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School enrolment and learning outcomes for children with disabilities: findings from a household survey in Pakistan

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ABSTRACT
This paper presents findings from household data collected as part of the Annual Survey of Education conducted in rural Punjab in 2015, which included questions on disability developed by the Washington Group on Disability Statistics. Data reported here focuses on the disability status of children aged 5 to 16 years, their access to school and learning outcomes on basic reading and maths tasks. Our findings highlight that children who were identified by their carer/mothers as having moderate to severe disabilities were less likely to be attending school and had lower levels of learning on basic reading and maths tasks, than their peers who were not identified as having any difficulties in functioning. More importantly, our findings also suggest that being a co-resident/sibling in a household with a child with moderate to severe disabilities was associated with lower levels of basic reading and numeracy for the co-residents/siblings compared to other children. We conclude by highlighting important policy considerations and identifying areas of future research.

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Disability; Pakistan; learning outcomes; household survey; enrolment; primary schooling

Introduction

The Japan International Cooperation Agency (JICA 2002, 5), in profiling disability in Pakistan, noted that 'persons with disabilities are mostly unseen, unheard and uncounted persons … They are the most marginalised group.' Over a decade later, there is no reason to believe that this situation has changed. A more recent report by the Economist Intelligence Unit (EIU 2014) observed that, 'Persons with disabilities form Pakistan's largest overlooked minority.' (p. 10).

In recent years, there has been increased global focus on disability issues as there is a growing realisation of the need for inclusive development to address inequalities in society. The Sustainable Development Goals (United Nations 2015) have a very strong and explicit focus on disability, propagating a socially just and rights-based approach where development efforts include all people, even those at the very margins of society. This focus is highly pertinent, especially in contexts, such as Pakistan, where factors

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such as high prevalence of poverty, significant gender discrimination, and negative societal perceptions towards disability all intersect to create multiple deep-rooted disadvantages. People with disabilities are over represented amongst the persistently poor and are less likely than others to be able to move themselves out of poverty (Singal 2007; World Health Organisation 2011). Thus efforts to overcome poverty must include a focus on disability. There are also compelling economic rationales for focusing on people with disabilities in Pakistan. EIU (2014) estimates that the exclusion of persons with disabilities from active and productive participation is leading to economic losses of as much as US $11.9bn-15.4bn or 4.9–6.3% of Pakistan's GDP. Whilst this provides a very convincing economic case for focusing attention on people with disabilities, an equally important justification is based on the vital importance of upholding basic human rights of all citizens, especially those who inhabit the margins.

Article 31 of the United Nations Convention on the Rights of Persons with Disabilities (United Nations 2006), notes that research focusing on disability is central to addressing discrimination, changing perceptions and combating stereotypes and prejudices. It highlights the importance of gathering research data that can inform policy and monitor progress towards the realisation of the rights of people with disabilities. In a similar vein, the World Report on Disability (World Health Organisation 2011) makes a strong case for research on disability and categorically highlights that continued 'lack of data and evidence … often impedes understanding and action' (p. 263) across the various sectors, including education.

This paper aims to address some of these issues by drawing on data collected through the Annual Status of Education Report (ASER) in Pakistan. ASER is the largest citizen led household-based initiative that over the past decade has provided information on the schooling status (for children aged 3–16 years) and basic learning outcomes (of children aged 5–16 years) residing in all rural and a few urban districts of Pakistan. This paper draws on data collected in 2015, an ASER round which specifically included questions on disability. In particular, this paper focuses attention on addressing questions such as differences in school enrolment and performance on basic reading and maths tests between children identified as having disabilities and those without disabilities, both who are in and out of school. Finally, it examines the impact on schooling and learning for children who are co-residents/siblings in households with a child identified as having disabilities.

Education of children with disabilities: policy overview and current status

In Pakistan, there is very little knowledge regarding prevalence rates and types of disabilities among children, and even more evident is the complete lack of information on how many children with disabilities attend school. The National Review Report on Education for All (Ministry of Education 2014), while assessing the slow progress towards the six EFA goals and acknowledging the many challenges facing the education system in Pakistan makes no single reference to persons with disabilities. In a review undertaken by Singal (2015, 2016a) it was noted that Pakistani government policy rarely mentions children with disabilities. The Right to Free and Compulsory Education Act 2012 (Government of Pakistan 2012), which ensures free education to children aged 5–16 years, as enshrined in Article 25A of the constitution, does not make any reference to children

with disabilities. The only mention of disability (termed 'handicapped') is in the 2009 National Education Policy (Government of Pakistan 2009), where under the section 'aims and objectives' it is noted (as point 15 of 20 bullet points): 'To equalise access to education through provision of special facilities for girls and boys alike, under-privileged/marginalized groups and handicapped children and adults.' The devolution of education from the federal to the provincial level has raised further concerns around comparability of data, the availability of professionals with requisite skills, and other essential resources. The 2002 National Policy for Persons with Disability (Government of Pakistan 2002) remains the most significant official document on disability. In relation to education, it specifically notes the need to adopt a 'shift from exclusive system of education to inclusive education for the children with disabilities' (p. 6).

While the National Policy provides aspirational goals, education of children with special needs (a term used synonymously with children with disabilities) in Pakistan remains 'an area which is grossly neglected and in need of urgent attention' (Fontana and Lari's (2002, 1). Similar assertions have been made by Rieser (2008) who notes that Pakistan is still in a phase of developing inclusive policies. In his report he identifies only a few small-scale projects targeting disabled people rather than a consolidated national commitment aimed at a large scale. Najam and Bari (2017) note that in addition to income and gender, disability is also a main reason for exclusion of youth from education. They state that provisions for educating people with disabilities in regular educational institutions, such as access to buildings etc., remain non-existent. While quality of education provided, even in the few special schools in rural areas, is questionable.

