Title

Access to schools and learning outcomes of children

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Abstract

More than sixty years after its formation, member countries of the United Nations came together to draft and sign the Convention on the Rights of Persons with Disabilities. A core provision in the basic human rights stipulated by the Convention is the right to education for persons with disabilities. In this paper, we investigate the access to education in children with disabilities in four administrative units in Pakistan - Islamabad - ICT, Khyber Pakhtunkhwa (KPK), Khyber Pakhtunkhwa Merged Region and Punjab. We use household data collected under the Annual Status of Education Report (ASER) (2018), which included questions on disability status of children aged 3 to 16 years, their enrolment in school, and their performance on reading and arithmetic.

Broadly, our findings indicate that in all four administrative units of our study, children with mild difficulties in functioning are more likely to enrol in schools compared to children with no difficulties. On the other hand, children with severe difficulties are less likely to access schools, when compared to their counterparts with no difficulties. In terms of type of school access, there are administrative unit based differences with Punjab and KPK exhibiting a preference for government schools by the mildly disabled children. Madrasah or religious schooling access has higher likelihood in case of children with mild difficulties in KPK and KPK Merged Region. In terms of learning outcomes of children with disabilities, we see a small gap between children with and without difficulties.

Keywords : Children with difficulties in functioning, school enrolment, learning outcomes

1   Introduction

In recent years, there has been a significant increase in school enrolment for children globally (UNICEF, 2020)[1]. However, research has shown that children with disabilities (difficulties in different functioning domains) are more prone to exclusion from schools and education (Filmer and Schady, 2009). If enrolled, these children face severe challenges in learning (Luo et al., 2020; Mizunoya et al., 2018; Trani et al., 2012). Not only this, just being enrolled in a school system does not translate into attending school regularly, for children with disabilities.

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[1]Before schools shuttered their doors as a result of the global pandemic related to spread of COVID 19 virus, four in five school-age children (3 to 17 years old) was enrolled in school. However, it is to be kept in mind that children in schools were not necessarily learning, with 617 million children and adolescents worldwide failing to reach minimum proficiency levels in reading and arithmetic (UNICEF, 2020).

An estimated 258 million children, adolescents and youth, or 17% of the global total, are not in school. Of these, children with disabilities constitute 15% of out-of-school children (UNESCO, 2020). These high numbers point in the direction of much needed research and debate on how to build disability-inclusive schools and education system[2]. These numbers also emphasise the significance of collecting data[3] for research purpose that can advise policy practitioners, and assist the progress towards accomplishing the rights of education and decent living for people with disabilities (UN Department of Economic and Social Affairs Disability , 2019).

When it comes to children who are enrolled in schools, UNESCO (2017) suggests that approximately 617 million children are lagging behind minimum levels in learning basic literacy and arithmetic. Of this, 80% children are concentrated in South Asia with a majority being female, or children belonging to ethnic minorities and lower socioeconomic background, and children with disabilities. In Pakistan, a staggering 22.84 million children were estimated to be out of school in 2015-16 (National Education Management Information System (NEMIS), 2017) and those that go to school often do not achieve even basic learning levels (Annual Status of Education Report (ASER), 2018). The out of school children proportion is tilted towards girls, with 12.2 million girls against 10.6 million boys who are out of school. In the KPK and Khyber Pakhtunkhwa Merged Region (newly merged districts), 13.5% and 27.6% children in the 5-16 age group were identified as out of school (as opposed to 10.6% in Punjab and 9.5% in Islamabad (ICT)) (Annual Status of Education Report (ASER), 2018). Other than these descriptive numbers on overall non-enrolment and performance in numeracy and literacy, there is no analysis on these metrics for children with difficulties in functioning domains.

Contribution of this paper and key differences from previous research : This paper aims to address the issues pertaining to the enrolment and learning gaps of children with disabilities through data from Annual Status of Education Report (ASER) (2018) in Pakistan. Specifically, we perform this study for four administrative units where information is collected with respect to children's difficulties in functioning domains. The availability of recent data in the four administrative units makes this an interesting avenue of research for two key reasons. First, to the best of our knowledge, there is no previous study that puts forth a comparative analysis on all the 4 administrative units based on the Annual Status of Education Report (ASER) (2018) data. Singal et al. (2020b) provide evidence from a household survey conducted in 2015 by Annual Status of Education Report (ASER), and Singal et al. (2020a) use primary data collected under Teaching Effectively ALL Children (TEACh), however, both these papers cover only one province - Punjab. In this regard, our study adds to literature by a wider coverage through the incorporation of data pertaining to three more administrative units - Islamabad, KPK and KPK Merged Region.

Second, our study is the first one to systematically explore the disability gaps by considering the heterogeneity of children with difficulties based on severity of difficulty. This becomes pertinent for want of better understanding how inclusive education policies improve school eco-system for children with various functional difficulties, as well as by identifying areas of weakness in existing education policies. Through an understanding of disability gaps by the type and severity, local governments and educational institutes can modify their policies and infrastructure respectively,

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[2]It is estimated that the world economy suffers losses roughly 3- 7% of global GDP due to the exclusion of people with disabilities from the world work market. In its annual meeting 2019 in Davos, the world economic forum stressed on the plight of people with disabilities that, "there is a need to build a more inclusive society that must include the estimated 1 billion people in the world living with a disability'.

[3]The World Health Organisation in 2011 highlighted the lack of data and evidence on people with disabilities in several sectors, including education that hinders a comprehensive plan for understanding their issues and taking action.

in line with the needs of these children.

Our results can be summarised as below for the whole sample (4 administrative units), and for sub-samples based on each administrative unit. Our results for the entire sample suggest that children with difficulties have higher likelihood of enrolment in schools compared to children with no difficulties. To probe this *counter intuitive* result further, we split our disability related indicator by severity of difficulty faced. By doing so, we are able to uncover the specific children with difficulties that are driving this result. We find that children with mild difficulties have higher likelihood of enrolment compared to children with no difficulties. On the other hand, children with severe difficulties are less likely to enroll in schools relative to other children with no difficulties. Girl children are disadvantaged in terms of access to schools with a lower likelihood of enrolment, compared to male children. Children of parents who have attended school have a higher likelihood of school enrolment, however, children coming from poor households have a lower likelihood of access to school compared to children coming from well off households. Our finding regarding higher enrolment of mildly disabled children, while counter-intuitive, throws light on the possibility that children without difficulties may not be enrolling in schools because of other labour force engagements. Therefore, within the Pakistani context, our findings differ from previous studies conducted on the Punjab province data, which have found children with mild and moderate to severe disabilities as less likely to attend schools compared to other children.

The results regarding school access that we find for the whole sample consisting of 4 administrative units are also consistent with individual sub-samples based on administrative units. However, Pakistan is a large country and different administrative units have different facilities as well as constraints. Therefore, to have a better policy recommendation based on each administrative unit we also study the enrolment by type of school accessed. In Punjab, which is the most populous and rich administrative unit in Pakistan relative to other units, we see that parents of children with mild difficulties prefer sending their wards to government schools. This could be because the quality of government schools is better in a rich province like Punjab. This also warrants that more focus should be laid on ameliorating the facilities in government schools because they receive children with difficulties in higher numbers. Private schools have lower enrolment from children with mild difficulties in both Punjab and KPK. However, children with moderate difficulties are enrolled in higher proportions in both KPK and KPK Merged Region into private schools. This could be because government schools are not equipped to receive children with moderate difficulties in these administrative units. Private schools, while more expensive, are deemed better suited for children with moderate difficulties by their care givers. A striking feature about religious school education is exposed in the KPK and KPK Merged Region. As evidenced by previous research, these administrative units have a higher concentration of Madrasahs, and in our results we also find evidence of higher likelihood of enrolment in these schools by both mild and moderate disable children. This finding warrants further investigation into the mainstreaming of children with difficulties in these less developed administrative units of Pakistan.

Our results on children's performance in literacy and numeracy are heterogeneous based on severity of difficulty, however, the gap between children with and without difficulties is not substantial. Across all administrative units, we find that only children with moderate difficulties have lower likelihood of recognising numbers or alphabets, when compared to children with no difficulties. At first sight these results are encouraging, since they could indicate that children with difficulties are similar to children without difficulties in learning performance. However, these results must be taken with caution since the definition of numerical and language learning in this case is broad. Further research can explore the learning outcomes at a granular level,

and also by type of difficulty faced (seeing, hearing, walking, understanding, remembering).

The rest of this paper is organised as follows : Section 2 describes the local context of the four administrative units of Pakistan where disability related data is available in the Annual Status of Education Report (ASER) (2018) survey, and used in this analysis. Section 3 details the specificity of Annual Status of Education Report (ASER) (2018) data, and descriptive statistics on enrolment and learning outcomes of children with difficulties in functioning domains. In Section 4 we provide the research design, and Section 5 presents the results from our data analyses. Finally, Section 6 concludes with a discussion on policy implications.

2   Policy overview and current status of education in children with disabilities: the case of Pakistan

Figure 1: Political map of Pakistan, Source: www.mapsofworld.com

Pakistan is the sixth most populous country in the world, with a population of over 210 million people. Two thirds of Pakistanis are below the age of 30 years (Pakistan Bureau of Statistics, 2017). Pakistan's fertility rate is the highest amongst neighbouring countries at 3.7 children per woman (United Nations Population Division, 2019). The stunting rate in children under 5 in Pakistan is very high at 38% compared with the Upper middle income country average of 7%. About 40% of the population lives in urban areas whereas the rest still resides in rural areas. The main religion is Islam with about 96.4% of the total population being Muslim (World Bank, 2019). The World Bank classifies Pakistan as a "Lower middle Income" country.

