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THE QUALITY OF LIFE OF YOUTH WITH DISABILITIES
IN EGYPT WITH SPECIAL FOCUS ON
EDUCATIONAL ACHIEVEMENT

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Working Paper No. 1215

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Abstract

Although youth with disabilities represent a heterogeneous group with respect to disability domain and degree of severity they are disadvantaged in almost all dimensions of the quality of life. The aim of this research is to examine the impact of disability among youth on one dimension of the quality of life which is education opportunities by using data of the nationwide survey "Household Observatory Survey, round 13, 2016," that was conducted by the Egyptian Cabinet Information and Decision Support Center (IDSC). Our study population consists of 12,651 individuals in the age group 15-29 years. The used data implemented the suggestion of UN-WG short list of questions to measure disability. Results showed that the prevalence rates of any, severe and complete disabilities among youth are 4.8%, 1.7% and 0.8%, respectively. The most common domain of severe disability among youth is communicating followed by remembering and concentration. The study applied random effect logit model to examine the impact of disability among youth on the likelihood of attending school, controlling for the other factors and the results suggested that disability has the strongest deterrent impact on school enrollment and interacts with the individual's standard of living in a way that exacerbates inequity. On the other hand, the results of the sequential transition model indicated that although disability tremendously reduces the chance of school enrollment its effect on continuing education to preparatory and to secondary is weakened and turns out to be statistically insignificant, signifying that once a disabled child is enrolled in education, s(he) is capable of continuing education. Additionally, gender, region of residence, parental level of education and family wealth significantly impact the educational opportunities of Egyptian youth.

JEL: I31, I14, I24, J13.

Keywords: Youth with disabilities, educational opportunities, random effect model, sequential logit model, concentration index, gender, parental education and poverty.

مخلص

على الرغم من أن الشباب ذوي الإعاقة يمثلون مجموعة غير متجانسة فيما يتعلق بنوع الإعاقة ودرجة حدته، إلا إنهم يعانون من الحرمان في العديد من نواحي الحياة. وتهدف الورقة إلى دراسة تأثير الإعاقة بين الشباب على أحد الأبعاد الهامة لجودة الحياة وهي فرص الالتحاق بالتعليم، باستخدام بيانات "مسح مرصد الأسرة المصرية، الدورة رقم (13) سنة 2016"، وهو مسح ممثل على المستوى القومي، قام بتنفيذه مركز المعلومات ودعم اتخاذ القرار بمجلس الوزراء المصري (IDSC). وتبلغ عينة الدراسة 12651 فرداً في الفئة العمرية 15-29 عاماً. وقد تبني المسح قائمة الأسئلة المستندة إلى التعريفات الموصى بها دولياً، حيث تم الالتزام بمجموعة الأسئلة الموجزة التي أعدها فريق واشنطن المعني بإحصاءات الإعاقة. وتشير النتائج أن معدلات انتشار أي نوع من الإعاقات بين الشباب تبلغ 4.8% بينما تبلغ 1.7% و 0.8% للإعاقات الشديدة والتامة على التوالي. وتعتبر أكثر أنواع الإعاقات الشديدة انتشاراً بين الشباب هي "التواصل مع الآخرين" يليها صعوبات التذكر. وقد تم تطبيق Random effect logit model لدراسة تأثير الإعاقة بين الشباب على احتمال الالتحاق بالمدرسة، مع ثبات العوامل الأخرى، وقد أظهرت نتائج النموذج إلى أن الإعاقة لها تأثير قوى على الالتحاق بالتعليم، ويوجد تفاعل مع مستوى معيشة (مؤشر الثروة) مما يزيد من فرص عدم المساواة. من ناحية أخرى، أشارت نتائج نموذج Sequential transition model إلى أنه على الرغم من أن الإعاقة تقلل بشكل كبير من فرص الالتحاق بالتعليم، إلا أن تأثيرها على استكمال مراحل التعليم والانتقال إلى مرحلة التعليم الإعدادي ثم الثانوي كان ضعيف وغير معنوي، مما يدل على أنه بمجرد أن يلتحق الطفل المعاق بالتعليم، يكون قادر على مواصلة التعليم. بالإضافة إلى ذلك، فإن النوع ومحل الإقامة، ومستوى تعليم الأبوين، ومؤشر الثروة كانوا أكثر المتغيرات التي تؤثر على فرص التحاق الشباب بالتعليم.

1. Introduction

According to World Health Organization's (WHO) International Classification of Functioning, Disability, and Health (ICF) (2001), "Disability is an umbrella term for impairments, activity limitations and participation restrictions. It denotes the negative aspects of the interaction between an individual (with a health condition) and that individual's contextual factors (environmental and personal factors)." And according to the Convention on the Right of Persons with Disabilities (CRPD -2007), "persons with disabilities include those who have long-term physical, mental, intellectual, or sensory impairments which in interaction with various barriers may hinder their full and effective participation in society on an equal basis with others."

Individuals living with disability amount to an estimated one Billion worldwide- or 15% of the world population, (WHO 2011), about 180-220 million of whom are youth in the age group 15-24 (UN-DESA 2013). These numbers are on the rise due to the increasing toll of road accidents, involvement of youth in violence, risky behavior, wars and conflicts, (UN-DESA 2013).

Although youth with disabilities although represent a heterogeneous group with respect to disability domain and degree of severity they are underprivileged in almost all dimensions of the quality of life. They are likely with varying degree to be deprived of enabling opportunities that impact not only their daily experiences but also, and most importantly, the remainder of their adult lives. They are more likely than their peers without disabilities to be deprived of education, according to UNESCO estimates, the global literacy rate for those with disability is 3% (Groce 1999), and to be deprived of economic opportunities, to live in poverty, to be highly dependent on other family members or government welfare, and to suffer from ill-equipped health care systems. They face marginalization, exclusion, isolation, lack of sexual relationships and abuse (UN-DESA 2013). Individuals with disabilities have worse health and socioeconomic outcomes which are avoidable and the disadvantages associated with it can be overcome, (WHO 2015). Disability disproportionately affects vulnerable populations (e.g., the poor, women, and the older people) and is more likely to be concentrated in lower income countries than higher income countries.

Although 80% of people with disabilities reside in less developed countries (LDCs), literature concerned with LDC populations with disabilities in general and youth with disabilities in particular is scarce, with Egypt being no exception. This is mainly due to the dramatic variation in definitions of disability, difficulties in data collection, and methods of data collection which are chiefly cross-sectional, (UN-ESCAP, 2014; Mitra et al., 2011; Filmer, 2008; Mont 2007). Shortage and inadequate data on individuals with disabilities, on one hand, and negligence of studying their living circumstances and level of wellbeing on the other hand, are enforcing each other in a vicious circle.

For decades, censuses and surveys collected information on disability using the question: "*Do you have a disability?*" Using this question led to severe under estimates of its level. As

disability is often associated with stigma (has very negative connotations particularly if it is mental or psychological) and people may perceive the term disability refers to the most severe limitations, (UN-ESCAP, 2014). For instance, the estimated prevalence of disability in the Arab countries ranges from 0.4% (Qatar) to 4.9% (Sudan) (UN-ESCWA 2014) and in Egypt according to census 2006, the estimated level among the Egyptian population is 0.7%. According to the Panel Survey of Young People (SYPE 2009), the estimated rate among the age group 10-29 in Egypt is 1.3% and 1.1% is obtained among the age group 13-35 from SYPE 2014 (Population Council 2010 & 2015). These low estimated levels of disabilities as well as the lack of the basic information on the level of severity, date of onset, and cause of disability have hampered conducting studies that aim to develop a precise and accurate map of disability in Egypt according to domain and level of severity and according to factors such as; sex, age, region of residence and socio-economic background. Furthermore, it hindered thoroughly identifying the risk factors, measuring the quality of life of individuals with disabilities, and rigorously assessing the level of discrimination based on disability.

Most of research that has been conducted in Egypt focused on specific groups of disabled individuals; namely: blind, mute and deaf/mute, mental disorder, amputation of one limb or of more than one limb/ unable to use one limb or more than one limb and paralyzed lower limb or paralyzed all four limbs¹. The majority relied on small samples or used qualitative techniques with the aim to identify reasons of disability and its consequences on the quality of life of the disabled and their families (El-Sayed 2009) as well as to recognize the disabled's needs, the problems they are facing and the rehabilitation programs and services available to them. Some research scrutinized disability among children (Isaac 2006; Foaad, 2001), among youth (Saleh 2005; Kamel 2003)².

A most recent study conducted in Egypt, (Nagy 2013), aimed to provide a profile of the disabled population; prevalence rate by type and cause and the demographic and socio-economic characteristics of the disabled (sex, age, region of residence, level of education, work status, and occupation). Moreover, it aimed to identify the factors that impact disabled people's likelihood of holding a job, that influence their educational achievement and level of wealth. The factors that have been examined include; types and causes of disability, sex, age and region of residence, (Nagy 2013). Nagy analyzed three data sets: the published data of 1996 and 2006 censuses, as well as a 10% sample of the census 2006 raw data and data of a nationwide survey, "Social contract survey in 2005" (SCS 2005), that has been carried out by the Egyptian Cabinet Information and Decision Support Center (IDSC). The reported rates of disability according to the 1996 census, 2006 census and SCS 2005 are 0.48%, 0.65% and 1.9%, respectively. Nagy (2013) finds that the most prevalent types of disability were those related to mobility - amputation of one limb or of more than one limb, unable to use one limb or more than one limb and paralyzed lower limb or paralyzed all four limbs- 34%-45%, followed by those related to

¹ These five categories of medically based diagnoses of disability have been measured in Egypt censuses for decades.