Commonly used figures in relation to educational access draw on the United Nations Economic and Social Commission for Asia and the Pacific document (UNESCAP 2006) which stated that only 4% of the total number of school-going age children with disabilities are enrolled in various schools/centres of the country. While the data sources are unclear, this figure was reiterated in a newspaper article in 2013 (Naqvi 2013). In a household survey undertaken by Singal, Bhatti, and Mailk (2010) in urban and rural households in Punjab and the Kyhber Pakhtunkhwa (KP)—formerly called the North West Frontier Province, it was noted that a large number of youth with disabilities had never attended school and this was even more pronounced for girls with disabilities.

Data

ASER 2015: an overview

The ASER survey conducted in 2015 covered 142 rural districts, with a national sample size of 83,755 households. In addition to the standard questions on which ASER has collected data since 2009, the 2015 survey also included questions specifically aimed at identifying the incidence of disability and the schooling status and learning outcomes of children with disabilities. However, this information was only collected in the province of Punjab. This paper draws on data collected on 36,076 children aged 5–16 years living in 14,573 rural households in the Punjab province of the country.

ASER is an annual survey and assesses learning of children in three basic competencies: reading: Urdu/Sindhi/Pashto, English and Maths. The language of assessment in the

Punjab province is Urdu. The learning assessments are based on grade two and three level competencies as given in the Pakistan national curriculum 2006. The assessments are conducted on a one-to-one basis where trained enumerator start with letter or number recognition and then progressively provide the child more complex tasks. If the child is not able to complete a level of task-difficulty, they are not tested further. The ASER reading and maths tools have a high inter-rater reliability and concurrent validity[1]. These paper and pencil tests are administered by trained volunteers, and are valued for their simplicity and ease of administration.

Disability in ASER 2015

ASER Pakistan, like many other national assessment initiatives, traditionally did not capture data on disability. This was primarily due to the lack of conceptual understanding around disability and more specifically the lack of knowledge around how to include disability questions in an effective and meaningful way in household surveys.

The National Population Census of Pakistan in 1998 defined disability as 'the physical or organic handicap of a person due to natural deformity or deficient functioning if any limb resulting from accident, disease etc … it refers to any visible malfunctioning of any organ of the body.' Thus the types of disabilities covered in the census included blindness, deafness and muteness, crippling mental retardation and insanity, and, in addition, severe cases of seeing, hearing, locomotive and learning impairments. In this census the prevalence rates for people with disabilities were noted as 2.38% of the total population. Ironically, this figure is much lower at 0.48%, in the recently concluded 6th Population and Housing Census 2017 (Pakistan Bureau of Statistics 2017). Both these figures are significantly low and one of the main reasons is how disability questions are farmed in Census and other large scale surveys.

The questions on disability used in the Pakistan Censuses, like in many countries, are based on a binary approach, wherein either someone is classified as disabled or as not disabled. The focus also is solely on the individual and his or her deficit. Such framing of questions has over the last few years come under scrutiny and is seen as one of the main reasons for the low disability rates. It is argued that people are reluctant to identify themselves or others in their family as having a disability, given various negative socio-cultural norms associated with disability in many cultures. However non-disclosure, as Jeffery and Singal (2008) note, could also be due to the fact that household members may not actually be aware of some conditions, or have a diagnosis, given the lack of health care provision in many areas.

A significant development in recent years, especially in relation to enhancing conceptual clarity around disability, has been undertaken by the Washington Group on Disability Statistics. The Washington Group has successfully built on the World Health Organisation's (WHO) conceptual framing of disability as a bio-psycho-social model of human functioning. Making a dramatic move away from the traditional individual deficit approach to disability, the UNCRPD (United Nations 2006) adopts a more holistic approach when it acknowledges that disability ' … is an evolving concept and that disability results from the interaction between persons with impairments and attitudinal and environmental barriers that hinders their full and effective participation in society on an equal basis with others.' This has important implications in terms of how disability

is operationalised. For example, rather than asking the traditional question in surveys, 'Do you have a disabled member in your family,' which assumed, among other things, a shared understanding of disability as a given, homogenous concept, there is a shift in adopting questions which highlight the interactionist nature of disability.

Questions posed on disability in the ASER 2015 survey drew heavily on questions framed by the Washington Group which have been cognitively tested in different countries. The Washington Group has currently developed three sets of questions:

(1) 'The Washington Group Short Set of Questions on Disability'- A short set of six questions primarily for assessing functioning of adults
(2) 'The Extended Set of Questions on Functioning' for adults
(3) 'Child Functioning Module (CFM)'- these are for two different age categories:
    i Child functioning for children under 5
    ii Child functioning for children 5–17 years

In ASER 2015 we used the short set of questions (which are commonly used for 18+ years[2]) and also drew on additional questions from the CFM for 5–17 years, so that we could include questions more relevant to the age group which we were focusing on.

A decision not to use the full set of CFM (5–17 years) was made because the ASER survey did not have enough space for all the questions. Also, given it was the very first time that such a large survey was using disability questions; we wanted to support the enumerators rather than burdening them with too many questions and compromising the quality of the data collected. This approach of combining the short set survey questions with CFM is something that the Washington Group is not opposed to. All questions were asked of parents (the respondents were usually the mothers) or primary caregivers and included an important precursor- 'Compared with children of the same age does your child have difficulty … .' The functional domains which we focused on were:

(1) Seeing
(2) Hearing
(3) Waking
(4) Self-care
(5) Understanding
(6) Remembering

As recommended by the Washington Group, we included the following response categories:

(1) No difficulty
(2) Some difficulty
(3) A lot of difficulty
(4) Cannot do at all

Findings: identification of type and severity

Our survey results in relation to the type and severity of disability identified are discussed below. Among children aged 5 to 16 years 2,066 children were reported by their parents or carers as having some form of disability (which corresponds to 4.8% of children of this age in the sample, see Table 1), of which 1579 children (3.7%) were reported as having mild disabilities and 487 (1.1%) were reported to have more moderate/severe disabilities. In calculating the severity we combined the 3rd (a lot of difficulty) and 4th (cannot do at all) response categories as 'moderate/severe,' while the 2nd (some difficulty) response category was identified as 'mild'.