Researchers estimate that Pakistan could have as many as 27 million people with disabilities, and a lack of engagement and inclusion of these people could be costing the economy between 4.9% and 6.3% of GDP each year (Roman et al., 2014). In Pakistan, people with disability(ies) lag behind on several socio-economic indicators, and are denied the right of education, healthcare, employment and rehabilitation (Singal, 2016). The words "Disable" and "Disability" are often used in negative sense in Pakistani society. People with disabilities (PWD) are never accepted in society and they are often disregarded and mistreated. Because there are limited opportunities of education and employment for these PWDs, majority of them live as dependents on family members (Arsh and Darain, 2019). Singal et al. (2020b) and Roman et al. (2014) point out that little has changed since a report published approximately two decades ago by the Japan International cooperation which noted that children with disabilities in Pakistan are one of the most marginalised groups who are unheard, unseen, and even not counted.

In the context of South Asian developing nations, Singal (2016) found that compared to India, Pakistan has failed to improve the condition of children with disability and a large number of them remain out of school. Furthermore, compared to women, men with disabilities have better access to both education and lifework opportunities. In Pakistan, a girl child with disability faces higher discrimination in access to education, healthcare, employment, and finding a life partner. Regarding gaps in learning, studies by Singal et al. (2020a,b) have measured enrolment and learning gaps of children with disabilities in Pakistan specific to the Punjab province. Their studies find that children with disabilities are less likely to attend schools, and those who attend school have lower levels of learning in basic reading and maths solving tasks. The researchers also found that being a sibling in a household with a child with disability is associated with lower levels of learning in reading and counting. In the context of rural Punjab, the researchers also found that children with disabilities are less likely to be enrolled, and have lower learning outcomes in both literacy and numeracy skills compared to their peers. However, contrary to the popular belief that children with disabilities attend specific schools designed to better cater to their special requirements, the study found that they are enrolled in the mainstream (government and private schools).

Historically, religious institutions were the major providers of education and care services to children with disabilities in Pakistan. It was only in 1959 that the National Commission on Education put children with a disability on the government agenda and proposed provisions of vocational education for them and training the personnel who deal with them. In the 1980s, funds were increased in the budget for the education of children with disabilities. In the same years, the government established 200 institutions solely for children with disabilities all over the country and also the Federal Directorate General of Special Education (Lari, 2006). Pakistan became the signatory to the Salamanca Statement and Framework for action on special needs education (Unit and of Public Information, 1994).

However, researchers have argued that in the last two decades, the government of Pakistan has paid little attention to the children with disabilities (Roman et al., 2014; Singal et al., 2020b). The 2002 National Policy for Persons with Disabilities remains the only comprehensive official document for the children with disability that lacks the way forward by referring to the international commitment of making education accessible for all through the integration of the children with special needs in the mainstream education system (Singal, 2016). The promulgation of article 2A of this Act in 2012 ensures the right of free education to children of ages 5-16 years, and serves as an important legislative landmark. However, it does not specifically mention children with disabilities.

Recent studies show that, in Pakistan, the devolution of the ministry of education from federal to provincial governments has had a negative impact on children with disabilities, mainly due to the exclusion of disability as a priority item from the federal list (Hilhorst Rosemar and Mohammad, 2019; Roman et al., 2014). Studies suggest that provincial governments do not have the ability and resources to provide quality education to the children with disabilities. Moreover, there is a gaping hole in the pool of trained teachers for children with disabilities (Hameed and Manzoor, 2016; Roman et al., 2014). Further, each province focuses differently on the issue. For example, Punjab's focus is more on extending the educational services to its population with disabilities compared to KPK, which provides assistance in employment support (Hilhorst Rosemar and Mohammad, 2019; Roman et al., 2014). However, the non-availability of data at the national level and, lack of trained professional with requisite skills has further worsened the situation by making it difficult to address the issue. The legal framework is nonexistent or weak regarding protecting the right of persons with disabilities. The only legislation passed for persons with a disability was put forward in 1981, and since then, minimal changes have been made to the law. Also, research proposes that private and public agencies are not abiding by the existing quota of 2% allotted for the person with disabilities (Roman et al., 2014). A country with a diverse society does not have any anti-discriminatory law thus making the marginalised more vulnerable. Although, Pakistan did ratify the convention on the rights of persons with disabilities (CRPD) in July 2011[4]. A chronology of Pakistan's policy actions with respect to supporting persons with disabilities is given in the Appendix Table A1.

3 Data and sample description

3.1 Disability measurement

Disability is a complex phenomenon that has been measured in different ways (Mitra, 2017; Mont, 2007; Sen, 1985, 1993). However, our study follows the recommendations of the Washington Group (WG) on Disability Statistics, established especially for this purpose by UN Statistical Commission[5]. The ASER household data also employs the definition and measure of disability undertaken by the WG. In contrast, Pakistan's official census used a binary approach simply by asking whether someone is classified as disabled or not disabled. This is particularly detrimental for collection of real data because in view of the negative socio-cultural norms associated with disability, many people decline to identify any family member as disabled (Arsh and Darain, 2019; Mont, 2007). Jeffery and Singal (2008) in their study noted that non-disclosure could be the reason since family members may not be aware of the real condition due to lack of information and the non-availability of health care facilities in rural areas.

The WG disability tested tools is one of the widely internationally accepted tools. The conceptual framing of disability in six physical and mental conditions are: seeing, hearing, walking, remembering and concentrating, self-care and communication. These conditions were measured on a four-point scale starting with *no difficulty*, *some difficulty*, *a lot of difficulty* and finally cannot do at all. These measures pertaining to functioning are in contrast to the conceptual frameworks based on recording impairment or loss of various body structures or limbs, which lead to underestimates of disability prevalence. The WG short set of questions on disability has gone through ample cognitive and field testing in different languages and regions (Altman, 2016; Madans et al., 2011).

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[4]According to 1998 census only 2.49% and according to 2017 census only 0.48% of the population had disability in Pakistan (Arsh and Darain, 2019). In the KPK and KPK newly merged districts, this number is estimated to be 10% of the population with disability which come to roughly 100,000 persons. There is a possibility that this number is under-estimated due to the stigma associated with disability and a reluctance in reporting.

[5]For details see this Link.

For this study, we draw from the set of questions exhibited in Table 1 included in the Annual Status of Education Report (ASER) (2018) to identify the variables related to measurement of difficulties faced by children in functioning.

Table 1: Survey question related to health and functioning of children (difficulties faced)

Sr. No.	Question	Options
1	Does your child have difficulty in seeing, even if wearing glasses?	Blank=No response 1=No difficulty 2=Yes some difficulty 3=Yes a lot of difficulty 4=Cannot see at all
2	Does your child have difficulty in hearing, even if wearing hearing aids?	Blank=No response 1=No difficulty 2=Yes some difficulty 3=Yes a lot of difficulty 4=Cannot hear at all
3	Does your child have difficulty in walking, compared with children of same age?	Blank=No response 1=No difficulty 2=Yes some difficulty 3=Yes a lot of difficulty 4=Cannot walk at all
4	Does your child have difficulty with self-care such as feeding or dressing him/herself, compared with children of same age?	Blank=No response 1=No difficulty 2=Yes some difficulty 3=Yes a lot of difficulty 4=Cannot do at all
5	Does your child have difficulty in being understood by others using customary/usual language, compared with children of same age?	Blank=No response 1=No difficulty 2=Yes some difficulty 3=Yes a lot of difficulty 4=Cannot be understood at all
6	Does your child have difficulty in remembering things that he/she has learned, compared with children of same age?	Blank=No response 1=No difficulty 2=Yes some difficulty 3=Yes a lot of difficulty 4=Cannot remember at all
7	Does your child use any aids and appliances (tick as many as application)	Blank=No response 1=glasses 2=Hearing aids 3=Mobility aids (crutches, wheel chair etc) 4=others

Source : Annual Status of Education Report (ASER) (2018) coding manual.

3.2 Disability related information in Annual Status of Education Report (ASER) (2018)

The data used in this paper is from the Annual Status of Education Report (ASER) (2018) survey conducted in 154 rural districts of Pakistan. The data includes questions specifically concerned with disability prevalence. In its previous versions, the survey had this information only for Punjab province (2015) and for KPK and Punjab province (2016). In the year 2018, the information on disability prevalence has been collected not only from Punjab, but also for Islamabad-ICT, KPK and KPK Merged Region- Newly Merged Districts (previously

known as FATA[6]). See Table 2 for further details. The data also comprises information on socioeconomic and demographic characteristics, parental education, and village characteristics such as availability of schools and health facilities. This paper draws on data collected on over 260,000 children aged 3 to 16 years old residing in the aforesaid four administrative units of Pakistan. Of this, roughly 118,800 children were found with responses on difficulties faced (about 4,482 missing responses related to disability). About 3.5% children reported some kind of difficulty in functioning domains related to seeing, hearing, walking, self-care, being understood or remembering (Annual Status of Education Report (ASER), 2018).