² For comprehensive review (see, Nagy, 2013).

limitations in mental functioning, 16.7%-22.4%, (see Appendix A). The major drawback of this study is that in its effort to identify the factors that impact the disabled's likelihood of holding job, his/her educational achievement and level of wealth it focused only on the population with disability and neglected the comparable group of people without disability.

It is important to note that the two types of disability: blindness, mute and deaf/mute, as measured in Egypt censuses (Appendix A) measure complete disability while the other three types most probably designate severe to complete disability.

Recently the final results of Egypt 2017 census have been published. Disability among population aged 5+ years has been measured based on the recommended short list of six questions of UN Washington Group on Disability Statistics (WG), (WG 2009) (see Appendix B). The reported rate of disability is 10.67%.

The paper is organized in the following sections. The introduction provides the study's main objectives and the proposed conceptual framework and its hypotheses. Section two describes data sources and methodology. Section three includes three sub-sections. The first estimates level of prevalence of disability overall and by domain and level of severity among youth and the total sample population. The second delivers descriptive statistical analysis of the background characteristics of youth with disability as well as estimates of the level of socio-economic inequity in the distribution of disability burden. Sub-section three conducts descriptive analysis of the demographic and socio-economic differentials of the likelihood of attending school among youth by disability status and its degree of severity. It also estimates the level of socio-economic inequity in school enrollment among youth with and without disability. In section four we conducted multivariate statistical analysis to estimate and assess the impact of disability on the probability of attending school and on educational achievement controlling for the different proposed factors. Finally, we conclude in section five.

1.1 Research objectives

The main objective of this paper is to fill a gap in the empirical research in Egypt on the impact of disability on the quality of life of youth with disability and the level of socio-economic inequity they are living with. Specifically, taking into account that youth with disability are not a homogenous group and their vulnerabilities vary according to domain and severity of their impairment, the study aims to:

- 1) Provide a profile of youth with disability, including; the most prevalent domains of disability and their level of severity, the patterns of disability by demographic and socio-economic characteristics.
- 2) Measure the socio-economic inequity in the distribution of the burden of disability.
- 3) Measure the socio-economic inequity in school enrollment among youth with and without disability.

- 4) Assess the extent to which disability impacts school enrollment and level of educational attainment.

The study focuses on youth population of the age group 15-29.

1.2 Conceptual framework and hypotheses

Well-being and quality of life are broad concepts that include several dimensions; income and wealth, jobs and earnings, housing, health status, work and life balance, education and skills, social connections, environmental quality, personal security and subjective well-being, (OECD 2013). Education is the heart of it. Investment in education, from the prospective of the human capital approach, has positive effects on the individual level and on the societal level (Bonal 2007). However, from the human development and human right approach which views human beings “never merely as means, but in every case at the same time as ends in themselves” (Tilak 2002, pp: 195), investment in education is a human right whether or not people are engaged in economic production activities. Education empowers people while education poverty is itself a capability poverty - a denial of choices and opportunities (Tilak 2002).

Several studies systematically showed that youth with disabilities, especially if disabilities occur during childhood, run a high risk of not attending schools and a high risk of dropping out of education, (Filmer, 2005; Filmer 2008, Eide and Kamaleri 2009, UN-DESA 2013) leading to restricted opportunities for employment and income generation. Filmer (2008, pp:159) find that in the 14 developing countries under study, school gap between children with and without disability is high, it ranges from 0.18 – 0.70 among the disabled and between 0.35-0.95 among those without disability (Filmer 2008, pp:153). Youth with disability face lack of inclusive educational systems on the one hand. On the other hand, the available educational institutions fall short of providing appropriate facilities; the necessary accommodations or assistive devices for students with disability. Teachers and school personnel lack sensitization, awareness-raising, and capacity building and appropriate teaching programs (UN-DESA 2013). Furthermore, the perceived low return on investment in the education of youth with disability discourages families, especially the poor, from enrolling their children with disability in school (Mitra et al. 2011). The deterrent impact of disability among youth on their school enrollment and school achievement would become strong as its level of severity increases.

The likelihood of attending school and continuing education is additionally impacted by several demographic, cultural, socio-economic, and environmental factors (on the individual, household and community levels). Further, disability is hypothesized to be effect modifier, i.e., interacts with these factors in their influencing the chance of education in such a way that further reduces the chance of education or exacerbates inequalities (Filmer 2005 and Filmer 2008). Additionally, the intensity of the impact of disability may become stronger as disability degree of severity increases, irrespective of its domain.

Disability, on the other hand, is assumed to be influenced by some factors that impact schooling notably; level of wealth, parents' level of education, son preference, and residence³, as summarized in Figure (1).

With regard to the pathways through which the several demographic, cultural, socio-economic, and environmental factors - depicted in Figure (1) influence schooling, the conceptual framework proposes the following: in societies that favor men, more women than men are denied education (See El-Saadani 2012; Ismail et al. 2016). Additionally, this **gender** gap is presumed to be exacerbated among females with disability as families may be reluctant to allocate resources to their education. Son preference, on the other hand, may influence investing in girls' health in comparison to boys'; producing girls with poor health who might develop a disability.

Evidently, disability rises with **age**. Disability among youth (if it has not occurred during their childhood) is likely to be caused by their involvement in risky behavior, violence, injuries caused by road accidents and wars. Nevertheless, we expect not much age differentials in the risk of disability among youth due to their short age span (in our study; 15-29). On the other hand, younger age cohorts (15-19) may experience rises in communities' health and educational services, especially those provided to the disabled, that were not available to the older cohorts (25-29). Yet, in this short time span (15 years) notable increase in the likelihood of attending school among younger cohorts in comparison to older ones is less likely to be achieved.

Child's birth order: we expect that a child of a higher birth order, especially if unwanted and a female child, is less likely to be enrolled in school or to continue education. But on the other hand, among poor families and in rural settings, the first child particularly a female child is more likely to drop out of education. This is in order to help parents in taking care of their younger offspring and doing the house chores. First male child is also expected to withdraw in order to hold an income generating job.

Child labor: children of poor and/or uneducated parents and of disrupted families (particularly the poor) are more vulnerable to participate in income generating jobs and are less likely to be in school or to continue their education if enrolled. Children may work in hazardous or unhealthy working arrangements that may cause disability. On the other hand, disability may be one of the contributing factors to child labor (the likelihood of labor force participation depends on disability domains and degree of severity and on the contextual environment (ILO-IPEC 2010)) or or conversely, it may act as a protecting factor against child labor. As noted by ILO-EAST (2010) protective concerns of the parents lowers the risk of disabled children's participation in the labor force.

Poor education breeds poor education. **Level of parents' education** is an important factor influencing their children's chance of schooling. Several studies reveal that children of parents of

³ There are other factors that cause disability among youth such as; marriage to relatives, child labor, accidents and injuries, involvement in violence, wars, and the quality of the health services.

a low level of education are more likely to be deprived of education than their peers belonging to highly educated parents, (Buis 2015). El-Saadani (2012) indicates that in Upper Egypt the probability of never attending school among children belonging to illiterate parents is tenfold the probability for children belonging to educated parent (have secondary level or above). Isamile et al. (2016) find that the probabilities of transitions from one educational level to another are decreasing if parents have low level of education. Furthermore, we expect that a disabled child belonging to less educated parents has a chance of attending school much lower than that of his peers without disability and belonging to parents with a similar level of education. Furthermore, the likelihood of attending school among youth with severe disability will be, intuitively, much less than that among those with mild disability.

It is well acknowledged in the literature that denial of education leads to income poverty in a cyclic form on the individual and household level as well as on the macro level. Both are closely related and reinforce each other. Young people constitute a major proportion of those living in **poverty** across the world. Youth with disability are in the heart of this group (UN-DESA, 2013). Furthermore, their households, generally, have low income and high risk of living below the poverty line (Mitra et al. 2011; Filmer 2008). Poor households find difficulty in sending their children to school, particularly children with disability or in letting them continue their education. For several reasons; low income, low expected benefits of investing in education in the instance of increasing unemployment among the educated persons and the high opportunity cost of children's work. Additionally, poor households face other education related costs; transportation to and from schools, uniforms, books and supplies. Adding to that, their children receive low quality education and cannot afford high-quality education which in turn lowers the expected returns on investment in their education.

Not only poverty contributes to reduce education it also gives rise to poor health. The interrelationship between poverty and ill health is well established in the literature. A household's low standard of living and poverty may lead to permanent health problems through several pathways; malnutrition, poor housing, environmental hazard, unsafe work and lack of access to health services. Poor households receive poor quality health services and low level of education and health education in particular which increase the exposure of their members to health hazards. Conversely, the onset of disability may lead to poverty through lost work, lower earnings, increase in the health expenditure (for a comprehensive review, see Mitra et al. 2011).

Youth in households that have one of their **parents with disability** (especially if s/he is the bread winner⁴) are hypothesized to drop out of education in order to hold income generating jobs and to take care of the household member with disability (Filmer 2008).

⁴ Persons with disabilities (particularly those with multiple disabilities) tend to have lower employment rates than those without disabilities. They have little chance of finding decent work, receive lower earnings and experience higher job insecurity, (UN 2013, Mizunoya and Mirta 2013, OECD 2013).