It is important to note here that in reporting our findings we are using the cut-off points recommended by the Washington Group, these cut off points can vary according to the purpose of the survey. We use the terms 'mild disability' and 'moderate/severe disabilities' to emphasise the differences in reported functioning among the two groupings. It is also important to reiterate here that while we use the term 'disability' this is no way a medical diagnosis. As the Washing Group acknowledges depending on the purpose of the survey, medical identification should be followed if giving a diagnosis is the main aim. Our aim in using these questions in ASER was not to identify rather we wanted to examine if a child's perceived difficulties in various types of functioning were in some way impacting on their access to schools and the impact on learning outcomes, when compared to children who were not identified as not facing any difficulties by their caregivers/parents.

We begin by discussing our findings in relation to the type and severity in the six functioning domains identified by the parents/cares for their children. Table 1, presents an overview of the type and severity reported in each of these functional domains. Respondents were able to identify different difficulties per child, and therefore the number of mild or moderate/severe disabilities reported here is greater than the total number of children identified with these disabilities. Still, we find that of the 1579 children identified as having some mild disabilities- 390 were in relation to seeing; 168 in relation to hearing; 70 with regard to walking; 531 in relation self-care; 207 in being understood and finally 383 in relation to remembering. Of the 487 children whose caregiver reported them as having with moderate/severe disabilities, 186 were in relation to seeing; 59 in relation to hearing; 21 with regard to walking; 165 in relation to self-care; 55 in being understood and finally 60 with regard to remembering. Responses seemed to focus heavily on difficulties in functioning associated with Self-care and Seeing.

Table 1. Prevalence of disability for children age 5–16 in ASER Pakistan 2015 data (Punjab).

			Level or degree of difficulty			
	Total		Mild		Moderate to Severe	
Type of Difficulty	#	%	#	%	#	%
Any difficulty	2066	4.8	1579	3.7	487	1.1
Seeing	576	1.4	390	1.0	186	0.5
Hearing	227	0.6	168	0.4	59	0.1
Walking	91	0.2	70	0.2	21	0.1
Self-care	696	1.7	531	1.3	165	0.4
Being understood	262	0.6	207	0.5	55	0.1
Remembering	443	1.1	383	0.9	60	0.1
Total Sample	40976					

Source: ASER Pakistan 2015.
Notes: Children with multiple difficulties are counted in several types of functioning.

Given that the number of children identified as having disabilities in any one of the six domains is rather small, in order to make our analysis meaningful, we have clustered these domains into three broad categories. The three categories we adopt for our analyses are *Category A (SHW)*: which include: seeing, hearing and walking, *Category B (Sc):* which includes only self-care, and *Category C (UR):* which includes being understood and remembering. In developing these categories we have greater analytical robustness and also some interesting differences emerge across these categories.

School enrolment and performance on reading and maths assessments

Unlike school based surveys, given that the ASER survey is conducted at the household level, it is powerful in capturing children who are not enrolled or attending school or have dropped out. Overall, 84.3% of children aged 5–16 in the ASER sample are enrolled in school[3]. Of these children, 56.2% are enrolled in public schools and 28.1% are enrolled in private[4] schools. In relation to performance on the tests we find that 15% of children aged 5–16 perform at level 1 maths (the lowest level), 10% in level 2 (number 1 to 9 recognition), 22% in level 3 (number 10 to 99 recognition), 17% in level 4 (ability to perform subtraction) and 36% perform at the highest level (ability to perform division). For reading, we find that 15% of children age 5–16 perform at level 1 (lowest level), 14% at level 2 (letter recognition), 16% at level 3 (word recognition), 13% at level 4 (ability to read sentences) and 42% at level 5 (ability to read a story).

For the purpose of this paper we dichotomised learning according to a specific threshold, achieving more than Level 2, rather than as a score. The reason for adopting this approach is because a score assumes that the movement from one level to the next constitutes the same change in learning, in other words, going from a nothing level to letter level is assumed to be the same as going from word recognition to reading a paragraph. Instead, we focus on one particular learning level, in our case achieving at least level 2 in maths (at least able to identify numbers 0–9) and reading (at least able to read a letter) and so the learning outcome is the proportion of children who have mastered this basic level. In other words, the basic reading outcome is made binary and take on a value of one if a child was assessed to be on level 3, 4 or 5 in reading (and has therefore mastered level 2 i.e. letters) and 0 otherwise (i.e. assessed to be on level 1 or 2); the basic maths outcome is also binary and take on a value of one if a child is assessed to be on level 3, 4 or 5 (and has therefore mastered level 2 i.e. ability to identify single digit numbers) and 0 otherwise (i.e. is assessed to be on levels 1 or 2). By forcing learning outcomes to take on binary values, we are able to interpret the coefficients of our regression estimates with more ease. Average values of the key explanatory variable are simply the proportion of children at that learning level in the sample. Other research using ASER data have also followed this approach (for example Aslam and Atherton 2014; Siddiqui and Gorard 2017).

Research questions

Having identified indicators for disability, school enrolment and learning outcomes in the ASER survey, this paper will now address empirically the following research questions:

(1) Are children who have been reported as having disabilities less likely to be enrolled in school?
   a. Does school enrolment for these children differ by degree of difficulty?
   b. Does school enrolment for these children differ by type and degree of difficulty?
   c. Are there any additional gender or wealth dimensions in school enrolment for this group of children?
(2) Conditional on school enrolment, are children who have been reported as having disabilities underperforming in school?
   a. Do learning outcomes for this group differ by degree of difficulty?
   b. Do learning outcomes for this group differ by type and degree of difficulty?
   c. Are there any additional gender or wealth dimensions which impact on their performance?
(3) Are siblings/co-residents of children who have been identified as having disabilities less likely to be enrolled in school and/or learn?
   a. Do these differences in enrolment or learning differ according to the siblings/co-residents degree of reported disability?
   b. Are there any additional wealth dimensions?