Table 2: Prevalence of disability in children aged 3 - 16 in Pakistan, Annual Status of Education Report (ASER) (2018)

Region	Children surveyed	No difficulties in functioning	Difficulties in functioning	Total	Missing
Regions where disability prevalence information is available					
Punjab	57,450	54,872	1,541	56,413	1,037
KPK	42,125	38,749	1,771	40,520	1,605
Islamabad - ICT	1,392	1,245	110	1,355	37
KPK Merged Region	22,312	19,687	822	20,509	1,803
Sub-Total (4 regions)	**123,279**	**114,553**	**4,244**	**118,797**	**4,482**
Regions where disability prevalence information is not available					
Sindh	36,525				
Balochistan	67,706				
Gilgit-Baltistan	16,828				
Azad Jammu and Kashmir	15,848				
Sub-Total (4 regions)	**136,907**				
Total sample size	**260,186**				

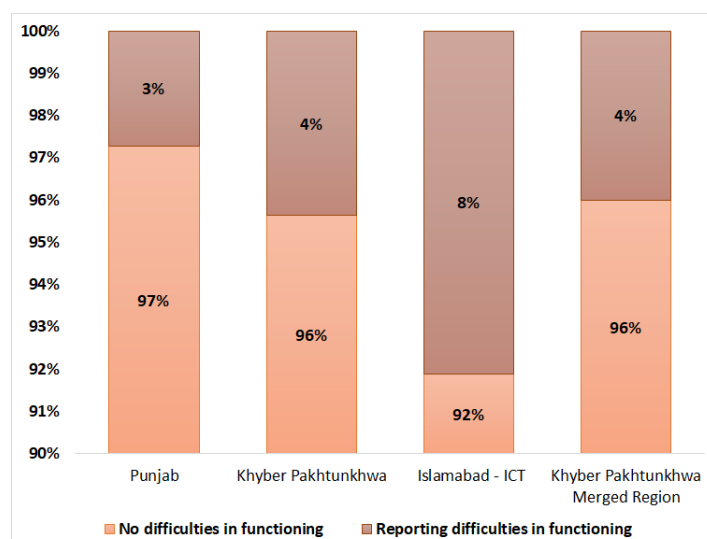Source: Annual Status of Education Report (ASER) (2018)

3.3 Prevalence of disability in children in Pakistan

Different census and survey held in Pakistan have different prevalence rates of disability. For instance, the census carried out in Pakistan in 1998 shows that 2.5% of the total population reports some type of moderate to severe disability. The most recent 2017 census form initially did not include persons with disabilities in the headcount exercise. Consequently, the country's apex court intervened and two additional codes were added to the code sequence: '4' for disabled man, '5' for disabled woman and '6' for a disabled transgender person under the 'sex' column. This mid-cycle change in census form raised several concerns on the reliability of data gathered by the Pakistan Bureau of Statistics (PBS) (Singal et al., 2020a).

As shown in Table 2, we present details of disability in children surveyed under Annual Status of Education Report (ASER) (2018). Information on the disability module was collected for little over 123,000 children aged 3 to 16. Of this, about 4,400 respondents did not provide any answer regarding the difficulties faced by their wards in functional domains.

Our data pertaining to 123,279 children from 4 administrative units in Pakistan suggests that 3.5% of children aged 3 to 16 (with information on difficulties) reported difficulties with seeing, hearing, walking, self-care, understanding or remembering. This number is 3% in Punjab and

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[6]The Federally Administered Tribal Areas (FATA) are located in the North West region of Pakistan on the Durand line with Afghanistan. These were previously governed under colonial law of frontier crime regulation (Cyan et al., 2017; Yousaf, 2019).

Figure 2: Prevalence of disability by administrative units in Pakistan

4% each in KPK and KPK Merged Region. However, 8% children in the sample pertaining to Islamabad - ICT are reported with difficulties in functioning (Figure 2). The number in Islamabad - ICT could be higher (110 of the 1,245 children reported difficulties) because of greater awareness in parents regarding children's disabilities. Since Islamabad - ICT are more urbanised than other districts of Pakistan, the parents may have a higher level of education and less stigma associated with disability which maybe reflected in higher instances of reporting.

In the Appendix Figure A1 is provided for the further break up of children with disabilities based on the severity of difficulty faced. We see that in the Punjab administrative unit, of the children who reported difficulties in functioning (3% of the sample), 2% reported mild difficulties and 0.4% each reported moderate and severe difficulties. In other administrative units too, children with mild difficulties are the largest share of children with difficulties (3% in KPK and KPK Merged Region, 6% in Islambad- ICT).

Gender
Our data suggests that the prevalence rates for disabilities is higher in case of male children than female children across all the severity levels (See Figure 3). For instance, in KPK administrative unit, 61% of the children with mild disabilities, 58% of those with moderate disabilities and 57% of those with severe disabilities are male. In case of KPK Merged Region, this gap is wider while in case of Punjab the gap is lowered. Caution is needed in interpreting this result since it may be plausible that families are more reluctant in reporting difficulties faced by girl children. If a girl child suffers from difficulties in functioning, this is likely to be under-reported in Pakistan where parents of daughters are most worried because they have to arrange suitable marital proposals for them, and a girl's marriage costs them decades' savings (Atif et al., 2016).

Access to schools
In Figure 4, we identify the administrative unit based variations in school enrolment depending on children without any difficulties and children with reported difficulties in functioning domains. In the Punjab administrative unit, we see that 85% of the children who do not report difficulties in functioning are enrolled in schools. The corresponding number for children who report functioning difficulties is 87%. School enrolment is lower in the KPK and KPK Merged Region
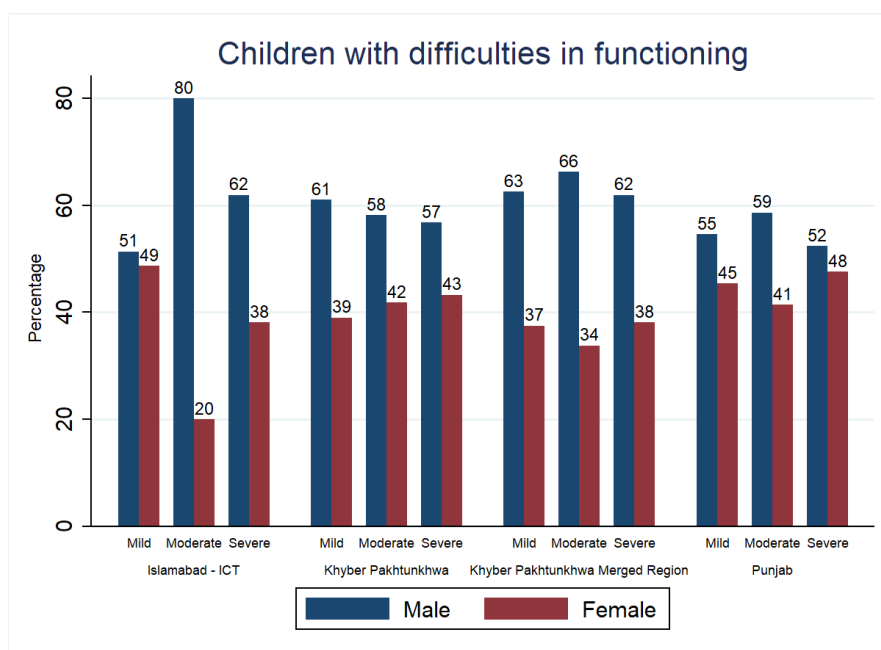
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Source : Annual Status of Education Report (ASER) (2018) survey in Pakistan pertaining to 123,279 children in the Punjab, KPK, ICT and KPK Merged Region.

Figure 3: Intersection of gender with severity of disability
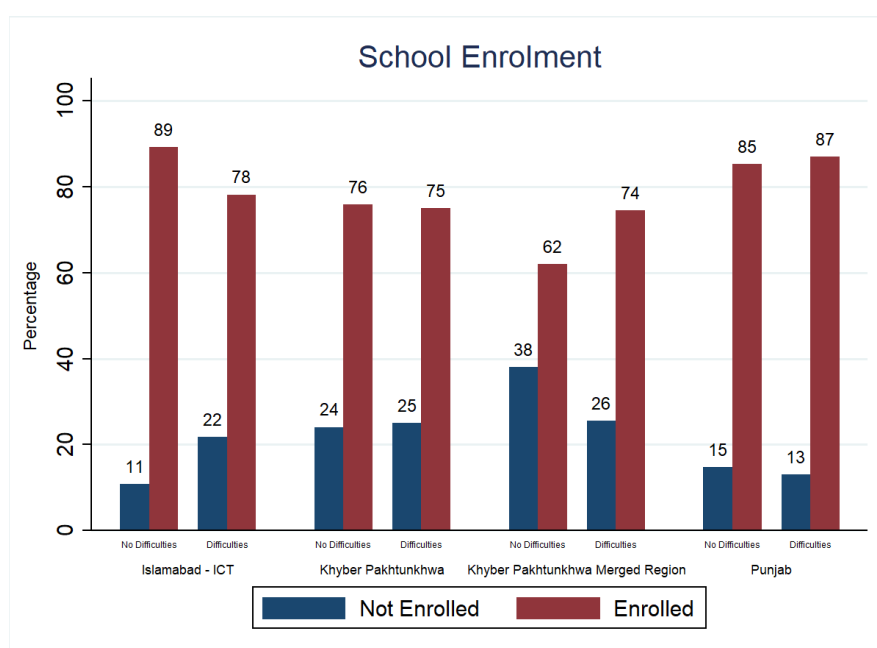
Source : Annual Status of Education Report (ASER) (2018) survey in Pakistan pertaining to 123,279 children in the Punjab, KPK, ICT and KPK Merged Region.

Figure 4: School enrolment of children in 4 regions of Pakistan, 2018

for both children with and without difficulties. However, in the capital administrative unit of Islamabad, enrolment numbers are high in children without difficulties. Nevertheless, the out of school children within the disabled group (78%) are commensurate with the much less developed KPK and KPK Merged Region.

