures. Among the marital outcomes we evaluate, we find that girls with disability are significantly less likely (6

percentage points) to get married by age 30 than boys.

6. Discussion and conclusion

The takeaway from the findings above is that disability has substantively large adverse effects on educational, labor market and marital outcomes in Nepal. The effects are more pronounced for girls, although additional research is needed to uncover gender-based nuances—for example, expectations about working for boys and girls when they have disability and why girls have higher educational attainment—that the census data do not allow us to explore.

A central threat to identification in an analysis of this nature is migration. If households migrate in response to the disability of one child thus affecting the outcomes for the other child without disability, our estimates can be biased upward; the difference in outcomes could be due to factors other than disability, such as differences in learning environments and access to resources due to migration. To assess potential bias from migration, we limited the analysis to households that reported currently living in the same district as the household head's district of birth. The results (not shown separately) are strikingly similar to those reported in Table 3.

Nonetheless, the magnitudes of the effects should be understood in light of a number of caveats. First, the analysis assumes that parental investment on a child without disability is not affected by the disability of another child. However, in resource-constrained environments, such as the one studied here, disability of one child may force parents to shift away resources from a non-disabled child. In that scenario, the estimates above are an underestimate of the true effect of disability. Conversely, parents may be forced to pull resources away from a child with a disability, which would lead to an overestimation of the true effect in our analysis. The net direction of the overall bias is indeterminate. Similarly, the data do not contain information on

the timing of the onset of disability. The analysis assumes that the outcomes did not precede disability. The findings would be inaccurate if, for example, disability was a result of employment, rather than *vice versa*.

Second, the 2011 Nepal census did not follow Washington Group's classification [17] or WHO's International Classification of Functioning model, thus reducing the comparability of our findings with that of other studies using these classifications (for example, Mizunoya et al., 2018). Indeed, there is wide variation in the disability prevalence rates reported by different studies and data sources, ranging from 1.9% in the census—consistent with what we report here—to 3.6% in the 2011 Nepal Living Standard Survey [18] and as high as 21.7% for 2002-2004 reported in the 2011 World Report on Disability [19]. For reasons mentioned previously, the census likely captures only extreme cases in the spectrum. In this study, if one child has extreme and another mild and the mild is not reported, the difference in the outcomes estimated here could be over or underestimated, depending on how the outcome differs between the two children. The 2021 census, which uses broader definitions of disability—consistent with the Washington Group's classification—was underway at the time of writing this manuscript.

Finally, an important limitation of using fixed effects is that the estimated effects come, in this case, from a subsample of sibling pairs with at least one of whom has disability [20], [21]. These individuals may differ from the broader population, thus threatening the external validity of the findings. Likewise, the estimates apply to siblings who are living in the same household and are thus likely to be younger.

Given the large size of the effects and lack of clarity on the overall direction of the bias from the factors mentioned above, the limitations are unlikely to alter the key message—that disability has notable adverse effects on educational, labor market, and marital outcomes in this

context. More importantly, the current study is an important step toward quantitatively documenting the wide-ranging disadvantages that individuals with disability face, particularly girls. Any social protection measures the government designs, including the revamping of the disability allowance currently in place, needs to reflect these disadvantages.

Statements and Declarations

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Conflict of interest: Yubraj Acharya and Di Yang declare that they have no conflict of interest.

Ethical clearance: Ethical clearance was not required for this study because it uses de-identified, publicly-available census data.

Data availability: The Stata codes used to clean the data and conduct the statistical analysis are available from the corresponding author on request.