Analytical strategy

We build our analytical strategy on the three research questions identified above. First, to investigate whether children who are reported as having a disability are less likely to be enrolled in school we employ a logit model. With the logit model we estimate the parameters measuring differences in school enrolment, differentiating between public and private schools' enrolment, and control for the 'disability status' of children who reported difficulties in functioning (with no reported disability as the base category). We estimate these parameters conditional on the influence of other variables such as age, gender, wealth, maternal and paternal education as well as regional differences, which are explained in more detail below (see Greene 2012 for full specification of the logit model). For difficulties reported we differentiate between children who reported mild disabilities from those who reported moderate to severe disabilities as well as the type reported. In addition, we investigate whether the likelihood of school enrolment for children identified as having a disability depends on the gender of the child or the wealth of his/her family. In order to do this, we include two interaction terms in the estimation of school enrolment, the interaction between difficulties in functioning and gender and the interaction between difficulties in functioning and wealth.

For the second research question we use our indicators of reading and maths assessments as measures of children's learning. As mentioned above, we dichotomise the learning outcomes into binary variables at level 2 so that we are essentially measuring the proportion of children in the sample who have at least mastered the ability to identify the alphabet (reading) or identify single digit numbers (maths). We employ a linear regression model (linear probability model) to estimate the parameters of the model that relate children's difficulties in functioning with their performance on the two tests. For these estimates it is important that we condition out for whether children are actually enrolled in school and the type of school (whether private or public) they attend, in addition to age, gender, wealth, paternal and maternal education and regional controls.

We investigate performance in our basic reading and maths measures for children identified as having different types and severity of disability. We also explore intersectionalities with age and wealth, as explained above.

For our third and final research question, we first identify siblings/co-residents[5] of children who were reported as having some disabilities and differentiate between co-resident/sibling children in a household where there is a child with mild disabilities from co-resident children in a household where there is a child with moderate to severe disabilities. We then investigate if co-residence with children identified as having disabilities limits school enrolment and learning for children who have not been reported as having any disabilities. For school enrolment we employ a logit model and for performance we employ a linear probability model to estimate the parameters of interest, in this case whether these children are less likely to attend school or to learn simply by residing with children reporting disabilities as compared to other children who live in households where no children have been identified as having any disabilities.

Control variables

In order to pursue this analytical strategy it is important to include control variables in the analysis. First, and importantly, the age of the children is a key determinant of both access to schooling as well as fluency in reading and maths. Age impacts on school access in an inverse way in which it impacts on school performance. In other words, as children age, they are more likely to drop out but also more likely to reach higher levels of literacy and numeracy if they remain in school. We also condition for gender, to account for gender differences not only in access and learning but also on the relationship of disability to access and learning. Gender is therefore included in the analysis as an interaction to account for the particular intersectionality of disability and gender and account for its consequences on access and learning.

Given the earlier discussion on links between poverty and disability, we were keen to explore this relationship within our data sets. In order to do so, we used the larger household survey information gathered from each house visited during the ASER survey to generate a wealth index. Following Saeed and Zia (2014), we generate a wealth index through a factor analysis of the following indicators on which information is typically collected in the ASER tools: type of house (*kutcha, semi-pucca or pucca*), whether the house is owned, whether the house has electricity, a mobile phone, and a television. The sample is then divided into quartiles, i.e. *poorest, poorer, richer and richest*, to account for differences in the socio-economic status of individuals in the sample. Wealth is also included in the analysis as a control variable, but we also investigate its intersectionality with disability and possible consequences for access and learning.

We also include controls for each of the districts within Punjab to account for regional differences in access and learning which may also impact on whether children with disability have access to education and are learning. To account for the intergenerational role of paternal education we included two variables, whether the mother ever attended school and whether the father ever attended school, which in the ASER dataset are based on parents' self-report. Finally, for learning models we include an indicator for whether the child attended private educational institution to account for differences in educational access by school type. Controlling for school-type is important within the context of

Pakistan and particularly so in Punjab where the private sector increasingly caters to a significantly large proportion of the school-age population (Day-Ashley et al. 2014 provide a rigorous review of the evidence on this debate). According to the latest figures from ASER Pakistan (2016), nationally about 26% of all children aged 6–16 years *in rural areas* were reported enrolled in some form of 'private' school and this proportion has decreased from 24% in 2015. These figures mask the very large proportions of children in urban areas who are predominantly enrolled in fee-charging private schools. There is now a vibrant evidence base in the country that show-cases this 'explosion' of private provision in the country (see for instance Andrabi et al. 2007; Aslam 2009 for some seminal work and Carneiro, Das, and Reis 2016 for some more recent work investigating parental willingness to pay for private schooling in rural Punjab) and it is important to identify whether the experiences of children reporting functioning difficulties are different both in terms of access and in terms of learning outcomes depending on the type of school they report being enrolled in.

Findings: school enrolment and learning outcomes

In the first instance, we estimate school enrolment and learning outcome models by pooling the sample of children aged 5–16 regardless of school type. However, by doing this, we are forcing the vector of coefficients to be identical across private and public schools. In order to overcome this limitation, we further estimate enrolment/learning outcome models separately by school type and this allows the identification of potential differences across coefficients (such as gender, wealth or disability status) by school type. All the results are conditional on the age and gender of the child, the wealth of the household, the education of the parents as well as on the prevalence of school access by districts within Punjab. Our results on reading and maths are conditional on school access and whether the type of school is public or private, as well as on the same factors used for school enrolment. We do not describe the association of control factors to school access and learning since our intention is to keep the focus on children with disabilities.

School enrolment, public and private

Table 2 shows that children aged 5–16 living in the Punjab province in Pakistan who were reported as having any disability are less likely to be enrolled in school. These children have only 66% of the odds of school enrolment relative to children without disabilities after conditioning out for age, gender, wealth, parental education, and regional controls (column 1). Access to school varies by the type of educational institution. Table 2 further shows that children who were reported as having any disability have only 62% of the odds of being enrolled in public schools (column 3) but 76% of the odds of being enrolled in private schools (column 5) relative to children without disabilities. The difference in the likelihood of being enrolled in public versus private schools is statistically significant, raising some important issues around access and parental decision making. For instance, one potential explanation for this difference in accessing public versus private schools for those with disabilities could be the lack of acceptance of these children or lack of attention within the public sector which causes those who can afford

Table 2. Parameter estimates [std. errors] for coefficients related to school attendance (by private and public schools).