In our data, we are also able to identify the school enrolment depending on the severity of

disabilities. For example, in case of KPK, there are 1,771 children (of 42,125 surveyed children in the administrative unit) who report difficulties in functioning. Of this, 868 (49%) children suffer with mild difficulties but are enrolled in schools while 253 (14%) children suffer with mild difficulties, but are *not* enrolled in school. In comparison, all other administrative units exhibit similar results where children with mild difficulties are enrolled in schools in higher numbers.

When we look at the type of disability and how it affects children's enrolment, we find that children with mild seeing difficulties are enrolled in larger numbers in all administrative units when compared to children with mild walking and hearing difficulties. On an administrative unit wise comparison, we find that KPK and KPK Merged Region have the worst numbers in terms of out-of-school children with seeing, walking, understanding and remembering difficulties. However, with respect to children with hearing difficulties, Punjab fares poorly with most out-of-school children.

Type of schools accessed
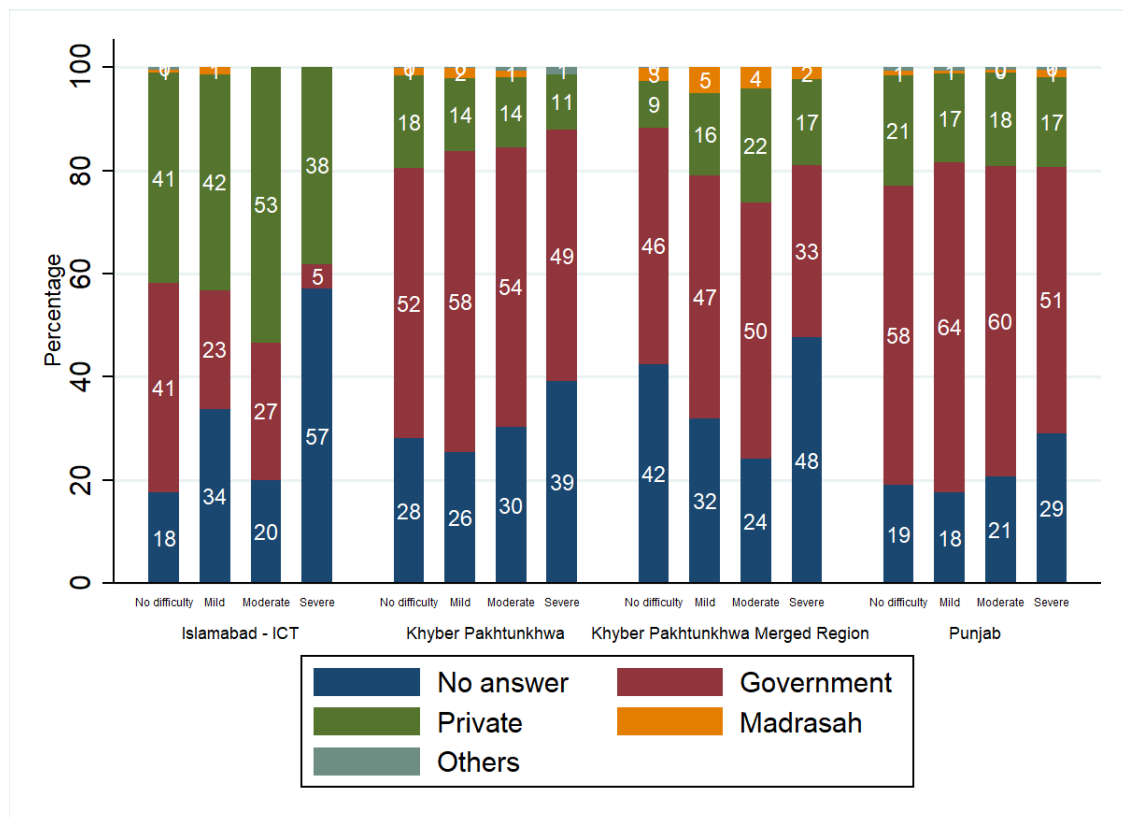
Source : Annual Status of Education Report (ASER) (2018) survey in Pakistan pertaining to 123,279 children in the Punjab, KPK, ICT and KPK Merged Region.

Figure 5: Intersection of type of school accessed with severity of disability

In the context of Pakistan the administrative unit wise difference in terms of type of school attended is exhibited in Figure 5. There are several studies pertaining to the province of Punjab where it is shown that parents' willingness to pay for private schooling (even in rural areas) is rising. Earlier research Christine Fair (2007); Dorronsoro (2012) have also noted that Madrasah are mainly concentrated in Baluchistan and KPK administrative units. However, in recent times, KPK and KPK Merged Region exhibit opposite trends in enrolment, at least in terms of early childhood education (ECE) indicators. It is noted by Annual Status of Education Report (ASER) (2018) that in KPK and FATA, ECE enrolment in government schools has gone up from

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46% to 67%, while this has come down from 55% to 33% in non-state (private, Madrasah and other types of schools). However, to the best of our knowledge there is no research or discussion in Pakistan around the discourse on specific needs of children with difficulties based on the type of school attended. Therefore, it becomes pertinent to investigate the role of the type of school attended on learning outcomes of children, specifically the children suffering with disabilities.

We see that in Punjab, children with any severity of disability are more likely to be enrolled in government schools. This is also seen in KPK and KPK Merged Region. However, in the Islamabad-ICT administrative unit, more children with disabilities are enrolled in private schools. This figure highlights the importance of government schools in education of children with functional difficulties, and evokes discussion on the facilities that these schools can provide to children with disabilities. Government schools do not operate on the same business model (fee structure) as private schools, however, seem to be the preferred choice of education institution for parents of disabled children. This may be because parents may be less likely to invest in a disabled child's education and therefore, would prefer public education which is almost free. We see that children with difficulties in the KPK and KPK Merged Region are enrolled in Madrasahs, although the absolute numbers in these categories are very low. These administrative units are characterised by high dependence on Madrasah education possibly because they are free of cost and offer children accommodation as well as food. In this context, a grim finding that warrants serious investigation is by Fraser et al. (2017) that suggests disabled children are exploited as suicide bombers in wars from this administrative unit (Fraser et al., 2017). Our findings become particularly pertinent to check this hypothesis in future studies.

Household wealth

Source : Annual Status of Education Report (ASER) (2018) survey in Pakistan pertaining to 123,279 children in the Punjab, KPK, ICT and KPK Merged Region.
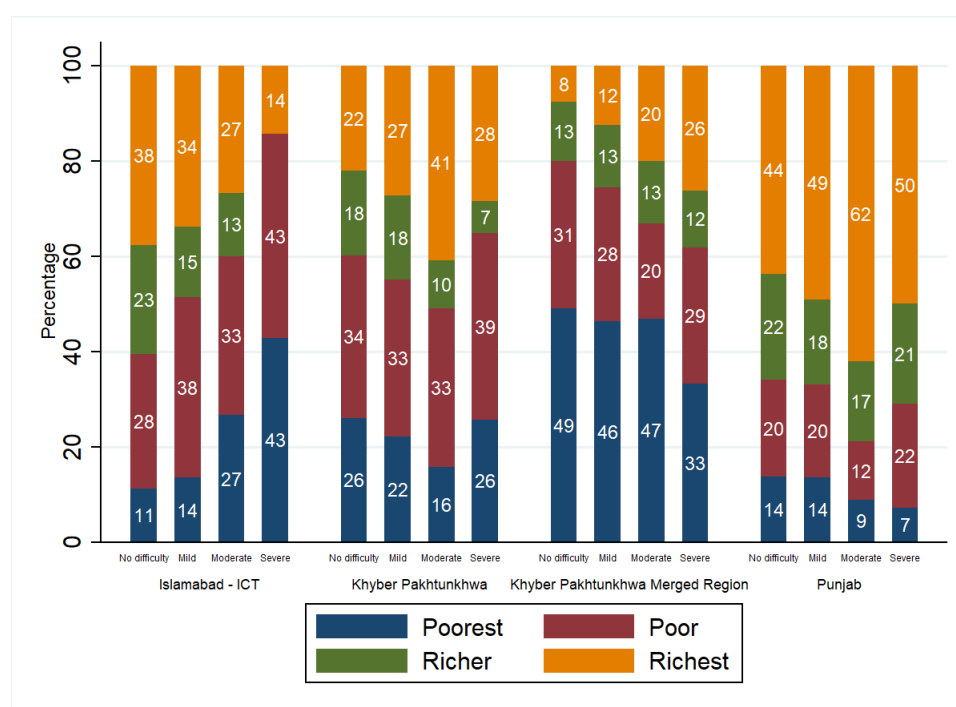
Figure 6: Intersection of household wealth with severity of disability

When looking at the distribution of children with difficulties based on household wealth (Figure 6) we find that children with disabilities are more likely to be in poorest or poorer households.

Only in the case of Punjab, we see a reversal in this statistic with a higher proportion of children in the richer or richest households. Punjab is Pakistan's most populous province with 55.6% of the country's population (Wazir and Goujon, 2019). It is the wealthiest province, characterised by fertile irrigated land, and developed urban centres. This finding is consistent with the studies by Braithwaite and Mont (2009); Mont and Cuong (2011); Singal (2007) that have shown an interconnection between poverty and higher prevalence of disability.