Unemployed or self-employed household head, especially in less developed countries (LDC) such as Egypt, is more likely to face income poverty as well as difficulties in financing her/his children's education. This would be exacerbated in case of children with disability. Educating disabled children is more fraught with hardship than educating children without disability. And as previously mentioned, the expected low return on investment in educating disabled children may discourage poor families from taking that decision.

Turning to **community level factors**, the chance of attending school differs according the **area's level of urbanization**. Data of Egypt DHS 2014 show that among women (6+ years) the percent that did not go to school is higher in rural areas as compared to urban areas (29.5% vs. 17%, respectively), particularly in rural Upper Egypt (34%). Comparable figures among the male population are 16.4% vs. 10.4% in rural versus urban and 18.1% in rural Upper⁵. Alshahawy (2017) reveals that, based on data from Egyptian Labor Market Panel Survey (ELMPS) 2012, the share of illiterate population in rural Upper and rural Lower is 46% and 33%, respectively.

Availability of educational institutions in the community of living increases access to education. However, the educational system in Egypt as a LDC, faces several barriers- particularly in rural areas- including; shortage of schools, lack of sufficient number of teachers, overcrowding, deficiency of educational resource (materials, furniture, equipment, textbooks), long distance and poor roads to schools and small number of secondary schools. A situation that results in poor quality of education and the inability of schools to accommodate the needs of disabled children. Adding to that the low rate of economic return on primary education if compared to rate of return on higher education, especially in face of increasing unemployment rates in Egypt (among the low educated as well as the highly educated). All of the above negatively influences the poor and rural households' perceptions of the usefulness of educating their children, thus adversely affects the households' decision to enroll children in schools (Bonal 2007, Aref 2011 and Langsten and Hassan 2012).

The continuum urbanization - ruralization not only reflects the level of accessibility and quality of services but also the **people's values and norms** towards the worth of education and in particular education of youth with disability. Furthermore, it reflects the people's perception towards girls' education as towards boys' education. El-Saadani (2012) finds that in rural areas, the perceived cost of educating a female child is much higher than that of a male child and the perceived cost of educating the children rises as parents' level of education declines.

⁵ DHS 2014, Tables 2.9.1 and 2.9.2.

2. Data and methodology

2.1 Data

The data used in the current study is drawn from a nation-wide survey “Household Observatory Survey, round 13, 2016,” (HOS 2016) that was conducted by the Egyptian Cabinet Information and Decision Support Center (IDSC)⁶. The survey was designed to provide estimates for the country as a whole and for the six major regions (the 4 Urban governorates, urban Lower, rural Lower, urban Upper, rural Upper, and the Frontier governorates). Furthermore, it was designed to allow for separate estimates at the governorate level. The data was collected from a sample of households based on stratified, multi-stage and cluster design. It contained information from 11,592 households with 49,431 individuals. Our study population consists of 12,651 youth subjects in the age group 15-29 years.

The survey has several modules, two of them provide the needed data. The first module is concerned with measuring disability among the sample population as well as providing the demographic and socio economic characteristics of all the household’s members. The second module provides information on the household’s housing conditions as well as wealth level (in terms of assets owned). In measuring disability, a short set of questions on disability designed by UN Washington Group (WG) on Disability Statistics was utilized (WG 2009). The WG short set of questions addresses six domains; vision, hearing, mobility, remembering and concentrating, self-care and communicating (Appendix B). Each question’s response categories are no difficulty, some difficulty, a lot of difficulty and totally unable to do it⁷.

It is important to mention that it is the first time in Egypt to conduct a nation-wide survey on individuals with disability using this approach. This approach covers the shortcomings of the simple question “Do you have disability?” that had been utilized in past surveys and censuses in Egypt as well as in the different countries.

⁶ The Household Observatory Survey (HOS) is a series of national surveys started in 2008 with the aim of monitoring the changes in the status of Egyptian households with regard to the following dimensions; demographic, health and socio-economic characteristics, housing and asset possessions, household’s income and its sources, household’s expenditure pattern, household’s evaluation of the quality of the public services and public goods and their prices, attitude towards fertility and family planning. The survey was initially planned to be conducted four times a year. After 2011, it has been conducted annually. Each round of the survey included additional module(s) that responded to current issues (at the time of conducting the survey round). The sample size of the survey is usually around 10 thousand households. The current round #13 included a module concerned with measuring disability using WG approach.

⁷ The UN Washington Group on disability statistics conducted validation studies including both cognitive and field testing of the questions. The major conclusion is that the questions were well understood and interpreted consistently across countries. The domains represented the majority (but not all) of respondents with self-reported difficulties. The UN Washington Group identified the following two limitations: a) not all functional domains are fully covered; mainly, psychological difficulties, and b), the WG questions were not developed specifically for use with children. In 2006 the short set of questions on disability was endorsed by 23 countries and 5 international agencies. Several governmental offices from developing countries including Egypt (The National Council for Disability Affairs, Information and the Decision Support Center and the Central Agency for Public Mobilization and Statistics) have been trained on disability measurement methodology through the WG efforts. Countries that received training worked internally to improve their overall approaches to dealing with the issue of disability measurement through ongoing data collection activities. For detailed information, see (UN Washington Group, 2008).

The available data set, however, imposes several limitations: (1) As a result of lacking information on the date of onset of disability, there would be two plausible sources of bias: (a) there would be an underestimate of the impact of disability on school enrollment if the occurrence of disability had happened during youth adolescent years or after, and (b) with long duration, persons with disability would become more adapted to it and through rehabilitation their ability to activity participation improves resulting in underestimate of disability's level of severity. (2) Youth without disability are more likely than youth with disability to get married and form separate nuclear families. For those who formed their separate families, the survey data did not have information on their parents' characteristics of interest. Accordingly, we excluded from the sample youth who are household heads (410 cases representing 3.2% of the youth sample). This is because we aimed to examine the impact of the household's environment in which youth (with and without disability) live on their school enrollment.

As hypothesized in the framework, the household head's level of education, his/her sex, disability status, and working status are important factors that condition school enrollment among the children⁸. Therefore, the multivariate analysis is limited to youth who are co-residing with their parents. (3) We limited the multivariate analysis to youth who are either offspring of the household head or grandchildren because there are cases (1941 cases representing 15.3% of youth sample) the vast majority of whom were partners (wife/husband) to household heads in the age group of interest⁹. Intuitively, they grew up in households different from the ones they were living in at the time of the survey and their scholastic achievement had been impacted by their parents.¹⁰ The final sample size for the multivariate analysis is 10405 including 520 disabled subjects, representing 5.06%.¹¹ And (4) due to the small number of observations with disability in the sample we were not able to examine the impact of disability by domain.

2.2 Methodology

2.2.1. The impact of disability among youth on school enrollment

This study aims to examine the impact of disability among youth on the likelihood of attending school and of moving from one educational stage to another controlling for the other factors.

The study assumes that the propensity that a youth subject is deprived of education is influenced by his/her disability status as well as three sets of covariates; the individual level covariates, household and community covariates, and a random component that takes into account the plausible presence of individual's unobserved heterogeneity as well as the fact that members of

⁸ The comparison between youth who are household heads and those who are not with regard to prevalence level of disability and some background characteristics shows that 0.7% of the former group have severe disability, the vast majority are men (97.8%), older (85% are in the age group 25-29) and married (89.2%) while 1.8% of the comparable group have severe disability (twice as great as that among the former group), are much younger (24.5% aged 25-29) and never married (83.7%) and slightly above half (53.6%) are men. There are no noticeable differences regarding region of residence or level of wealth, see (Appendix C).

⁹ Members other than the partners include; sisters/brothers in law, daughter/son in law, other relatives.

¹⁰ We had to make some compromises which certainly rendered our sample less than ideal.

¹¹ The descriptive analysis considers all cases of youth in the age group 15-29 which amount to 12651.

the household are not independent of each other. Siblings share parental characteristics, parental earnings, school quality, cultural factors and neighborhood characteristics. And as noted by Filmer (2008), there may be other types of unobserved factors related to intra-household resource allocation that affect both the probability of being disabled and the probability of attending school. For example, “households that disfavor investing in both children’s health and education in favor of other types of expenditures are more likely to have infants and children with poor health who might develop disability as a result and low schooling. In this case disability and education would be related, but the association would merely reflect parental neglect,” (Filmer 2008, pp155-156). Additionally, having a youth member with disability in the household may impact school enrollment and school achievement of siblings.

Therefore, we assume a random-intercept model such that for an individual number j ($j=1,2, \dots, n_i$), in household number i and $i=1, 2, \dots, N$

$$\Pr(Y_{ij} = 1) = \alpha_i + \beta' X_{ij} + \gamma' Z_i + \varepsilon_{ij}, \quad (1)$$

$$\alpha_i \sim \text{IID} (0, \sigma_\alpha^2)$$

$$\varepsilon_{ij} \sim \text{IID} (0, \sigma_u^2)$$

Where:

Y_{ij} : school enrollment for youth j who belongs to household i . Y_{ij} takes value 1 if the subject did not start school and value 0 otherwise.

n_i : number of youth members in the household.

N : total number of households.

X_{ij} : individual level covariates.

Z_i : household and community variables.

α_i : random component.

ε_{ij} : error term.

And α_i and ε_{ij} are assumed to be independent.