	Enrolment (any school)		Public schools		Private schools	
	[1]	[2]	[3]	[4]	[5]	[6]
Any difficulty	0.665***		0.619***		0.762***	
	[0.0480]		[0.0470]		[0.0713]	
Mild difficulties		0.808**		0.764***		0.935
		[0.0676]		[0.0663]		[0.101]
Moderate to severe difficulties		0.373***		0.318***		0.441***
		[0.0504]		[0.0487]		[0.0779]
Girls	0.591***	0.591***	0.578***	0.578***	0.678***	0.676***
	[0.0193]	[0.0193]	[0.0195]	[0.0195]	[0.0281]	[0.0280]
Wealth 50–75%	0.676***	0.674***	0.763***	0.761***	0.536***	0.533***
	[0.0316]	[0.0315]	[0.0369]	[0.0369]	[0.0299]	[0.0298]
Wealth Poor 25–50%	0.582***	0.583***	0.676***	0.676***	0.431***	0.431***
	[0.0309]	[0.0310]	[0.0372]	[0.0373]	[0.0286]	[0.0287]
Wealth Poorest 25%	0.421***	0.420***	0.512***	0.512***	0.255***	0.255***
	[0.0195]	[0.0195]	[0.0245]	[0.0245]	[0.0150]	[0.0150]
Child age (years)	1.834***	1.833***	1.862***	1.863***	2.027***	2.021***
	[0.0599]	[0.0599]	[0.0628]	[0.0628]	[0.0842]	[0.0840]
Age squared	0.965***	0.965***	0.965***	0.965***	0.959***	0.959***
	[0.00147]	[0.00147]	[0.00152]	[0.00152]	[0.00191]	[0.00191]
Mother attended school	1.907***	1.910***	1.606***	1.607***	2.749***	2.761***
	[0.0774]	[0.0776]	[0.0673]	[0.0675]	[0.132]	[0.133]
Father attended school	1.708***	1.710***	1.601***	1.603***	2.135***	2.137***
	[0.0605]	[0.0606]	[0.0580]	[0.0582]	[0.0971]	[0.0973]
District	YES	YES	YES	YES	YES	YES
Constant	1.246	1.247	0.644**	0.638**	0.312***	0.315***
	[0.261]	[0.262]	[0.142]	[0.141]	[0.0781]	[0.0792]
Observations	36,076	36,076	25,471	25,471	15,866	15,866

Source: ASER Pakistan.
Notes: Robust standard errors in brackets.
Asterisks *, **, *** indicate statistical significance at ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.

to send their children with disabilities into private schools to do so. As with all school choice literature (see for instance Aslam 2009; Nguyen and Raju 2014), this would indicate a selection bias amongst private school pupils – pupils who attend these schools are likely to come from more educated, able or financially better off families who are able to send their children to these types of schools (regardless of disability) as compared to those who send their children to state schools.

Although we estimate that gender and wealth are significant determinants of educational access (as shown in all estimations in Table 2), we do not find that girls who were reported as having disabilities to be less likely to be enrolled in schools relative to boys who reported having disabilities. We also do not find that the likelihood of school enrolment for children with disabilities is further affected by the wealth of the household. In other words, children with disabilities living in the poorest households have the same conditional probability of being enrolled in school relative to other children.

In terms of severity of disabilities, school enrolment differs significantly. Children who were reported as having mild disabilities had 80% of the odds of school enrolment relative to those without any reported disabilities. However, children who were reported as having moderate/severe disabilities had only 37% of the odds of school enrolment relative to without any reported disabilities (Table 2, column 2). This gradient is more pronounced

for those enrolled in public schools, whereby children with mild disabilities had 76% the odds of being enrolled in public schools and those with moderate/severe disabilities had only 31% of the odds of being enrolled in public schools relative to those without any disabilities. For access to private schools, we do not find statistical differences in enrolment between children who reported mild disabilities and those without any disabilities. For children with moderate/severe disabilities we found that these children had 44% of the odds of being enrolled in private schools relative to children without disabilities. Interestingly, we did not find any additional gender or wealth variation in relation to school enrolment by type of institution. In other words, once we conditioned out for gender and wealth, then there is not an additional disadvantage of school access from being a girl or a boy with moderate/severe disabilities. For wealth, the wealth gradient of school access is the same for children without disabilities than for children with mild or with moderate/severe disabilities.[6]

Table 3 shows findings in relation to educational access across the three broad categories, Category A (SHW), Category B (Sc), and Category C (UR). Children in Category A with mild disability had 62% of the odds of school enrolment in comparison to those without reported disabilities, while those with moderate/severe sensory disabilities were much likely to be in school, with only 38% of the odds of school enrolment than those without disabilities. We found that access to public and private schools for those with mild disabilities to be also around 60% when compared those without any disabilities, but for those with moderate/severe disabilities the chances of accessing schools are much lower in public schools (only 32% of the odds) than for private schools (53% of the odds). Thus, children who were reporting higher severity of disabilities in Category A were less likely to be in school when compared to the overall attendance, but when in school they were more likely to be enrolled in private schools.

With respect to children in Category B (Sc) our analysis suggests that only those with moderate/severe self-caring disabilities have a lower probability of school enrolment (only

Table 3. Parameter estimates [std. errors] for coefficients relating type of difficulty to school attendance (by private and public schools).

	Cat A (SHW)	Cat B (Sc)	Cat C (UR)
Enrolment (any school)			
Mild difficulties	0.621***	0.844	0.884
	[0.0754]	[0.128]	[0.117]
Moderate to severe difficulties	0.381***	0.149***	0.880
	[0.0642]	[0.0315]	[0.295]
Public schools			
Mild difficulties	0.612***	0.785	0.810
	[0.0775]	[0.126]	[0.111]
Moderate to severe difficulties	0.318***	0.117***	0.773
	[0.0621]	[0.0294]	[0.272]
Private schools			
Mild difficulties	0.657***	1.030	1.131
	[0.102]	[0.201]	[0.193]
Moderate to severe difficulties	0.525***	0.178***	1.079
	[0.108]	[0.0486]	[0.502]

Source: ASER Pakistan.