Learning outcomes

In Figure 7 we present statistics on the performance of children with difficulties in arithmetic problems. We see that a large number of children with mild, moderate and severe difficulties are not in a position to perform basic arithmetic operations, and fall in the 'beginner' category. We see that 41% of the disabled children in Islamabad, 15% in KPK, 11% in KPK Merged Region and 13% in Punjab, are not able to perform basic arithmetic operations. These numbers are significantly higher when compared to numerical learning outcomes of children with no reported difficulties in functioning.

With respect to learning outcomes pertaining to languages, we divide our analysis into knowledge in local language and English language. In Figure 8 we see that children with difficulties in functioning do not perform as well as their counterparts without any difficulties. For instance, in Islamabad, 50% of the children with no difficulties can read stories in the local language, however, only 26% of the children with difficulties can do so. A higher proportion of disabled children fall in the 'beginner' category across all administrative units (except KPK Merged Region), when compared to their counterparts who do not report any difficulties.

An almost identical relationship is seen in the learning outcomes in English language in the four administrative units. Children with disabilities are in higher proportions in the 'beginner' category, and lower proportions in more advanced outcomes like recognising words and making sentences.
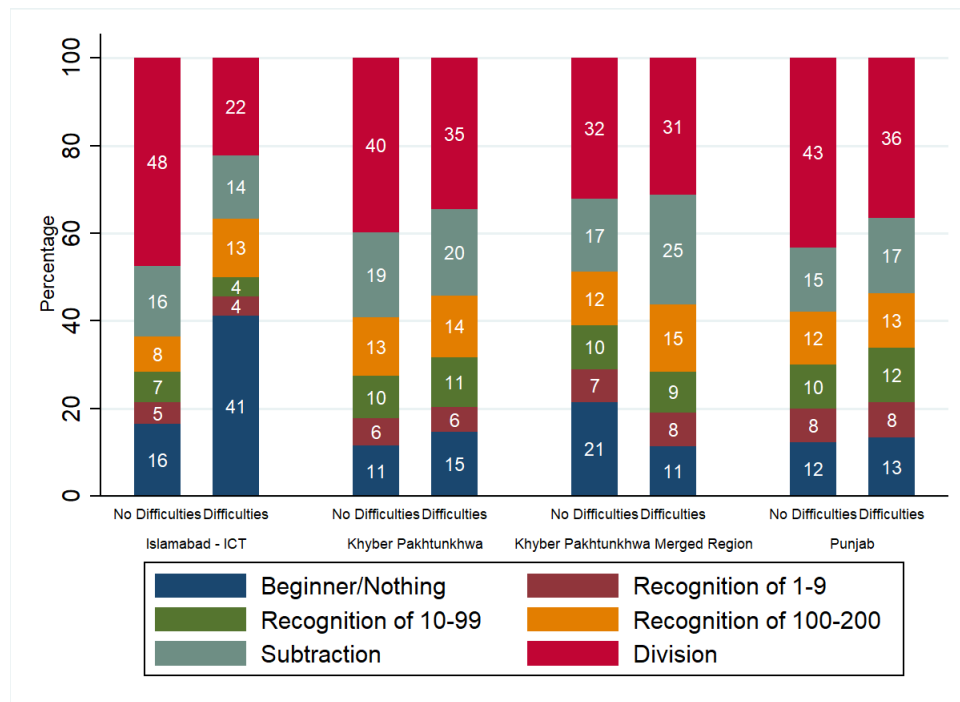
Source : Annual Status of Education Report (ASER) (2018) survey in Pakistan pertaining to 123,279 children in the Punjab, KPK, ICT and KPK Merged Region.

Figure 7: Numeracy outcomes of children with disabilities
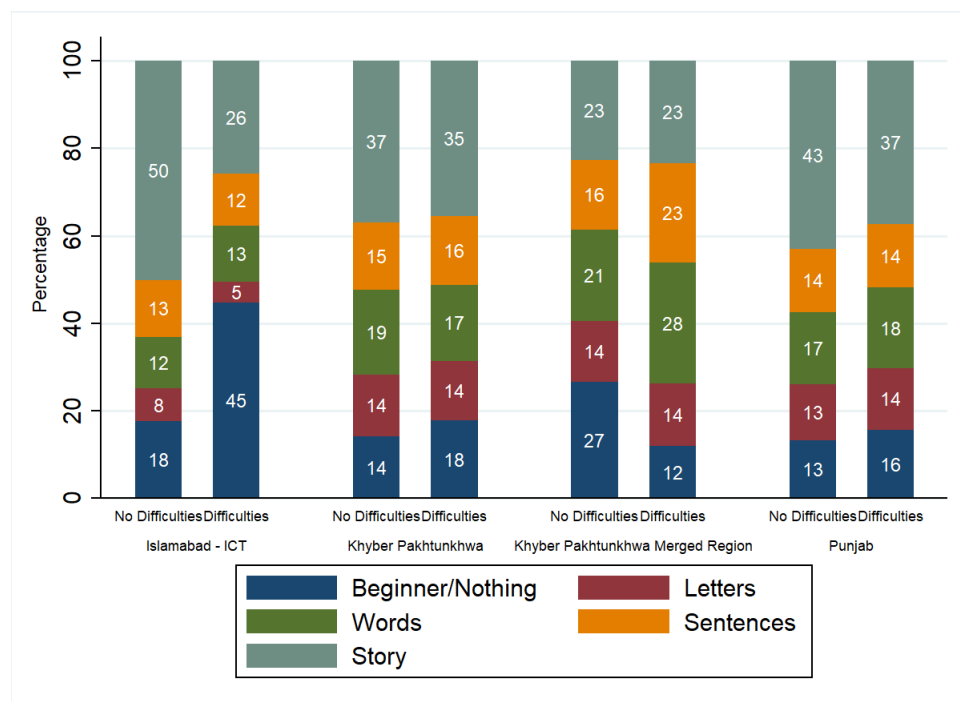
Source : Annual Status of Education Report (ASER) (2018) survey in Pakistan pertaining to 123,279 children in the Punjab, KPK, ICT and KPK Merged Region.

Figure 8: Local language outcomes of children with disabilities

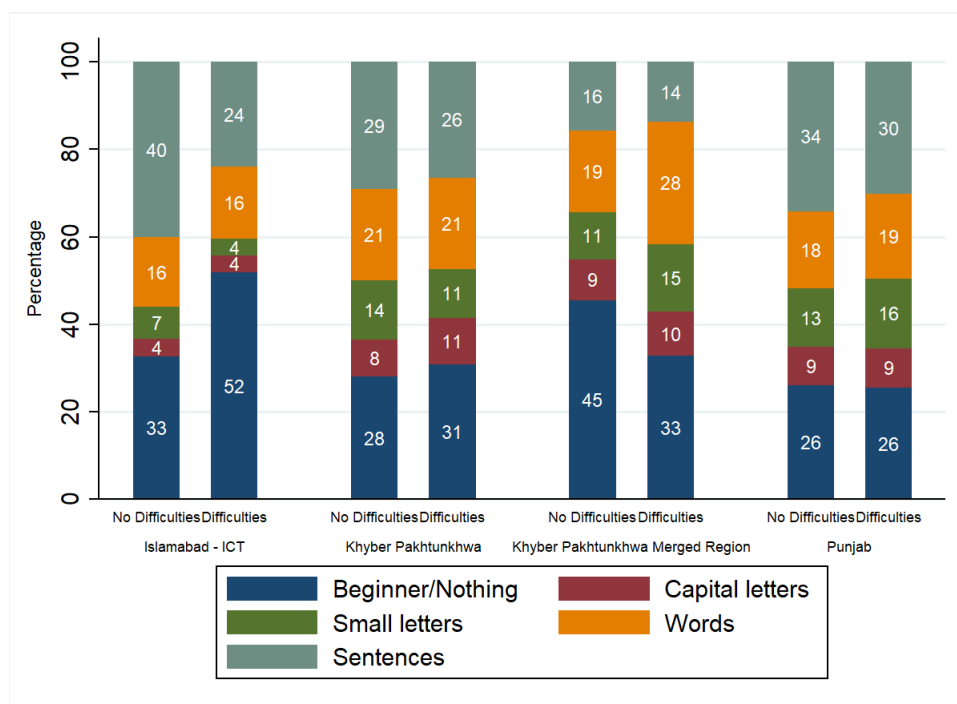Source : Annual Status of Education Report (ASER) (2018) survey in Pakistan pertaining to 123,279 children in the Punjab, KPK, ICT and KPK Merged Region.

Figure 9: English outcomes of children with disabilities

4 Empirical Strategy for multivariate analysis

4.1 Techniques for analysis

In this paper, over and above the descriptive representation of data in Annual Status of Education Report (ASER) (2018), we perform a multivariate analysis to identify the relationship between children with disabilities and their school enrolment and learning outcomes. Below, we provide the details on the empirical strategy employed for arriving at our results. Our research questions take the following form:

1. *School enrolment*

    - Does there exist a difference in the school enrolment of children with difficulties in different functioning domains, when compared to children with no such difficulties reported?

    - Is school enrolment different by the severity of difficulty?

2. *Learning outcomes* *(conditional to school enrolment)*

    - Does there exist a difference in the performance on numeracy and literacy assessments for children with difficulties in different functioning domains, when compared to children with no such difficulties reported?

    - Is there any difference in the learning outcome by the severity of difficulty?

4.2 Dependent Variables

For the first research question on school enrolment, we use a dummy variable **$Enrolment_{ij}$**, which is coded as **1** if the child is currently attending school, **0** if not attending.