Adding the two error terms together we get the new error term $v_{ij} = \alpha_i + \varepsilon_{ij}$

And we have $\text{COV}(v_{ir}, v_{is}) = \sigma_\alpha^2 + \sigma_u^2$ for $r = s$

$$= \sigma_\alpha^2 \quad \text{for } r \neq s$$

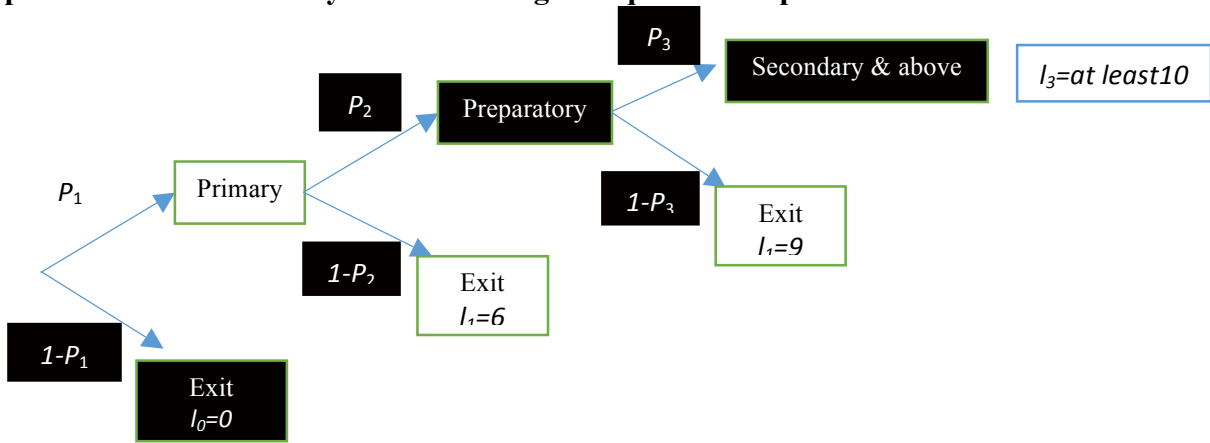
$$\text{COV}(v_{ir}, v_{js}) = 0 \quad \text{for all } r, s \text{ if } i \neq j$$

To estimate the model parameters, we fitted a mixed-effect logistic regression model¹². And we applied hausman test to examine the assumption that α_i are not correlated with X_{ij} .

2.2.2. The impact of disability among youth on scholastic achievement

The transition from one level of education to the next is assumed to take the following hypothetical educational system.

Hypothetical educational system according to sequential response model:



The likelihood of transition from one level of education to the next is estimated among youth (with and without disability) controlling for the aforementioned factors by a series of Sequential Response Models (Maddala, 1983; Buis 2015). In this proposed sequential response model, whether or not a youth subject passes the first, second and the third transition is represented by three indicator variables Y_1 , Y_2 , and Y_3 , respectively.

$Y_1 = 1$ if the individual was enrolled in primary education and takes value 0 if the individual had not been enrolled.

$Y_2 = 1$ if the individual enrolled in preparatory and takes value 0 if she completed primary and exit education.

$Y_3 = 1$ if the individual enrolled in secondary and takes value 0 if she completed preparatory and exit education.

The series of the conditional probabilities of passing one education stage to the next take the form:

$$P_1 = \Pr(Y_1 = 1 | X, \varepsilon_1) = F(\beta'_1 X, \varepsilon_1) \quad (2)$$

$$P_2 = \Pr(Y_2 = 1 | X, \varepsilon_2, Y_1 = 1) = [1 - F(\beta'_1 X, \varepsilon_1)] F(\beta'_2 X, \varepsilon_2) \quad (3)$$

$$P_3 = \Pr(Y_3 = 1 | X, \varepsilon_3, Y_2 = 1) = [1 - F(\beta'_1 X, \varepsilon_1)][1 - F(\beta'_2 X, \varepsilon_2)] F(\beta'_3 X, \varepsilon_3) \quad (4)$$

Under the assumption that the probability of choice at each stage is independent of the choice at the previous stages and the assumption that the random factors influencing responses at various

¹² We used xtlogit command in STATA version 12.

stages are independent it is possible to estimate the model parameters by maximum likelihood functions, (Maddala, 1983, 49-51). Using the logit link function, the model is named sequential logit model.

School transition models, however, suffer from the problem that the estimated coefficients of the covariates impacting the probability of continuing in school are affected by differential attrition on unobserved factors¹³ at earlier stages of schooling. The selection bias is likely to occur due to the fact that even if an unobserved variable is not a confounding variable at the initial transition because it is uncorrelated with any of the observed variables, it will become a confounding variable at the higher transitions because the respondents with higher latent likelihood of passing these higher transitions form a selected sub-sample of the original sample (Buis 2010). Further, these unobserved determinants may be both exogenous and endogenous with respect to the observed covariates in the model. If we were not able to control for these unobserved variables, then the effect of the exogenous variables would be underestimated. Finally, the sequential response model does not allow covariates to differ across transitions, for example, to examine in the first transition the impact of distance to nearest primary school and examine in the second transition the impact of distance to nearest preparatory school. Constrained by these limitations, it is hard to give causal interpretations so the results should be treated as tentative.

Due to the small sample size particularly number of disabled youth, we were not able to consider the two educational transitions; secondary and university levels. In order to include these two educational stages we should restrict the analysis to a sub-sample of youth who are in the age group 22-29. The small number of disabled youth in the data set hinders getting reliable estimates. Therefore, we restricted the analysis to earlier educational transitions among youth of age group 17-29¹⁴. This choice has the advantage that the plausible impact of the selection process at earlier transitions will not be as strong as its impact at higher transitions. This analysis also does not consider subjects who drop out at each stage of educational transition. The total number of drop outs is 712 cases, amounts to 8.7%. The final sample size is 7329 who are in the age group 17-29 and enrolled in secondary education, of whom 369 (4.98%) have any disability.

3. Results

3.1 Prevalence of disability by domain and degree of severity

As mentioned earlier, measuring disability is based on the short set of questions that has been developed by WG (2009). These six questions address 6 domains: functional limitation in three domains; vision, hearing, remembering and concentrating¹⁵. And activity limitation/ participation

¹³ Such as mental ability, motivations.

¹⁴ The vast majority of students finish preparatory education at age 15. We considered the sample of youth of age group 17-29 in order to be able to observe whether the subject who completed the preparatory stage was able to enroll in secondary school or exit education.

¹⁵ Mental disabilities are screened through the only two questions remembering and concentrating. They tend to miss some population because they exclude learning and making decision components. The WG chose to focus on the earlier two because the concepts of the latter two vary across different cultures and economic situations, Mont (2007, pp: 19).

restrictions in the other three domains; mobility, self-care, and communication. The estimated prevalence of disability depends on the implemented severity thresholds. Figure (2) shows the prevalence rate of disability according to the disability degree of difficulty. If a subject has a score 'some difficulty' in at least one domain he will be considered disabled "any disability". The prevalence rates of any disability are 4.8% and 11.4% among youth and the sample population aged 5 + years "population (5+)"¹⁶, respectively. If a more conservative cut-off was selected - at least one domain is scored a lot of difficulty "severe disability" - the prevalence rates are 1.7% and 3.14% among youth and the sample population (5+), respectively. This population estimate is very close to the level in the world cited by the WHO's World Report on Disability (3%) (WHO 2011). Additionally, results reveal that the estimates obtained from the survey are very close to those obtained from Egypt census 2017, a matter that gives credibility to the survey estimates. Interestingly enough, the survey and census 2017 estimates of the rate of any disability among the population (5+) are dramatically greater than that obtained from census 2006 (11.4% vs. 07%). However, we should keep in mind that this dramatic variability is mainly rooted in the differences in definition of disability and techniques of identifying the disabled population.

On the contrary, the survey estimate of prevalence rates of "complete disability" (at least one domain is scored unable to do it at all)¹⁷ among youth and population (5+) are .8% - 0.9% and they are nearly similar to the national prevalence rate obtained from the Egypt 2006 census (0.7%). One plausible reason that might account in part for such closeness of the complete disability rates is that the 2006 census estimate was based on impairment-based definition. The term disability is most probably perceived by the respondents to denote the most severe or complete disability.

Figures (3-A, 3-B and 3-C) display the prevalence of disability by domain and degree of severity among youth, total population sample (5+) and census 2017 population (5+). The estimated prevalence of any disability among Egyptian youth ranges from 0.7% (hearing) to 2.53% (vision), (Figure 3-A). When we consider a level of severity "at least one domain is scored a lot of difficulty", the estimated prevalence ranges between 0.31% (hearing) to 0.60% and 0.63% (remembering & concentrating, mobility, and communicating). Undoubtedly, disability among the total population is influenced, among other factors, by the aging process of its adult members. Accordingly, the estimated prevalence ranges from 1.48% (remembering & concentrating) to 6.52% (seeing). Vision mobility and hearing are the three prevalent domains of any disability as Figure (3-B) reveals. On the other hand, mobility, vision and self-care are the

¹⁶ The estimated prevalence excludes children because as noted by UN-WG (2008) disability information from young children using limited number of questions is very difficult to obtain and as stated by ESCAP (2014, pp:8-9) "Childhood functioning is more varied than functioning in adults and identifying functional difficulty is confounded by underlying variation in typical childhood development."

¹⁷ Thereafter, at least one domain is scored some difficulty, a lot of difficulty, and unable to do it at all will be denoted; any, severe and complete, respectively.

most reported domains of severe disability. Their estimated prevalence take the values 1.63%, 1.09% and 0.72%, respectively. Hearing is also the least stated one.

Comparable rates according to census 2017, displayed in Figure 3-C, show that for all disability domains but vision the prevalence rates of any disability as well as severe disability are almost always larger than the corresponding rates among the sample population. Further, data reveal that the most reported severe disability domain in the two data sets is mobility. It is interesting to underline that youth have prevalence of severe disability higher than that among the population in the two domains; remembering & concentrating and communicating.