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Tables

Table 1. Key outcomes and inclusion criteria

Outcome	Outcome indicator	Sample inclusion criteria
Education	Currently in school (binary)	5-18 years
	At the appropriate grade for their age (binary)	5-18 years, in school
	Completed years of education (continuous)	5-60 years, no longer in school
Labor market	Currently employed (binary)	≤60 years, not in school
	Job is full-time & salaried (binary)	≤60 years, not in school, currently employed
Marriage	Early marriage (married before the age of 15) (binary)	Married at least once
	Currently married (binary)	>30 years
	Age at first marriage (continuous)	Married at least once

Table 2. Summary statistics

	N	Mean or percentage	SD
Has a disability	2,807,764	1.91	
Currently enrolled (ages 5-18 years)	1,234,095	85.49	
At the appropriate grade for age (ages 5-18 years)	1,051,251	49.29	
Educational attainment, years (ages 5-60 years, no longer in school)	607,486	8.24	3.77
Currently employed (ages ≤60 years)	644,173	82.10	
Employed in a salaried job (among those who are employed)	528,889	43.88	
Married before age 15, if married	1,022,169	6.94	
Married, if age ≥30 years	760,889	97.20	
Age at first marriage, years	1,022,169	20.11	4.73

Source: Nepal Housing and Population Census 2011. Note: This table shows the summary statistics for the sample used in the analysis. Except for educational attainment and age at first marriage, the reported numbers are in percentages.

Table 3. Linear Probability Model Results for the Effect of Disability on Educational, Labor Market, and Marital Outcomes

	Currently enrolled	Appropriate grade for age	Educational attainment	Currently employed	Employed in a salaried job	Married before age 15	Married by age 30	Age at first marriage
Has disability	-0.165***	-0.069***	-0.433***	-0.214***	-0.009	-0.011**	-0.300***	0.443***
	(0.006)	(0.007)	(0.067)	(0.010)	(0.011)	(0.003)	(0.007)	(0.062)
Female	-0.017***	0.012***	-0.653***	-0.188***	-0.104***	0.117***	-0.172***	-2.785***
	(0.001)	(0.001)	(0.019)	(0.003)	(0.004)	(0.002)	(0.003)	(0.024)
Has a disability × Female	-0.006	-0.025	-0.778***	0.033	0.035	0.021	-0.060***	-0.169
	(0.008)	(0.010)	(0.156)	(0.021)	(0.029)	(0.011)	(0.012)	(0.152)
Constant	0.684***	1.001***	2.679***	0.083***	0.315***	0.636***	0.786***	13.156***
	(0.003)	(0.003)	(0.213)	(0.021)	(0.039)	(0.023)	(0.017)	(0.243)
Number of individuals	1,234,095	1,051,251	607,486	644,173	528,889	1,022,169	760,889	1,022,169
Number of sibling-pairs	566,855	519,749	474,317	495,273	437,311	798,056	667,848	798,056
Within R-squared	0.12	0.28	0.19	0.30	0.05	0.14	0.17	0.19

Notes: This table shows the coefficient on whether an individual has a disability, their gender, and the interaction between the two, obtained from estimating equation (1). All regressions include sibling-pair fixed effects as well as birth year fixed effects. In addition, models with 'currently employed' and 'employed in a salaried job' include educational attainment as a covariate. The standard errors are clustered at the household level. As discussed in the text, the sample on which the regression is estimated differs based on the outcome. * p<0.0125, ** p<0.00625, *** p<0.000125. The cutoffs are Bonferroni-corrected for multiple (specifically, eight) hypotheses and correspond to 10%, 5% and 1% significance level, respectively.

Appendix Table A1. Derivation of the Analytic Sample	
	N
Population of Nepal according to the 2011 census	26,494,504
15 percent sample	4,037,885
Nepalese citizens	4,018,206
Identified as sibling, child or grand-child of household head	2,899,784
Non-missing information on disability	2,861,644
Analytic sample by outcome:	
Currently enrolled	1,234,095
At appropriate grade for age	1,051,251
Years of education completed	607,486
Currently employed	644,173
Employed in a salaried job	528,889
Married before age 15	1,022,169
Married by age 30	760,889
Age at first marriage	1,022,169

Source: Nepal Housing and Population Census 2011

Note: This table shows how the analytic sample for each of the outcomes was derived. The final numbers for each outcome correspond to the sample size for that outcome reported in Tables 2 and 3.