For the second research question on learning outcomes, we have three different dependent variables related to **$Numeracy_{ij}$**, **$Literacy(local)_{ij}$** and **$Literacy\ (English)_{ij}$**. **$Numeracy_{ij}$** is coded as **1** if the child can recognise 1-9, 10-99, 100-200, subtraction and division; **0** if beginner or nothing. **$Literacy(local)_{ij}$** is coded as **1** if the child can read letters, words, sentences and story in the local language; **0** if beginner/nothing. And, **$Literacy\ (English)_{ij}$** is coded as **1** if the child can read capital letters, small letters, words, and sentences; **0** if beginner/nothing. Details on the dependent and independent variables used in this analysis are provided in Table A2 in the Appendix.

In order to perform analyses for school enrolment, we use a binary response regression model, i.e. the logit model with robust standard errors, which is in line with similar research studies (Kameyama, 2019; Lamichhane and Kawakatsu, 2015; Singal et al., 2020a). We present our results in the form of *odds of success* wherein success is defined as (i) enrolment in school, and (ii) being able to perform basic arithmetic and linguistic functions that have been defined before.

4.3 Independent Variables

The independent variables used to estimate the above mentioned dependent variables fall into three categories. First, individual characteristics like children's gender, age (in years), square of age and gender of the child. For family characteristics we use whether the parents of this

child have attended school themselves. Within the broad category of family characteristics we also look at the wealth of the household by dividing our sample into four quartiles based on the wealth index proposed by Annual Status of Education Report (ASER) (2018). The wealth index is created by integrating multiple household indicators. These indicators measure the assets possession and wealth status of a household. Details are provided in Table A3 in the Appendix.

5 Results and discussion

5.1 School Enrolment of children with difficulties in functioning - differences by administrative units

The first two columns of Table 3 show that children with difficulties in functioning aged 5-16 living in Punjab, KPK, KPK Merged Region and Islamabad administrative unit in Pakistan are more likely to be enrolled in schools when compared to children with no reported difficulties. These children have 11.2% higher odds of school enrolment relative to children without disabilities. These estimates are obtained after conditioning for age, gender, wealth, parental education and district controls. While this seems to be a counter-intuitive finding, it finds merit in our descriptive representation provided in Figure 4, where we see that the KPK Merged Region and Punjab report higher proportion of disabled children enrolled in schools. In case of KPK we find that disabled children have only 79.6% odds of being enrolled relative to children without disabilities.

To probe further, we provide estimates by dis-aggregating our main independent variable related to disability into three categories based on the severity of disability i.e. **mild, moderate and severe** disability. Across all administrative units except KPK Merged Region, we see that the difference in likelihood of being enrolled by a child suffering from severe disabilities is statistically significant. For instance, over the entire sample of 4 administrative units, children with severe disabilities have 42.4% of the odds of being enrolled in schools relative to children with no difficulties in functioning. On a administrative unit based analysis, we see that children with difficulties in Punjab have 57% odds, in KPK have 19.6% odds and in Islamabad have 34% odds of being enrolled when compared to children without any difficulties in these administrative units. When we look at the enrolment of children with mild difficulties the numbers are positive in case of Punjab and KPK Merged Region where we see that the enrolment is more likely by 48% and 83% respectively. In other words, while children with severe difficulties have a higher likelihood of being out of school, this likelihood is reversed in case of children with mild difficulties in comparison with their counterparts who do not report any functioning difficulties. Children with moderate difficulties do not show any significant relationship with school enrolment. The higher enrolment in case of children with mild difficulties could potentially be explained by two ideas. *First*, children with mild difficulties may not be engaged in other labour activities by their parents or care givers and hence report a higher enrolment rate. *Second*, parents or care givers may be more sensitive about the needs of children with mild difficulties and may ensure that these children are sent to school for attainment of better living conditions.

As shown by previous researchers (Lamichhane and Kawakatsu, 2015; Singal et al., 2020a) we also find that girls are less likely to enrol in schools compared to boys. We also find that children living in poor household categories, have a lower likelihood of enrolment when compared to children living in richer households. Individual characteristics like age are seen to be positively correlated with enrolment. The effect of parental education on school enrolment show that children with educated parents are more likely to enrol compared to children whose parents have never attended school.

Table 3: Determinants of school participation among children aged 3-16 years

	All regions		Punjab		KPK		Islamabad		KPK merged	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Any difficulty	1.112**		1.277**		0.796***		0.631		1.715***	
	(0.0598)		(0.127)		(0.0673)		(0.201)		(0.188)	
Mild Difficulty		1.252***		1.480***		0.849		0.704		1.838***
		(0.0806)		(0.173)		(0.0896)		(0.303)		(0.225)
Moderate Difficulty		1.131		1.376		0.932		1.483		1.749*
		(0.125)		(0.398)		(0.133)		(1.247)		(0.503)
Severe Difficulty		0.424***		0.569**		0.196***		0.340*		0.669
		(0.0766)		(0.136)		(0.0651)		(0.189)		(0.273)
Female	0.462***	0.462***	0.782***	0.783***	0.470***	0.470***	0.882	0.899	0.186***	0.185***
	(0.00942)	(0.00943)	(0.0246)	(0.0247)	(0.0166)	(0.0166)	(0.194)	(0.197)	(0.00811)	(0.00811)
Age	6.801***	6.804***	6.907***	6.909***	8.766***	8.788***	5.147***	5.126***	5.189***	5.184***
	(0.102)	(0.102)	(0.165)	(0.166)	(0.242)	(0.243)	(0.799)	(0.795)	(0.153)	(0.153)
Age^2	0.916***	0.916***	0.915***	0.915***	0.907***	0.906***	0.929***	0.929***	0.928***	0.928***
	(0.000704)	(0.000704)	(0.00112)	(0.00112)	(0.00126)	(0.00126)	(0.00758)	(0.00760)	(0.00143)	(0.00143)
Mother (schooled)	1.293***	1.294***	1.301***	1.305***	1.341***	1.339***	1.870**	1.857***	1.287***	1.286***
	(0.0324)	(0.0325)	(0.0487)	(0.0489)	(0.0562)	(0.0561)	(0.460)	(0.459)	(0.0891)	(0.0890)
Father (schooled)	1.389***	1.388***	1.359***	1.358***	1.223***	1.222***	3.854***	3.840***	1.670***	1.671***
	(0.0347)	(0.0347)	(0.0540)	(0.0540)	(0.0529)	(0.0529)	(0.994)	(0.992)	(0.0863)	(0.0863)
Wealth Quartiles										
Poorest	0.708***	0.707***	0.628***	0.628***	0.816***	0.816***	0.498*	0.516*	0.584***	0.583***
	(0.0239)	(0.0239)	(0.0343)	(0.0343)	(0.0471)	(0.0470)	(0.192)	(0.204)	(0.0519)	(0.0518)
Poor	0.853***	0.852***	0.874***	0.874***	0.848***	0.844***	0.376***	0.369***	0.752***	0.751***
	(0.0246)	(0.0245)	(0.0385)	(0.0385)	(0.0414)	(0.0412)	(0.109)	(0.108)	(0.0634)	(0.0633)
Richer	0.998	0.996	0.978	0.978	1.184***	1.178***	0.596*	0.580*	0.730***	0.729***
	(0.0302)	(0.0301)	(0.0399)	(0.0399)	(0.0669)	(0.0667)	(0.186)	(0.183)	(0.0646)	(0.0646)
Constant	4.395***	4.394***	4.393***	4.390***	3.688***	3.688***	8.222***	8.222***	2.831***	2.847***
	(0.281)	(0.281)	(0.280)	(0.280)	(0.219)	(0.219)	(0.750)	(0.750)	(0.166)	(0.166)
Observations	118,977	118,977	56,413	56,413	40,520	40,520	1,355	1,355	20,689	20,689

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1. All estimates are obtained after incorporating district fixed effects.

5.2 Type of school attended

Table 4 shows stark differences in the enrolment of children with difficulties into government, private or religious schools.

Punjab

Children aged 5-16 living in Punjab administrative unit in Pakistan who were reported as having mild disabilities, have higher odds (by 24%) of being enrolled in government schools. These odds are lower for children with severe difficulties. There are several studies pertaining to the province of Punjab where it is shown that parents' willingness to pay for private schooling (even in rural areas) is rising, however, this seems to be not true for children with difficulties in functioning. In Punjab, children with mild difficulties have lower likelihood to be enrolled in private schools compared to children with no difficulties.

KPK

Earlier researchers Christine Fair (2007); Dorronsoro (2012) have noted that Madrasahs are mainly concentrated in Baluchistan and KPK administrative units of Pakistan. However, in recent times, KPK and KPK Merged Region exhibited opposite trends in enrolment, at least in terms of early childhood education (ECE) indicators. It is noted by Annual Status of Education Report (ASER) (2018) that in KPK and FATA, ECE enrolment in government schools has gone up from 46% to 67%, while this has come down from 55% to 33% in non-state (private, Madrasah and other types of schools). This finding by Annual Status of Education Report (ASER) is echoed by our results in case of KPK for government schools. However, we must remember that our results pertain to only disabled children. We find that children with moderate difficulties in the KPK region have higher likelihood of being enrolled in private schools or Madrasahs.

KPK Merged Region

We find that in KPK Merged Region, enrolment of children with mild difficulties in private and religious schools (madrasahs) is higher relative to children with no difficulties. Previous government reports through communities focused group discussions suggest that parents have positive perception on the quality of private school in terms of teachers presence, facilities, subject taught. Whereas, government schools are associated with a lack of quality and facilities(Secretariat, FATA, 2013). Parents who can afford the tuition fees prefer to send their children to private schools.