Notes: Models include controls for gender, age, wealth, education of the parents, and district. Robust standard errors in brackets.

Asterisks *, **, *** indicate statistical significance at ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$. Number of observations for enrolment any school 36,076; public 25,471; private 15,866.

15% of the odds) than those without disabilities. This result is consistent across both enrolment in public and private schools. In public schools, children with moderate/severe disabilities with self-caring had only 12% of the odds of school enrolment and private schools 18% of the odds of school enrolment relative to children without any disabilities.

Finally, for children in Category C (UR), irrespective of the degree of severity, we did not find statistical differences in school enrolment, whether public or private, between children with disabilities and those without any disabilities (see Table 3).

Performance on reading and maths assessments

Focusing now on results on learning (Table 4), and taking into consideration whether children are in school, in other words presenting results that are conditional on school enrolment, we find that children who have been identified as having any disability have 9.8 percentage points lower probability of being able to perform at least single digit number recognition than children without reported disabilities (Table 4, Column 1). Similarly, children identified as having any difficulty have 9.7 percentage points lower probability of being able to recognise the alphabet compared with children who were

Table 4. Parameter estimates [std. errors] for coefficients related to performance on numeracy and literacy.

	Numeracy		Literacy	
	[1]	[2]	[3]	[4]
Any difficulty	−0.0983***		−0.0967***	
	[0.0112]		[0.0112]	
Mild difficulties		−0.0161		−0.0202*
		[0.0110]		[0.0111]
Moderate to severe difficulties		−0.393***		−0.371***
		[0.0267]		[0.0262]
Girls	−0.00945**	−0.00992**	−0.00327	−0.00365
	[0.00424]	[0.00422]	[0.00429]	[0.00427]
Wealth 50–75%	−0.0144***	−0.0158***	−0.0160***	−0.0171***
	[0.00519]	[0.00516]	[0.00529]	[0.00526]
Wealth poor 25–50%	−0.0112*	−0.0108	−0.0140**	−0.0138**
	[0.00669]	[0.00666]	[0.00683]	[0.00679]
Wealth poorest 25%	−0.0540***	−0.0544***	−0.0570***	−0.0573***
	[0.00641]	[0.00638]	[0.00656]	[0.00654]
Child age (years)	0.274***	0.274***	0.287***	0.287***
	[0.00421]	[0.00420]	[0.00413]	[0.00411]
Age squared	−0.0105***	−0.0105***	−0.0108***	−0.0108***
	[0.000194]	[0.000193]	[0.000192]	[0.000191]
Mother attended school	0.0262***	0.0277***	0.0347***	0.0358***
	[0.00474]	[0.00471]	[0.00482]	[0.00480]
Father attended school	0.0250***	0.0249***	0.0127**	0.0126**
	[0.00505]	[0.00503]	[0.00511]	[0.00509]
Child enrolled in public school	0.370***	0.366***	0.361***	0.358***
	[0.0102]	[0.0102]	[0.0102]	[0.0102]
Child enrolled in private school	0.389***	0.386***	0.379***	0.376***
	[0.0106]	[0.0106]	[0.0106]	[0.0106]
District	YES	YES	YES	YES
Constant	−1.204***	−1.201***	−1.309***	−1.306***
	[0.0271]	[0.0271]	[0.0266]	[0.0264]
Observations	29,208	29,208	29,821	29,821

Source: ASER Pakistan.
Notes: Robust standard errors in brackets.
Asterisks *, **, *** indicate statistical significance at ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$.

identified as not having any disabilities (Table 4, Column 3). The results also show interesting differences by gender: whilst we find differences in the likelihood of girls being able to recognise single digits relative to boys, there is no apparent gender difference in whether boys and girls are able to recognise the alphabet. We did not find any additional gender effects with respect to the ability to achieve this basic reading or maths tasks for children who reported disabilities. In other words, conditional on school attendance, both boys and girls who have been identified as having any difficulty have the same probability to recognise single digits or learn the alphabet as other boys and girls without disabilities.

With respect to wealth, we also find interesting differences. In particular, we find that children from the poorest quartile of the families have 5.4 percentage points lower probability of undertaking at least single digit recognition and 5.7 percentage points lesser probability of learning at least the alphabet compared to children from the richest quartile of the families. Children from middle income families are also less likely to recognise numbers or be able to identify the alphabet compared with children living in the richest households. However, it is worth noting that children from the poorest quintiles appear to be disadvantaged most in that they have the lowest probability of mastering level 2 reading or maths when compared to those children who belong to the more middle-income families and compared to those children who belong to the richest quartiles. In terms of the interaction between disability and wealth, we only found that children from the 50th to the 75th percentile highest income quartile and who have reported some difficulty are more likely to outperform children from the richest quartile in single digit number and alphabet recognition.

Moving to the degree of difficulty, children with mild disabilities are equally likely to identify single digit numbers than children who were reported as having no disabilities. Children with mild disabilities are only two percentage points less likely to be able to identify the alphabet (Table 4, Columns 2 and 4). In contrast, children with moderate/severe disabilities are 39 percentage points less likely to be able to identify single digit numbers and 37 percentage points less likely to learn the alphabet compared to children who have no disabilities (Table 4, Columns 2 and 4).

Focusing now on the specific type of disabilities, we find large differences in learning especially for children with moderate/severe disabilities in Category A (Table 5).

Table 5. Parameter estimates [std. errors] for coefficients relating type of difficulty to performance in numeracy and literacy.

	Cat A (SHW)	Cat B (Sc)	Cat C (UR)
Numeracy			
Mild difficulties	−0.0147	−0.0194	−0.0227
	[0.0166]	[0.0210]	[0.0177]
Moderate to severe difficulties	−0.676***	−0.291***	0.0301
	[0.0241]	[0.0442]	[0.0412]
Literacy			
Mild difficulties	−0.0253	−0.0229	−0.0196
	[0.0170]	[0.0206]	[0.0180]
Moderate to severe difficulties	−0.627***	−0.238***	−0.0282
	[0.0250]	[0.0426]	[0.0475]

Source: ASER Pakistan.