Table (1) delivers the percent of the disabled who reported having at least double disability (i.e., reported having disability in at least two domains) by level of severity. Table (1) discloses three significant points: (a) the toll of the reported burden is high among the disabled youth; almost 90% have multiple disabilities of variant degrees (any), close to half (44.7%) have severe disability in at least two domains and close to one third of the disabled youth (30%) have complete disability in at least two domains. We believe that there are instances in which disability in one domain could lead to or exacerbate disability in another domain. For example, it is possible that for those who have a seeing problem (especially complete difficulty) would also be having difficulty in walking and climbing stairs or in self-care. Hearing problems overlap with communication. The high correlation between hearing and communication disturbs measuring the communication domain, although the latter is meant to pick up limitations in mental functioning along with the questions on remembering and concentrating, (Mont 2007); (b) The burden of double severe disabilities among the disabled youth is much higher than that among the total disabled sample population; (c) the prevalence rate of double disabilities of complete degree of severity in the following four domains of activity limitation/ participation restrictions; mobility, self-care and communication as well as remembering and concentration is very high among total disabled youth and at the same time is very much greater than that among the total disabled population; representing among the former group 23.1% while it is 8.3% among the latter (Appendix D-1 and D-2). We have no way to compare these results with other countries' as there is no such information in the literature.

3.2 Profile of youth with disability according to different characteristics and degree of disability

Table (2) shows a detailed profile of youth with any and severe disabilities according to their different background characteristics and the corresponding odds ratios. As the size of subjects with disability in the study population is small we restrict the analysis henceforth to the two

disability groups that relate to the first two definitions of disability, i.e., those who have any disability and those who have severe disability¹⁸.

Results reveal that more young men than young women have disability and the difference is statistically significant. There is no apparent difference among the two sexes with regard to the prevalence of severe disability. Prevalence of disability; any or severe, slightly rises with age. Nevertheless, the oldest cohort (25-29) has prevalence rates higher than the overall average. If compared with the youngest cohort the odds of having any and severe disabilities among the oldest one increase by 28% and 41%, respectively, and are statistically significant.

The prevalence of any disability among never married youth is larger than that among the married; however, it is statistically insignificant. In contrary, the rate of severe disability among the former group is remarkably greater than that among the latter. Further, the odds of having severe disability among the unmarried is twice as high as that among the married youth and is statistically significant at p-value less than 0.05.

It can be readily seen that there is no variability of significance in the prevalence of any disability according to birth order. On the other hand, children of lower birth order tend to have low prevalence of severe disability. However, the odds ratio is only statistically significant for the second birth order.

A substantial gap is observed in rates of disabilities- any and severe- between youth who live in households where 2 or more members (in the age groups 0-14 or 30+) suffer from any disability and their peers who live in households with a smaller number of disabled members. Additionally, the odds ratios are statistically significant.

Youth living in female headed households have slightly more disability than those headed by males but the difference is insignificant. Furthermore, in families where household heads have any disability the prevalence of any disability as well as severe disability among their youth members are remarkably greater than the rates among their peers who have household heads without disability and the corresponding odds noticeably decline among the latter group and is statistically significant.

Substantial disparities in rates of any and severe disabilities are observed among youth according to their parents' level of education. It is interesting to observe the disability descending gradient by level of education. It is the highest among youth in households headed by illiterate parents then gradually declines by increasing level of education. In households headed by illiterate parents the likelihood of having a youth with severe disability is more than three times as large as the likelihood among their counterparts living in households headed by highly educated parents (university or above).

¹⁸ The sample size of individuals with degree of difficulty "complete/unable to do" was too small, 102 cases, to conduct the analysis separately for those with severe difficulty and those with complete/ unable to do difficulty.

There is no significant variability in rates of disability among youth according to their household heads' working status although the pattern is congruent with what has been expected. The prevalence of disabilities, any and severe, among youth having unemployed household heads is the biggest followed by those having household heads who are out of labor force, then those having employed parents. However, the differences are not statistically significant as indicated by the odds ratios.

Descending gradient of disability by level of wealth cannot be missed. Results disclose that prevalence of any as well as severe disabilities are the highest among youth living in poor households and gradually decline as household's level of wealth rises. The odds of having any and severe disabilities among the poorest segment of the study sample are twofold and fourfold the odds among the richest group, respectively. The estimated poverty profile of disability, however, is susceptible to underestimation. Several studies reveal selective reporting in such a way that the wealthier socio-economic groups are more likely to report morbidities and disabilities than the poorer ones (Murray and Chen 1992). In such instance the relation between disability and poverty would be underestimated (Filmer 2008).

Prevalence of disability among youth is greater in rural than in urban areas. The odds of having any and severe disabilities among urban resident youth are 0.76 and 0.69 times less than that among their counterparts rural resident and are statistically significant. The highest level of prevalence of any disability is in Lower Egypt, rural and urban, followed by residents of Upper regions and the Frontiers, while the prevalence of severe disability is equally observed in both regions Lower and Upper Egypt. The four urban governorates have the lowest prevalence. However, as indicated by the odds ratio these regional variations are not of statistical significance. To further measure the contextual and community level conditions, we calculated from 1996 census, for each governorate, percent of illiteracy in rural and urban areas. We choose 1996 census so that the oldest individual in our study population was aged 9 years old at that time. As results reveal prevalence of severe disability increases in areas that have high level of illiteracy among its population (10+ years). Areas in which less than 30% of its population are illiterate have significantly less disabled youth than areas with much great number of illiterate population (50+%).

A useful way to measure the level of inequity in the distribution of the burden of disability among youth along the socio-economic status, as depicted in Table (2) with regard to level of parent's education and household's level of wealth, is to summarize the entire distribution of disability across the socio-economic status distribution. We drew concentration curves¹⁹ and

¹⁹ These curves plot cumulative percentiles of a population ranked by economic status on the horizontal axis (x), against the cumulative percentile of an outcome variable on the vertical axis (y). When the concentration curve lies above (below) the 45 degree line (equality line) this means that the outcome variable is concentrated among the most disadvantaged (most privileged) groups. The farther the curve is above (below) the line of equality, the more the concentration the outcome variable is among the least privileged (most privileged) groups.

estimated the associated concentration indices²⁰. Concentration index quantifies the degree of socio economic related inequality in the outcome variable²¹. Negative (positive) value of the index indicates that the variable of interest is higher, on average, among the deprived (better off), and when there is no inequality the concentration index equals zero. The larger in absolute size the index is, the greater the degree of inequality. The concentration index is bounded between -1 and +1. While ± 1 is the theoretical maximum of a CI²², there is no criterion to determine if certain values of CI are high or low. Previous studies did not present specific thresholds for CI but a few of them indicated that values less than 5%, mean equity but if CI takes values between 5 - 10% it means inequity and if CI exceeds 10% it indicates high inequity. WHO (2013) considers a value of 0.2 to 0.3 is indicative of a reasonably high level of relative inequality.

We additionally examined the level of inequity in the distribution of the disability among youth with regard to region of residence. Classification of region of residence as rural or urban is a proxy for the continuum classification ruralization- urbanization. This continuum, especially in LDCs, is associated with the gradient of the socio-economic, health, and environmental development and of individuals' level of wellbeing. The more the level of urbanization the better is, on average, the level of most, if not all, wellbeing indicators. The geography of Egypt provides additional important classification: Lower and Upper Egypt. The geography and contemporary historical distribution of resources and investments led researchers to classify Egypt into six main regions according to the level of urbanization as displayed in table (2). For long decades, the six regions held ranks in terms of the many health and socio-economic development indicators in the following order: the four urban governorates occupy the top position, followed by urban Lower, urban Upper, rural Lower, and lastly, rural Upper and the Frontiers. Rural Upper always has the worse indicators. Interest in the Frontiers is recent because of its small population share and the high cost of gathering information through sample surveys.

Table (3) presents the concentration index (CI) of youth with disability according to educational level of the household head, household's level of wealth, and region of residence and Figures (4-A, 4-B and 4-C) draw the corresponding concentration curves. As results reveal, the negative values of CI with regard to the educational level of household head and wealth quintiles are statistically different from zero, while that related to region of residence is positive and of trivial magnitude. The results indicate that youth with disability are disproportionately concentrated in households that are headed by less educated parents and in poor households. However, the three curves tend to be fairly close to the diagonal line.

²⁰ The concentration index is defined as twice the area between the concentration curve and the line of equality (the 45-degree line).

²¹ The concentration index (CI) has proved to be a useful summary statistic in the measurement of socioeconomic relative inequalities in the health sector (Wagstaff 2004).

²² However, as noted by Wagstaff (2004) "when the variable under consideration is binary, the minimum and maximum possible values of the concentration index are determined by the mean of the binary variable. Specifically, the minimum value of the concentration index is equal to $\mu-1$, and the maximum value is equal to $1-\mu$. Thus as the mean increases, the range of the possible values of the concentration index shrinks, tending to zero as the mean tends to one and the concentration index tends to zero".

To conclude, the prevalence rate of severe disability among Egyptian youth is the least in the 4 urban governorates (1.2%), while it peaks in households that have some members (other than youth) with disability (3.9%). Additionally, youth with disability are likely to be men, older, unmarried, of high birth order, to live in households headed by females, unemployed heads and are likely to reside in rural areas and in societies that have high illiteracy rates. Youth with disability are disproportionately concentrated in the poor households and in households that are headed by less educated parents.