Islamabad - ICT

In the case of Islamabad, we can see that children with mild as well as moderate levels of difficulty have lower odds of being enrolled in government schools. The capital administrative unit, which is urban may have a higher proliferation of private schools, and parents of a ward with disabilities maybe better equipped financially to invest in other forms of education - private or home tutoring. However, we do not find any statistically significant result with respect to other types of schools in Islamabad.

School choice literature has evidenced that students in private schools are characterised by more educated and financially better off families who are able to invest in their education (Aslam, 2007; Nguyen, 2019; Singal et al., 2020a). However, we see that atleast for children with mild difficulties, government schools seem to be preferred by parents. This could indicate a recent amelioration in quality of schools where parents feel confident of sending their wards with special needs. On the other hand, this could also mean that parents with disabled children (who mostly come from poorer households as evidenced in Table 3) cannot invest in their children's education. In both cases, a policy implication that raises its head is that government schools need to better

Table 4: Determinants of school participation among children aged 3-16 years, by type of school

VARIABLES	Punjab			KPK			KPK merged region			Islamabad - ICT		
	Govt (1)	Pvt (2)	Madrasah (3)	Govt (4)	Pvt (5)	Madrasah (6)	Govt (7)	Pvt (8)	Madrasah (9)	Govt (10)	Pvt (11)	Madrasah (12)
Mild difficulty	1.240***	0.848**	1.231	1.283***	0.619***	1.921***	0.941	1.747***	1.570**	0.484**	1.174	2.956
	(0.0869)	(0.0713)	(0.471)	(0.0889)	(0.0568)	(0.430)	(0.0942)	(0.227)	(0.291)	(0.149)	(0.294)	(3.477)
Moderate difficulty	1.080	1.079	1.207	0.737***	1.377**	4.632***	1.079	1.633**	1.344	0.676	1.805	
	(0.178)	(0.211)	(1.225)	(0.0723)	(0.195)	(1.901)	(0.250)	(0.404)	(0.629)	(0.424)	(0.901)	
Severe difficulty	0.754*	0.751	1.886	0.693	0.441**		0.702	1.005	0.862	0.0765**	1.303	
	(0.122)	(0.144)	(1.141)	(0.173)	(0.166)		(0.267)	(0.466)	(0.921)	(0.0817)	(0.605)	
Female	0.923***	0.953**	0.888	0.727***	0.791***	1.126	0.353***	0.382***	1.379***	1.426***	0.749**	0.609
	(0.0179)	(0.0213)	(0.0941)	(0.0174)	(0.0233)	(0.113)	(0.0125)	(0.0247)	(0.135)	(0.175)	(0.0887)	(0.415)
Age	2.347***	1.478***	1.249***	2.905***	1.712***	1.691***	3.266***	1.832***	1.522***	2.025***	1.092	2.847
	(0.0305)	(0.0228)	(0.0880)	(0.0456)	(0.0331)	(0.118)	(0.0776)	(0.0728)	(0.0993)	(0.171)	(0.0888)	(2.083)
Age^2	0.962***	0.978***	0.994*	0.952***	0.974***	0.979***	0.944***	0.973***	0.983***	0.970***	0.993*	0.955
	(0.000654)	(0.000829)	(0.00344)	(0.000787)	(0.00102)	(0.00349)	(0.00122)	(0.00206)	(0.00345)	(0.00426)	(0.00429)	(0.0302)
Mother (schooled)	0.843***	1.597***	0.827	0.932**	1.507***	0.405***	1.057	1.541***	0.360***	0.930	1.551***	0.351
	(0.0199)	(0.0438)	(0.115)	(0.0264)	(0.0491)	(0.0560)	(0.0634)	(0.118)	(0.0831)	(0.138)	(0.224)	(0.229)
Father (schooled)	1.060**	1.201***	0.902	0.943**	1.479***	0.902	1.305***	1.481***	1.175	1.811***	1.068	
	(0.0259)	(0.0342)	(0.121)	(0.0266)	(0.0524)	(0.0973)	(0.0557)	(0.104)	(0.137)	(0.319)	(0.177)	
Wealth Quartiles												
Poorest	0.937*	0.649***	1.888***	1.355***	0.458***	2.721***	1.106	0.326***	0.673*	1.231	0.564***	1.738
	(0.0317)	(0.0272)	(0.316)	(0.0533)	(0.0227)	(0.481)	(0.0857)	(0.0330)	(0.159)	(0.262)	(0.112)	(2.009)
Poor	1.083***	0.786***	1.649***	1.508***	0.489***	1.679***	1.139*	0.502***	1.152	1.988***	0.354***	4.004
	(0.0292)	(0.0246)	(0.229)	(0.0505)	(0.0194)	(0.289)	(0.0841)	(0.0437)	(0.240)	(0.306)	(0.0532)	(3.394)
Richer	1.103***	0.811***	1.273	1.310***	0.783***	1.071	1.086	0.609***	0.593**	1.411**	0.635***	0.984
	(0.0287)	(0.0243)	(0.196)	(0.0507)	(0.0330)	(0.218)	(0.0861)	(0.0581)	(0.152)	(0.231)	(0.0997)	(1.310)
Constant	0.0333***	0.0463***	0.00118***	0.00731***	0.0266***	0.000877***	0.00425***	0.0348***	0.00182***	0.00821***	0.794	4.90e-05**
	(0.00273)	(0.00471)	(0.000564)	(0.000748)	(0.00314)	(0.000376)	(0.000591)	(0.00686)	(0.000765)	(0.00351)	(0.302)	(0.000206)
Observations	52,069	52,069	52,069	36,474	36,474	34,072	19,490	16,616	18,219	1,302	1,302	1,016

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1. All estimates are obtained after incorporating district fixed effects.

equip themselves for the needs of differently-abled children since they receive them in higher numbers in Punjab and KPK.

5.3 Learning assessment of children in literacy and arithmetic

In this sub-section, we focus our attention on learning outcomes or performance of children who are enrolled in schools. With the results presented in Table 5, we find that children with moderate difficulties have lower odds of being able to perform single digit number recognition than children without reported difficulties. This finding is also applicable on being able to recognise the alphabet in local and English language.

However, when we look at evidence from administrative unit based sub-samples, we see that amongst school going children in Punjab and Islamabad-ICT, there is no difference in the numeracy and literacy levels of children with and without difficulties in functioning. In the KPK Merged Region, children with mild difficulties have better odds of single digit arithmetic recognition and alphabet recognition, when compared to their counterparts with no difficulties. This is an interesting and encouraging result for children with disabilities, and is in line with what (Singal et al., 2020b) find for children with mild disabilities in Punjab administrative unit based on Annual Status of Education Report (ASER) data pertaining to 2015.

6 Conclusion and Policy Implications

Despite the worldwide increase in school enrolment and efforts to include children with disabilities in the education system, Pakistan is still lagging in enrolling its children in school. The education system in Pakistan, especially in the border administrative units that have had a history of conflict and insurgence, is fraught with problems like low quality of teaching and learning. The issue of access and quality of education remain prominent in the context of rural Pakistan. Keeping in view the education crisis in Pakistan, the debate of including children with disabilities is not even part of the national discourse (Arsh and Darain, 2019; Singal, 2016; Singal et al., 2020a).

With that backdrop, our paper is an investigative study into the determinants of school enrolment of children in four administrative units of Pakistan with a focus on children with difficulties in functioning domains. We use a large sample drawn from the Annual Status of Education Report (ASER) (2018) survey, which drew heavily on questions framed by the Washington Group (Altman, 2016; Madans et al., 2011) which have been cognitively tested in different countries. We acknowledge that it is not possible to generalise our findings to other parts of Pakistan where access to schools and performance of children in numeracy and literacy could be lower. However, our sample includes two administrative units that are more urban (Punjab and Islamabad) and two that are relatively more rural (KPK and KPK Merged Region). The prevalence of education and infrastructure availability in these administrative units is quite diverse and hence makes an interesting comparative study.

We examined two important metrics of education : *school enrolment* and *learning performance* of children with disabilities. Our findings suggests that children with severe difficulties in functioning are less likely to enrol in school compared to children without difficulties. However, in case of children with mild difficulties, this result is positive as children with mild difficulties are more likely to enrol in schools, when compared to their peers who report no difficulty. A plausible explanation for this *counter-intuitive phenomenon* could be that children with mild difficulties are excluded from labour force and may have higher likelihood to enroll in schools. Parents or care-takers may not consider them productive in employment or house-work, and

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Table 5: Learning outcomes of school going children aged 3-16 years

	All regions		Punjab		KPK		Islamabad		KPK merged	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Arithmetic learning										
Any Difficulty	0.936		0.955		0.778**		1.391		1.236	
	(0.0689)		(0.121)		(0.0887)		(0.555)		(0.247)	
Mild Difficulty		1.023		0.930		0.882		1.795		1.567*
		(0.0944)		(0.128)		(0.143)		(0.889)		(0.395)
Moderate Difficulty		0.769**		1.182		0.659**		0.910		0.673
		(0.0979)		(0.421)		(0.108)		(0.728)		(0.232)
Severe Difficulty		0.869		0.771		0.896		0.751		0.896
		(0.305)		(0.422)		(0.725)		(0.890)		(0.636)
Local Language learning										
Any Difficulty	0.915		0.919		0.704***		1.079		1.610**	
	(0.0662)		(0.114)		(0.0801)		(0.415)		(0.329)	
Mild Difficulty		1.072		0.999		0.820		1.264		2.204***
		(0.0980)		(0.139)		(0.132)		(0.578)		(0.578)
Moderate Difficulty		0.671***		0.674		0.591***		0.791		0.859
		(0.0856)		(0.204)		(0.0987)		(0.659)		(0.322)
Severe Difficulty		0.584*		0.571		0.435*		0.739		0.667
		(0.176)		(0.297)		(0.210)		(0.844)		(0.424)
English Language learning										
Any Difficulty	0.913*		0.942		0.852*		1.504		0.968	
	(0.0502)		(0.0908)		(0.0724)		(0.524)		(0.118)	
Mild Difficulty		0.955		0.940		0.898		1.540		1.059
		(0.0632)		(0.0995)		(0.101)		(0.617)		(0.149)
Moderate Difficulty		0.773**		0.883		0.728**		1.140		0.800
		(0.0777)		(0.223)		(0.0934)		(0.940)		(0.198)
Severe Difficulty		1.068		1.235		1.457		1.929		0.454
		(0.289)		(0.582)		(0.768)		(2.157)		(0.229)
Observations	74,565	74,565	38,152	38,152	24,997	24,997	887	887	10,529	10,529

Robust standard errors in parentheses. Odds ratio for other independent variables are not shown here to conserve space.
*** p<0.01, ** p<0.05, * p<0.1. All estimates are obtained after incorporating district fixed effects.

they may be considered 'better off' going to school.