Notes: Models include controls for gender, age, wealth, education of the parents, type of school, and district. Robust standard errors in brackets.

Asterisks *, **, *** indicate statistical significance at ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$. Number of observations for numeracy 29,208 and for literacy 29,821.

Children with moderate/severe sensory disabilities are, on average, 67 percentage points less likely to know single digit numbers relative to those without any disabilities. On the other hand, children with mild sensory disabilities (Category A) are as likely to identify single digit numbers relative to children who have no disabilities. With respect to reading, children with moderate/severe sensory disabilities are also 63 percentage points less likely to learn the alphabet relative to children without disabilities. Children with mild sensory disabilities are as likely to identify the alphabet as children without any disabilities.

Children with moderate/severe self-caring disabilities (Category B) are 2.9 percentage points less likely to identify single digit numbers and 2.4 percentage points less likely to identify the alphabet compared to children without disabilities. We do not find differences in the likelihood to identify single digit numbers of the alphabet for children who have mild self-caring disabilities relative to children who have no disabilities.

In terms of children who reported mild, moderate/severe disabilities in Category C (in relation to Understanding and Remembering), we find that these children were performing as equal in terms of single digit number recognition and identification of the alphabet as children without any disabilities. We did not find statistically significant results in the proportion of children reported to have these kinds of disabilities and their likelihood to achieve level 2 in the ASER assessment in maths and reading.

Impact on siblings/co-residents: educational enrolment and learning within the household

As part of the analysis we also focused on wider aspects of school access and learning for siblings/co-residents of children who reported mild, moderate/severe disabilities. For each household, we identified all the siblings/co-residents of children with mild disabilities and all the siblings of children with moderate/severe disabilities. For the case in which there is a household with children reporting both mild disabilities and moderate disabilities, we take the latter as the dominant indicator to classify the siblings/co-residents. Results are shown in Table 6.

Table 6. Parameter estimates [std. errors] for coefficients related to school attendance, performance on numeracy and literacy for co-residents/siblings of children with disabilities.

	Access			Learning	
	Any [1]	Public [2]	Private [3]	Numeracy [4]	Literacy [5]
Child mild difficulty	0.821**	0.774***	0.973	−0.0161	−0.0164
	[0.0712]	[0.0694]	[0.110]	[0.0115]	[0.0116]
Child mod to severe difficulty	0.371***	0.315***	0.446***	−0.393***	−0.371***
	[0.0502]	[0.0483]	[0.0787]	[0.0267]	[0.0262]
Sibling of child with moderate to severe difficulty	0.789*	0.758**	0.906	−0.0411**	−0.0407**
	[0.0958]	[0.0973]	[0.144]	[0.0163]	[0.0165]
Sibling of child with mild difficulty	1.017	0.935	1.211*	0.0112	0.0228**
	[0.0896]	[0.0855]	[0.137]	[0.0101]	[0.0103]

Source: ASER Pakistan.

Notes: Models include controls for gender, age, wealth, education of the parents, and district. In addition, for literacy and numeracy models and numeracy models include controls for whether in school and type of school. Robust standard errors in brackets.

Asterisks *, **, *** indicate statistical significance at ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$. Number of observations for enrolment in any school 36,076, public 25,471, private 15,866; for numeracy 29,208 and for literacy 29,821.

A key finding from this analysis indicates deficit in both access and learning which goes beyond the child identifying as having moderate/severe disabilities within the household, to an impact on both access and learning outcomes for other children within the household.

Interestingly, for siblings/co-residents of these children we also find lower chances of access to school, in particular to public schools. Siblings/co-residents of children, who have moderate/severe disabilities, have 76% of the odds of being enrolled in public schools relative to children without disabilities. However, siblings/co-resident of children with moderate/severe disabilities has the same odds of accessing private schools than children without any disabilities.

In terms of learning, children who reside in the same household as with children who have been identified as having with moderate/severe disabilities we find these children are 4.1 percentage points less likely to be able to recognise single digit numbers or the alphabet relative to the rest of the children. Overall, these differences are more pronounced for children in households with a child identified as having moderate/severe disabilities. For children co-habiting in households where a child has been identified as having mild disabilities these differences are not evident, as shown in Table 6.

Discussion

This paper provides empirical evidence in relation to barriers faced by children with disabilities in access to school and learning in the Punjab province of Pakistan. This research drew on the work undertaken by two novel initiatives, ASER (Pakistan) and the Washington Group on Disability Statistics. By incorporating disability questions developed by the Washington Group in public accountability efforts at enhancing the quality of learning in schools through learning assessments at the household level by ASER, we gathered data on enrolment and learning levels of children identified as having disabilities. By locating disability questions in a larger survey we were able to draw comparisons with children without disabilities, and most significantly we were also able to gather important insights on the impact of learning for siblings/co-residents of children with disabilities.

Overall, our findings suggest that children who were reported as having moderate/severe disabilities were less likely to be attending school even though there were slight variations in relation to the type of disabilities. Nonetheless, across the sample, irrespective of gender or wealth status of the household, children reported to have moderate/severe disabilities have a greater probability of being out of school. These results are in line with those noted by Lamichhane and Kawakatsu (2015) whose analysis noted that disability is negatively associated with school attendance in Bangladesh. Similarly, Mizunoya, Mitra, and Yamasaki (2018) on examining data sets across 15 low- and middle-income countries identified disability gap in school attendance as being consistent and statistically significant in all these countries. More importantly, they concluded that neither individual, nor socio-economic and unobserved household characteristics explain this low attendance among children with disabilities. While our results are in line with these broader findings, they are unique for the Pakistani context, where no such research has been conducted yet.