3.3 The demographic and socio-economic differentials of the likelihood of attending school among youth with and without disability

In what follows, we estimate the demographic and socio-economic differentials of school enrollment rates among youth with and without disability. This is to examine the extent to which youth with disability were deprived of education as well as to compare their profile with that of their peers without disability.

Table (4) reveals that the extent to which youth with disability are deprived of education is massive. The percent who have never enrolled in education among youth with any and severe disabilities is 17.7% and 33.9%, respectively. The gap between youth with and without disabilities is of great significance; the percent who have never enrolled in education among the former group amounting to fourfold and eightfold the percent among the latter. Obviously, as the data shows, among the disabled the likelihood of denial of education increases with increasing disability degree of severity. This is true across all segments of youth of different demographic and socio-economic background.

Being a boy child without disability ensures a great chance to attend school (2.3% had never entered school among young men). Overall, young women are less fortunate than young men. Women, with and without disability, are likely to be deprived of education more than men. Interestingly to find that the gender gap in education is wider among youth without disability than among their peers with disability.

Youth, with and without disability, of older age cohorts are less fortunate than the younger cohorts in their chance to attend education. Remarkably, youth with disability, of all age cohorts, have lesser chance to enroll in school than their counterparts without disability and their opportunities to attend education declines with increasing the degree of disability. Furthermore, the age gap in the probability of not attending education is wider among youth without disability than that among youth with disability and the gap declines with increasing disability level of severity.

The probability of deprivation of education steadily increases as the birth order of youth rises. This is true irrespective of their disability status. Additionally, results reveal a sizeable

divergence between youth with and those without disability in their chance of attending education.

Turning to household characteristics, results display that one quarter of youth with any disability who live in female headed household were not able to attend school. The percent is almost one and half times higher than the percent among their peers who live in male headed households. It can be readily seen that the situation is much worse among those with severe disability. In contrast, fewer youth without disability who live in female headed households were denied education if compared to their counterparts who live in male headed households.

Unexpectedly, the findings demonstrate that disabled youth who live in households that have two or more additional members with disability have chance of entering school greater than their peers' who live in households that have none of its members with disability.

Interestingly we find that there are no remarkable differences in the likelihood of deprivation of education among youth with disability according to whether their household head suffers from any disability. In contrast, youth without disability who live in households headed by a disabled parent have a lesser chance to attend education than their peers living in households without disabled parents.

Results demonstrate that parent's level of education plays a substantial role in educating their children. As can be seen, in households headed by an illiterate parent, ten percent of their youth members without disability were not able to go to schools. The comparable figures sharply decline once the parent has some education (primary or preparatory). It is important to note that above one third and about half of youth with any and severe disabilities, respectively, who have illiterate parents were not able to enroll in school. There is apparent a steep decline in educational deprivation with rising level of parent's education. Again, it is noteworthy to find that the educational gap (in terms of the relative percentage points difference between the first and last categories) is narrower among youth with severe disability than among youth with any disability and the widest educational gap is among youth without disability.

Results display that youth who have an unemployed household head have less chance to attend school than their peers who have an employed household head. The probability of deprivation of education sharply rises among youth with disability and rises with its degree of severity.

There is apparent gradient of chance of education according to wealth. As we move from the poorest to the wealthiest groups, the likelihood of deprivation of education among youth diminishes. This is true irrespective of their disability status. Youth with and without disability who are living in poor households were the least to attend school. The situation is greatly exacerbated in the instance of having severe disability. It is interesting to notice that among youth without disability the wealth gap in their probability of not attending school is much larger than that among youth with disability. On contrary, the poverty gap in attending education is the smallest among youth with severe disability.

The analysis according to community level data shows that residents of rural areas and in particular rural Upper Egypt are the most disadvantaged group. One third and close to one half of rural Upper youth population with any and severe disabilities, respectively, are denied education. Additionally, almost 10 percent of their youth without disability are denied school followed by residents of the Frontiers. Further, the regional gap is the largest among youth without disability and narrows among youth with disability. Additionally, in societies that have high illiteracy rates among its population children were less likely to attend school than in societies that have an educated population and the hampering effect of widespread illiteracy on the chances of education of children is quite obvious for the disabled members.

In Table (5) we provided an estimate of the level of disability based discrimination in the chance of education in our society. We estimated CIs for deprivation of education among the disabled youth (panel 1) and among youth without disability (panel 2) and the corresponding concentration curves are drawn in Figures (5 and 6).

All the estimated concentration indexes are negative, are statistically significantly different from zero and are of remarkably large magnitude indicating that deprivation of education is higher among youth populations with lower socio-economic status; of lower wealth, have low educated parents, and living in Upper Egypt. Another important result that can be extracted from Table (5) is that the degree of socio-economic based inequality in the lack of educational opportunities is greater among young people who are not disabled compared to those with disability.

These unexpectedly significant findings point to the following; taking into account that youth with disability are much more deprived of education than their peers without disability as indicated by results of table (4) above, then, because of their disability, disabled youth are closer in the level of injustice they are facing than their peers without disability. In other words, youth with disability of the various socio-economic standings are involuntary not able to go to school even if their parents are capable of enrolling them in education, even well off families failed to secure educational opportunities to youth with disability.

There is noticeable heterogeneity among youth with disability according to domain in the likelihood of school enrollment as demonstrated in Figure (7). Youth suffering from vision difficulty are the least to be denied education if compared to other disability groups- 8% of them had never attended school. One quarter of those having difficulty in mobility and one third of those who have hearing problems are denied education. Slightly above half of those who have problems in remembering & concentrating and communication (51.3% and 55.1%, respectively) did not enroll in school. The significant majority of youth with difficulty in self-care are denied education and their likelihood of not attending education is 8 times as great as that among those who have vision problems. The situation is much worse among youth with severe disability. Importantly we find that the rate of education deprivation among youth with severe disability in some domains (for example, self-care) can reach levels as high as three quarters of them had

never entered school. These findings, however, should be taken with caution as the sample size is small.

4. Assessment of disability among youth on scholastic achievement

As revealed from the tri-variate analysis, when contrasted with youth without disability, youth with disability are less likely to attend school and less likely to advance in education if enrolled in school. The likelihood of deprivation of education further increases with increasing degree of severity. To properly investigate the deterrent role of disability, we conducted multivariate analysis to estimate the net impact of disability on school enrollment as well as on school transition after controlling for the other demographic and socio-economic and contextual factors that are hypothesized to affect schooling.

4.1 Random logit model for the assessment of the impact of disability on school enrollment

In this model, the probability that a youth subject had never attended school is assumed to be causally conditioned on two sets of factors. The first includes subject's characteristics; notably, his/her disability status, sex, age cohort and birth order²³. The second set includes the household and community factors that are assumed to impact school attendance as well as are hypothesized to confound the influence of subject's disability on her/his chance to attend school.

In the random effect logit model the dependent variable is a dummy variable; takes on the value one if the individual had never enrolled in school and zero if the subject enrolled in school. The risk factor is a dummy variable; where 1 denoted the presence of individual with disability and zero indicated the existence of youth without disability. The other covariates are; one dummy for sex, three dummy variables for age groups, and four dummies for birth order. Household's level covariates are: one dummy variable for sex of household head, one dummy for her/his disability status (any disability), three dummies for number of household's members in the age groups 0-14 or 30+ who have any disability, four dummies for education of the household head, one dummy variable for his working status, five dummies for wealth quintiles. For community covariates; in an attempt to measure other community level factors besides level of urbanization as indicated by five dummies for region of residence and level of illiteracy in 1996 (continuous), we used data of ELMPS 2012. It included information, at rural/urban geographic level in each governorate, on time and mode of transportation to the nearest school by type of school; primary, preparatory and secondary. We created the following variables; for each of the three levels of schooling we calculated the percent who walk, percent who spend less or equal to 15 minutes, and mean time to go to school. All these 9 continuous variables are in reference to the nearest school. After examining the correlation matrix of these 9 variables we chose the percent who walk to the nearest primary school as it has the lowest correlation with the other variables. This choice also serves the fact that primary school is the first gate to enroll and advance in education. Further, we calculated from 1996 census, for each governorate, percent of illiteracy in rural and

²³ We were not able to estimate the impact of child labor because the survey does not have data on it.

urban areas. We choose 1996 census so that the oldest individual in our study population was aged 9 years old at that time.

Results reveal that the variables; youth' disability status, sex and age, and household head's level of education, wealth, region of residence and area's level of illiteracy significantly impact the likelihood that the subject had never attended school. All the corresponding coefficients are statistically significant at $p\text{-value} < 0.01$ or < 0.05 except for the following: the coefficient on level of education of household head- secondary level- is not statistically different from that on above secondary, the coefficients on household's level of wealth- the second to the fourth wealth quintiles- are not statistically different from those on the fifth wealth quintile, the coefficients on the two regions of residence; urban Lower and urban Upper are not statistically different from the coefficients on the 4 urban governorates. Results indicate that the other five variables; youth birth order, sex of household head, her disability and her working status and number of members other than youth who have disability in no instance influenced the likelihood of school enrollment among youth²⁴. Further, we examined the several community variables that measure the proximity to education services on the premise that the availability and proximity of schools encourage and raise enrollment. The percentage who walk to primary school variable is the only one that is statistically significant. It has, however, unexpected positive direction of relationship²⁵.

The assumption that disability status of the subject is an effect modifier is examined by creating interaction terms between disability status and each of the other factors in the model. We run the model separately for each interaction term due to the small number of the disabled subjects in the data set²⁶. The interactions between subject's disability status and the two covariates; wealth and household head's level of education are statistically significant at $p\text{-value} < 0.01$. Other than these two interaction terms, there are no statistically significant interactions.