We find that gender and wealth are significant determinants of school enrolment in these administrative units of Pakistan. Girls are less likely to enrol compared to boys. Further, our results suggest that regardless of disability status children living in poorer household are less likely to enrol compared to children from richer households. Our results are consistent with previous studies (Lamichhane and Kawakatsu, 2015; Mitra, 2017; Singal et al., 2020b) which found similar results in context of Pakistan (Punjab) and Bangladesh.

Our second finding is regarding the performance of children with the category of disability faced. We find that children with moderate difficulties lag behind children with no reported difficulties across all the disability types. We find that children with mild difficulties in the KPK Merged Region perform better than their peers with no reported difficulties on numeracy and local language literacy. Our results highlight the importance of focus on quality of educational experience depending on the specific needs of children with disabilities by severity of difficulty faced. Including children with difficulties needs organic reforms customised to the needs of children with different types of difficulties faced.

With the aforesaid findings, our paper has three major policy implications.

First, this study has highlighted the urgent need for collection of disability related data from all provinces and administrative units of Pakistan. This data collection must focus on timeliness, reliability and high-quality data in order to track progress on the achievement of key Sustainable Development Goals set out by international agencies monitoring development. Through the experiences of smaller scale studies conducted by Singal et al. (2020a), it is evident that capturing of information on children with difficulties in functioning is feasible and data collectors can be trained to collect this information accurately.

Second, our findings reveal that disable children are accessing schools, specially, if the difficulty based by them is mild. In this scenario, it becomes critical that schools are focus on improving the quality of learning. This can be achieved through targeted teacher training; sensitisation of care-givers, parents, and the community as a whole; and betterment of infrastructure and facilities to cater to the need of children with functioning difficulties. We argue through our findings that since more disabled children are enrolling in schools, the focus of the government and local bodies must now shift to improving education quality as well as the complete education experience for these children as well as their parents.

Third, our results have shown that children with severe difficulties are less likely to enrol in schools. This gives rise to the need for specialised institutes that can cater to the educational and development needs of these children.

In conclusion, this study has thrown light on the fact that contrary to common perceptions, a large proportion of children with functioning difficulties are in mainstream schools. Therefore, in a country like Pakistan, including children with difficulties warrants methodical reforms in the education system, which are significant inputs to the achievement of the larger goals of equitable and sustainable development.

<div align="center">***</div>

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Appendix

Table A1: Timeline of national policies and legislation supporting persons with disabilities in Pakistan

Year	National policies and legislation
1981	The Disabled Persons' (Employment and Rehabilitation) Ordinance
2002	National Policy for Persons with Disabilities
2006	National Plan of Action
2006	Accessibility Code of Pakistan
2008	Special Citizens' Act
2008	National Youth Policy
2009	National Education Policy of Pakistan
2010	Import of Duty-Free Car for Disabled Persons
2011	Ratification of UNCRPD
2014	Accessible Banking Infrastructure for Special Persons
2014	Guidelines for Banking Services to Visually Impaired/Blind Persons
2017	The Balochistan Persons with Disabilities Act
2018	Sindh Empowerment of Persons with Disabilities Act
2018	The ICT Rights of Persons with Disability Act
2019	State Bank of Pakistan concessionary financing facility

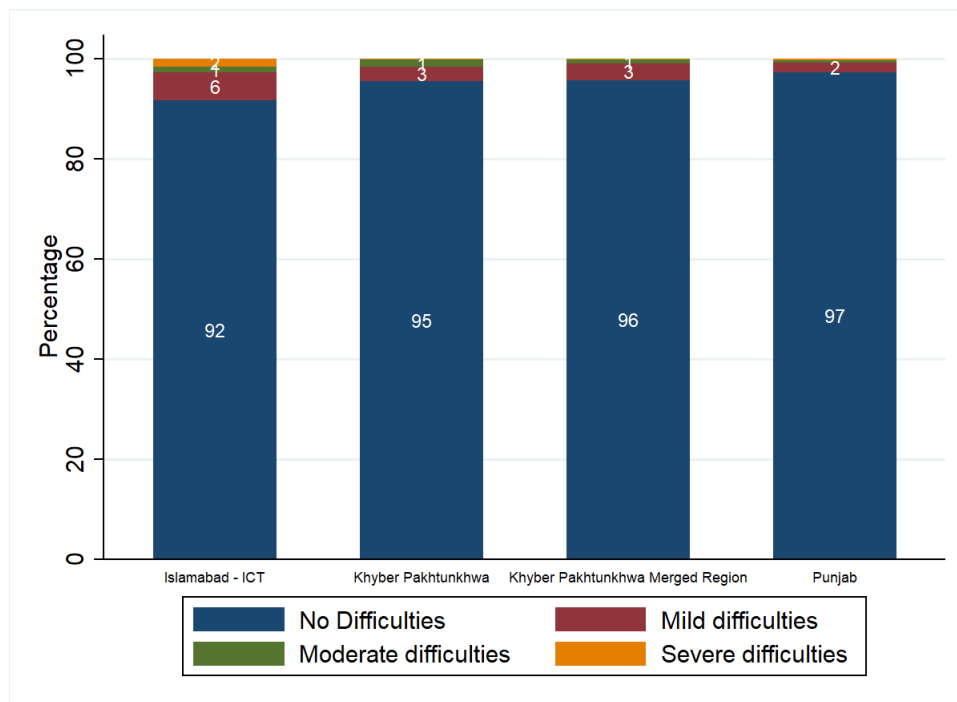Based on Roman et al. (2014) and updated further by authors.

Figure A1: Prevalence of disability by regions and severity in Pakistan

Table A2: Description of Variables

Variable	Definition
Dependent variable	
Enrolment	Binary : 1 if child is currently enrolled in school; 0 if either never enrolled or dropped out of school
Numeracy	Arithmetic levels: 1 if the child can recognise 1-9, 10-99, 100-200, subtraction and division; 0 if beginner or nothing
Literacy - Local language	Basic Learning Levels: Reading in Local/National language. 1 if the child can read letter, words, sentences and story; 0 if beginner/nothing.
Literacy - English	Basic Learning Levels: Reading in English language. 1 if the child can read capital letters, small letters, words, and sentences; 0 if beginner/nothing.
Independent variable	
Individual characteristics	
Any difficulty	Binary : 1 if any difficulty; 0 if no difficulty
Mild difficulties	Binary : 1 if mild (some) difficulty reported; 0 otherwise
Moderate difficulties	Binary : 1 if moderate (lot of difficulty); 0 otherwise
Severe difficulties	Binary : 1 if severe (cannot see/hear/walk/self-care/remember at all); 0 otherwise
Gender	Binary : 1 if female; 0 otherwise
Age	Child's age
Family characteristics	
Mother attended school	Binary : 1 if mother attended school; 0 otherwise
Father attended school	Binary : 1 if father attended school; 0 otherwise
Wealth Index	Wealth index created from different household components; Is house own? Type of house; katcha, semipucca, and pucca. Is electricity available? Is TV available? Is mobile phone available?
Wealth Quartiles	Wealth quartiles created from wealth index;
Poorest	Binary : 1 if it falls in the lowest wealth quartile; 0 otherwise
Poor	Binary : 1 if it falls in the second lowest wealth quartile; 0 otherwise
Richer	Binary : 1 if it falls in the second highest wealth quartile; 0 otherwise
Richest	Binary : 1 if it falls in the highest wealth quartile; 0 otherwise

Source: Annual Status of Education Report (ASER) (2018).

Table A3: Household Indicators for calculation of Wealth Index

No.	Variable	Type	Description
1	House Type	Categorical	Kutcha (Mud) = 1 Semi-Pucca (Partially cemented/ bricked) = 2 Pucca (Cemented/bricked) =3
2	House Owned	Binary	1 if the house is owned, 0 otherwise
3	Electricity	Binary	1 if the household has electricity connection, 0 otherwise
4	Television	Binary	1 if the household has a television, 0 otherwise
5	Mobile Telephone	Binary	1 if the household has a mobile phone, 0 otherwise
6	Computer	Binary	1 if the household has a computer/laptop/tablet, 0 otherwise
7	Motor Vehicle	Binary	1 if the household has atleast 1 motor vehicle (car/ motorcycle), 0 otherwise

Source: Annual Status of Education Report (ASER) (2018)