However, what is rather surprising in our findings is that children who were identified as having any disabilities were more likely to be enrolled in private schools rather than in public schools. While, given the nature of our survey design, we do not have data on

parental decision making, it is possible that private schools were seen as more accommodating or simply less likely to exclude children with disabilities given the financial incentives associated with the children coming to these schools. In contrast, public schools which do not operate with similar fee incentives, do not have any such motivation, thus are more likely to exclude children who are perceived as being different. Thus it is possible that some of these reasons contributed to children who were reported to have moderate/severe disabilities were more likely to be enrolled in private schools when compared to those children reported to have mild disabilities. It is important to acknowledge here that these findings, wherein parents of children with disabilities are spending on the education of their child with disabilities, unlike commonly held notions of parental neglect, are similar to the findings in India (World Bank 2007; Singal 2016b).

However, it is also plausible that parents of children who were attending private schools were more likely to be aware of the difficulties that their child was facing due to greater engagement with teachers, and hence were more likely to report it. These are some interesting findings and need to be explored further through more research.

In relation to children's performance on the basic learning tasks, our findings clearly highlight that the global learning crisis referred to in the UNESCO Global Monitoring Report (GMR 2014) is even more magnified for children with disabilities. Learning levels for children with disabilities remain far lower than their peers who were not identified as having any disabilities. In this regard there are some very noticeable differences especially in relation to children who were identified as having moderate/severe disabilities in Category C, that is, children who were reported to have disabilities in relation to being understood and remembering. Important to emphasize here is that within the various types of disabilities, there are some who are even more likely to be disadvantaged than others and hence a homogenised discourse around disability is not sufficient. Thus, in the education discourse there needs to be greater acknowledgement of the different barriers that children face and the diversity of possibilities to overcome these challenges.

Most significantly, findings reported in this paper suggest that it is not only the learning of children with disabilities which is compromised; rather there is a significant impact on the learning of their siblings/co-residents, regardless of gender. This is particularly true for children whose parents identified one of their siblings/co-residents as having moderate or severe disabilities. Here we can draw insights from the 'education deficit' argument put forth by Hoogeveen (2004) based on his work in Uganda. Hoogeveen in his findings noted that in households headed by a person with disabilities the children irrespective of their ability status received less education. Our findings note an education deficit in relation to the levels of learning achieved by children whose siblings/co-residents were identified as having moderate/severe disabilities. While our survey findings do not provide any explanations for this deficit, it is possible that low levels of learning among co-residents/siblings who were not reported as having any disabilities could be attributed to the additional household work or extra caring responsibilities that they may be required to undertake which takes them away from learning or even attending school on a regular basis. Thus, the 'cascading impact' of disability (Singal 2007), wherein there are reduced schooling, learning and social opportunities not just for the individual with disabilities but even for those without disability in the household is clearly noticeable. These findings have significant policy implications.

Conclusion

The key feature of this paper is that for the first time in a Southern context, data were collected on disability and assessment based on a large sample. In this respect, ASER presented the perfect platform as it allowed for this data to be collected at scale and linking with other critical aspects – such as learning outcomes, gender, socio-economic status, etc. However, there are critical aspects, in which the data are still lacking. ASER data on learning outcomes has been consistently criticised for being too restrictive in that they are not sufficiently rich or diagnostic enough to make judgements in relation to a broader definition of meaningful learning. In particular, the instruments only measure very mechanical functions and allow for analysis and reporting on levels of achievement rather than continuous total scores (for example, the data allows users to assess whether a child is at 'word' level or 'sentence' level in Urdu/English or 'subtraction' or 'division' level for example in Arithmetic) and this limits the analysis presented in this paper. Nevertheless, this is the only data set of this size to consistently report on learning levels for children who are both enrolled and not enrolled in school. Additionally, it has been powerful in highlighting the even greater learning disadvantage that child with disabilities face in achieving basic learning outcomes.

While across the globe increased efforts have been made to include children with disabilities into education systems, Pakistan is still lagging behind. The country's education system is struggling with broader issues of access and quality, as clearly discussed at length in the Education for All Review Report (Ministry of Education 2014). It has the second highest out of school population and is 'very far from target' of the goal of universal primary enrolment by 2015 (Global Monitoring Report 2014). In such a context, education of children with disabilities is not even part of the national discourse (Singal 2016) hence making their situation even more vulnerable. This is particularly worrying given that focusing on the education of children with disabilities is likely to have greater returns, both at the individual and national level. For example, Singal et al. (2012) based on findings of a project examining educational outcomes of young people with disabilities in India and Pakistan noted the high value placed on education in developing basic communication skills and literacy skills, and also with regard to gaining respect of others to counter the psychological experiences of possible shame and stigma which is commonly associated with disability. Being educated was also regarded by young people with disabilities in both the countries as being centrally important in countering perceived dependency on others. At a national level, drawing on datasets from Bangladesh, Cambodia, India, Nepal and the Philippines, Lamichhane (2015) indicates that investing in education for people with disabilities provided returns which were three times higher than for people without disabilities. Thus, government's effort at increasing access to education and meaningful learning must be inclusive of all, including those with disabilities.

Findings from our paper highlight important policy implications not just in relation to actively promoting the inclusion of children with disabilities in schools, but also a need to focus on the quality of their educational experiences. In an education system already fraught with low quality of teaching and learning, children with disabilities are the ones who are most likely to be disadvantaged and most likely to be left further behind. Also, rather crucially our findings highlight that when planning policy interventions there is

a need to focus on other members of the households and not just on children with disabilities. Including children with disabilities needs systemic reforms which carry significant positive benefits for all children.

Notes

1. More detailed information about ASER is available at http://www.asercentre.org/p/113.html
2. It is important to emphasize here that the Washington Group does not discourage the use of the Short set in surveys with any age group. Rather the advice given is that it would be better to use these questions, rather than totally exclude disability in surveys.
3. The exact question asked to the main respondent was 'Is the child currently enrolled in school?' Therefore, we refer in our paper to school enrolment.
4. Private schools in the ASER survey include low cost private schools, community schools and private chains.
5. Not all children living in the same household may be the sibling of or be related to the child who has been identified with disabilities.
6. Since none of the interactions were statistically significant, we opted not to show them in the tables of results. These estimates are available from the authors upon request.

Disclosure statement

No potential conflict of interest was reported by the authors.

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