The interaction between youth disability status and household head's level of education, albeit is statistically significant, causes a sharp rise in the estimated value of the odds ratio of the household head's education variable to become 118 and critically widen its confidence interval (13.2, 1053.7). Therefore, we considered only the interaction between wealth and subject's disability status in the Model.

Moreover, we tried to examine not only the disability status of youth but also its various degrees of difficulty. We created a categorical variable of disability of three dummies as follows: not disabled (reference group), has simple disability- those who reported having, *at maximum*, some difficulty in any domain and has severe disability as previously defined (those who reported having a lot of difficulty or cannot do it in at least one domain). However, the small numbers of

²⁴ We tried several models and in all the trials these five variables were systematically insignificant.

²⁵ It is worth mentioning that these variables have the limitation that they are not in reference to the time in which our study population is eligible to enter school.

²⁶ When we ran a model containing all the interaction terms we got severely distorted results

subjects with severe difficulty in the sample makes it problematic to get reliable estimate with much precision; the estimated odds was extremely high and its corresponding confidence interval is exceptionally wide²⁷. Therefore, we considered only the model that examines the impact of the subject's any disability on the likelihood of not attending education as displayed in Table (6).

Finally we applied Hausman test to examine the assumption that the random components are correlated with the model's covariates. We could not reject the null hypothesis. Accordingly, the random components are not correlated with the covariates.

Results of the Model, Table (6), provide evidence that, with other factors held constant, youth with disability are less likely to attend school. The likelihood of not attending education among youth with disability is 14 times higher than the odds among their peers without disability. The probability of not attending school among young women is 4 times higher than that among young men. Young adults in the age group 25-29 are five times less likely to go to school than the younger age cohorts (15-19), while those in the age group 20-24 are two times less likely to attend education than the control group. Results provide proof that household head's level of education is a powerful factor influencing their children's chance of school enrollment, other factors *ceteris paribus*. Subjects with illiterate parents if compared with those with university educated parents their odds of have never had education is multiplied by 36. However, its confidence interval is markedly wide. The odds of educational deprivation largely declines once the parent has some education (basic education). Furthermore, living in a well off household ensures education for its members. As results reveal, belonging to an extremely poor family significantly increases the probability of deprivation of education among youth 13 times greater than that among their peers living in the richest households. Subjects who live in poor, middle or rich households their likelihood of never attending education does not statistically vary from that among those living in richest households.

One important result is that disability interacts with the individual's standard of living in such a way that exacerbates inequity and all the interaction terms are statistically significant at p-value less than 0.01%. However, the confidence interval for the two interaction terms; disability & middle wealth and disability & rich, are noticeably wide.

Additionally, results provide evidence, as indicated by the large value of *Rho* (0.693), of high intra-household correlation of the outcome suggesting that youth members of the same family will have similar chances of school enrollment than youth selected at random from different households, controlling for disability status as well as for the other factors.

The estimated marginal effects show two important revelations, (Figures (8.a- 8.b)); first, it assures that disability not poverty has the strongest deterrent impact on school enrollment.

²⁷ Results are available upon request.

Second, residing in one of the four urban governorates has impact on the chance of attending education stronger than that of living in very poor households or in households headed by illiterate parents.

4.2 Sequential logit model for the assessment of the impact of disability on educational achievement

Disability-based discrimination in education opportunities is further evidenced when we examined the pattern of educational advancement among youth with and without disability, Figure (9). Results disclose the extent to which youth with disability suffer from discrimination in educational achievement and the level of discrimination exacerbates as disability level of severity rises. Slightly above 20% of youth with severe disability either dropped out of primary level of education or stopped at this level and an additional equal percent either dropped out of the preparatory level or did not proceed to the secondary level. Furthermore, slightly above half of the subjects with severe disability moved to secondary education while three quarters of the comparable group without disability continued to that level. Accordingly, youth with disability have average years of schooling less than those of their peers without disability.

To properly assess the restrictive role of disability, we conducted multivariate analysis to estimate the net impact of disability on school transition after controlling for the other demographic and socio-economic and contextual factors that are hypothesized to affect scholastic achievement.

In the sequential logit model the dependent variable is a series of three dummies; the first takes one if the individual had ever enrolled in school and zero otherwise, the second takes 1 if the individual moved to preparatory and zero otherwise, and the third equals 1 if the individual moved to secondary level of education and zero otherwise.

The results, Table (7), show that disability tremendously reduces the chance of first transition, i.e., school enrollment and is statistically significant. But its effects on continuing education to preparatory and to secondary are weakened and turns out to be statistically insignificant. Indicating that once the disabled child is enrolled in education, his chance of continuing education is not hampered by the disability status. Results suggest that girls are less likely than boys to enroll in schools but once girls entered schools they are more likely than boys to continue and end the preparatory stage. Then they withdraw from education and young men have greater chance to go to secondary level. The coefficients are statistically significant at all transitions. The oldest age cohort (25-29) in our study has less chance to enroll in education if compared to the youngest. Once enrolled in school, the oldest cohort has higher chance than the others to complete preparatory education but has lower chance to move to the secondary level. There are no significant differences between the two younger cohorts across the three transitions. Parental education plays a central role in investing in their children's education. The odds of attending education and of moving to higher transitions declines as the level of parent's level of

education declines. The results are consistent across the three transitions and statistically significant for all the parental educational categories, but the secondary level.

Like parental level of education, level of wealth of the household show positive relationship with the likelihood of school enrollment and of continuing education among children. Lower standard of living significantly discourages school participation. The results are consistent across the three transitions. It is also noticed, however, that the odds of attending school for a child belonging to lowest wealth quintile is the only significant coefficient. Once attended school the odds of moving to the preparatory level and of moving to secondary level turn out to be statistically significant for all wealth categories (but the fourth quintile in the instance of the preparatory stage).

The other household level variables; sex of household head, his/her disability status, his/her working status and number of disabled members in the household are statistically insignificant in all transitions.

Level of illiteracy rate in the community has negative and statistically significant impact on school enrollment but insignificant impact on the two higher educational transitions. Additionally, living in regions different from the four urban governorates unpredictably ensures high school enrollment rate and higher likelihood of educational transitions. The odds of school enrollment and of transition to the preparatory or to secondary level of education are statistically significant for all regions but urban Lower.

We examined the hypothesized interaction between disability and wealth on the chance of school enrollment and of educational achievement. The analysis yields estimates of the interaction coefficients that are unstable across transitions with regard to the direction of relationship and level of significance.²⁸

5. Conclusion

Shortage of research delays developing the appropriate policies by decision makers to ensure full realization and potential of youth with disability. The aim of this research is to contribute in building a quantitative evidence base for empirically grounded health, education, economic, and culture disability sensitive policies. We focus in the current study on examining the impact of disability among youth on one dimension of the quality of life which is education. Education opportunities have tremendous and long lasting impact over the entire life of the individual. Furthermore, education significantly impacts the other dimensions of the individuals' quality of life. The study has threefold objectives; providing a profile of youth with disability, measuring the socio-economic inequity in the distribution of the burden of disability as well as the socio-economic inequity in school enrollment among youth with and without disability and finally,

²⁸ Results are available upon request.

assessing the extent to which disability among youth impact their school enrollment and their level of educational attainment.

Using data that implemented the suggestion of UN-WG short list of questions to measure disability our results showed that the prevalence rates of any, severe and complete disabilities among youth are 4.8%, 1.7% and 0.8%, respectively. The most common domain of severe disability among youth is communicating followed by remembering and concentration, the two are meant to measure mental problems. And the least reported one is hearing. The burden of double disability is high, close to half (44.7%) of the disabled have severe disability in at least two domains. The double disabilities are dominated by communicating, remembering & concentrating, mobility and vision. Youth with severe disability in Egypt are more prevalent among the older cohorts, equally prevalent among the two sexes, disproportionately concentrated in poor households and in households that are headed by less educated parents, are more prevalent in households with unemployed, female heads and in households with more disabled members. Youth with severe disability are likely to reside in rural areas and in communities that have high illiteracy rates.

The benchmark results of the mixed-effect logit model and the estimated marginal effects suggested that disability has the strongest deterrent impact on school enrollment and interacts with the individual's standard of living in such a way that exacerbates inequity.

Still the prevailing culture runs against girls' education, the probability of not attending school among girls is much greater than that among males. Results provided proof that household head's level of education is a powerful factor influencing their children's chance of school enrollment. Likewise, living in a well off household ensures education opportunities for its members. Apparent gradient of education opportunities with the socio-economic status of the households to which youth belong cannot be missed. Additionally, the socio-economic gaps in education poverty narrow as the disability's degree of severity rises. One unexpected finding is that living in the four urban governorates has deterrent impact on attending education bigger than that of parental socio-economic status. Results provided evidence of high intra-household correlation with regard to education opportunities.

Despite the limitations of the educational transition model, the data is nevertheless revealing. Results suggested that although disability tremendously reduces the chance of school enrollment its effect on continuing education to preparatory and to secondary level is weakened and turns out to be statistically insignificant, signifying that once a disabled child is enrolled in education, she is capable of continuing.

Results also suggested that female children are less likely than male children to enroll in schools but once enrolled they are more likely than their male counterparts to continue and end the preparatory stage, then they withdraw from education, while their male counterparts continue to secondary level. The oldest age cohort (25-29) in our study has less chance to enroll in education

if compared to the youngest. Once enrolled in school, the oldest cohort has a higher chance than the others to complete preparatory education but has a lower chance to move to the secondary level. Parental education as well as wealth of the household play a positive central role in investing in their children's education.

Results provide evidence that investment in education is not independent of the context in which individuals live. High levels of illiteracy rate have negative and statistically significant impact on school enrollment but insignificant impact on the two higher educational transitions. Living in regions different from the four urban governorates or urban Lower unpredictably ensures higher school enrollment rate and higher likelihood of educational transitions. Three factors may partly explain this unexpected result, the unprecedented growth of slum areas in these two regions with highly dense population concurrent with increasing urban poverty and a growing child labor market. We may speculate also, that the cost of schooling (as part of costs of living) in these two regions is higher than that in the other three as well as there may be an increasing pressure in the latter regions to let more and more students pass, especially the two compulsory stages (primary and preparatory which form basic education). However, this finding encourages further analysis. It is worth mentioning that the availability of the two pieces of information; the onset and the reason of disability (which have been missed in the used dataset), will enable researchers to examine two other important dimensions of the quality of life of the disabled; participation in the labor force and marriage prospects and family formation.

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Figure 1: Conceptual Framework for the Factors Impacting Youth School Enrollment

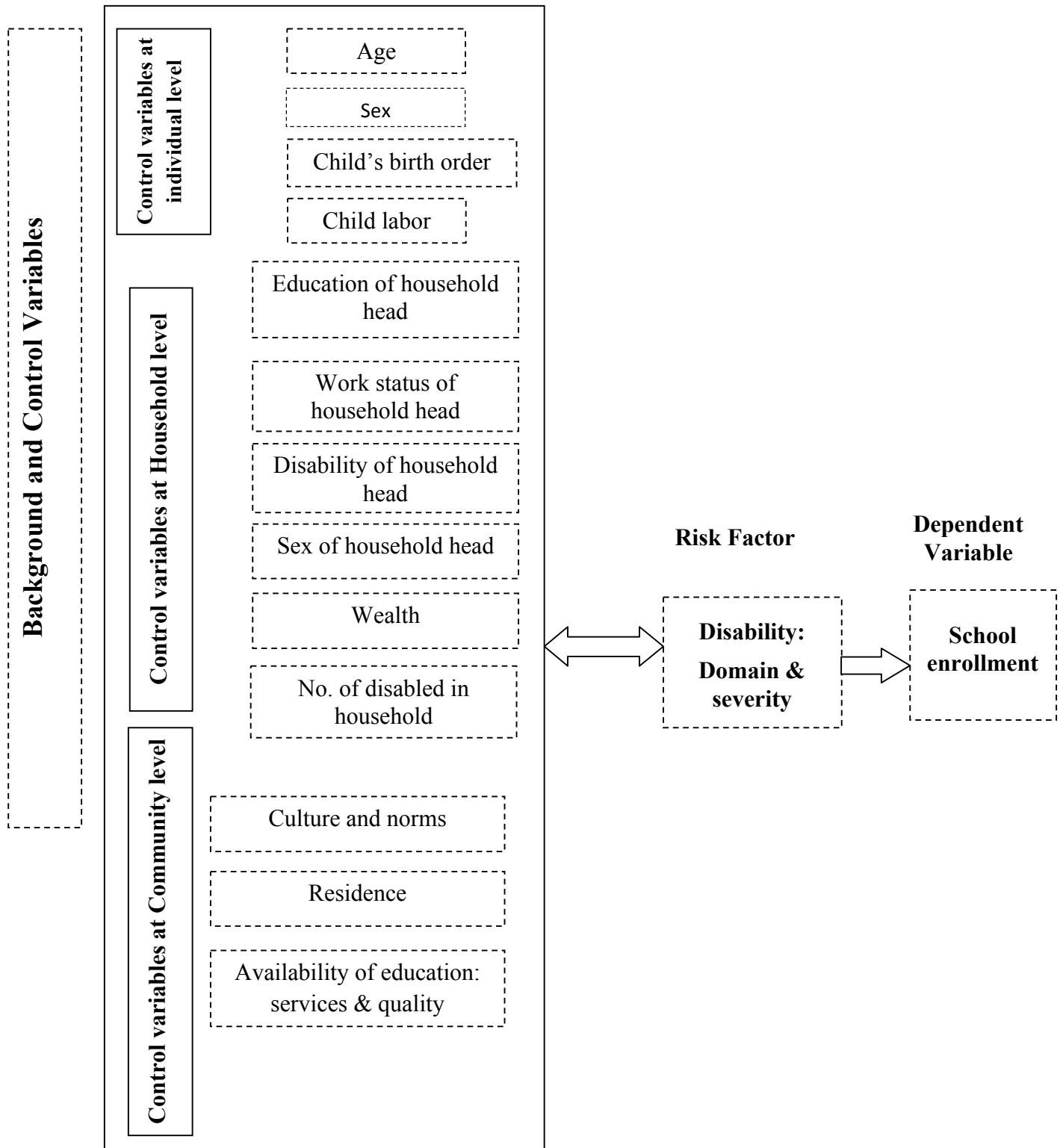
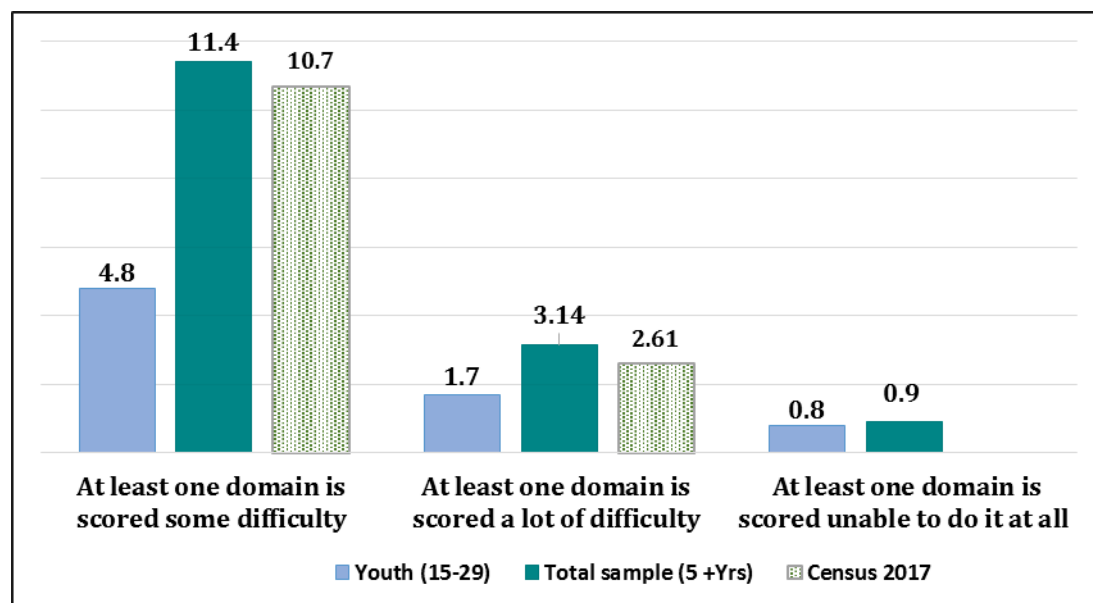


Figure 2: Prevalence of disability according to level of severity among youth (15-29) and total sample (5+ Yrs)²⁹: Egypt, HOS 2016 and Population Census 2017



Note:

- Each categorization includes the higher levels of severity, i.e., prevalence level of cut-off (3) is a sub-set of prevalence level according to cut-off (2), and in turn, the latter is a sub-set of prevalence level of cut-off (1).
- All estimates are weighted. Standard error is in parentheses.

²⁹ The estimated prevalence excludes children because as noted by WG (2008) disability information from young children using limited number of questions is very difficult to obtain and as stated by ESCAP (2014, pp:8-9) “Childhood functioning is more varied than functioning in adults and identifying functional difficulty is confounded by underlying variation in typical childhood development.”

Figure 3.A: Prevalence of disability by domain among the disabled youth (15-29)³⁰: HOS 2016

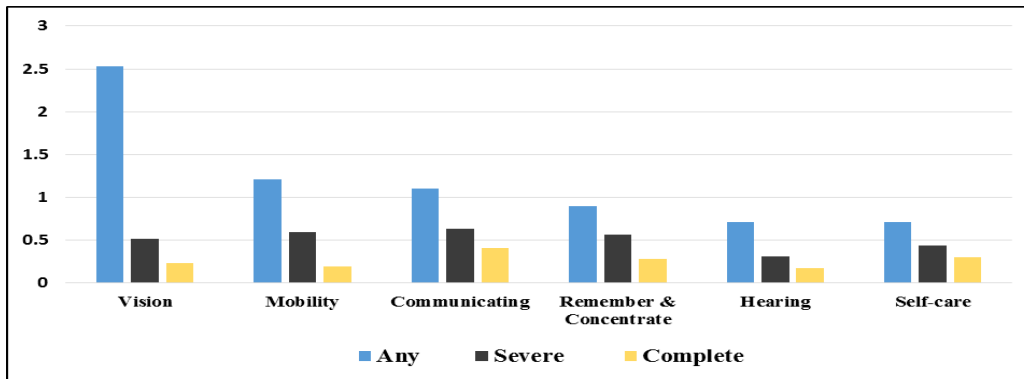


Figure 3.B: Prevalence of disability by domain among the disabled total sample population (5+): HOS 2016

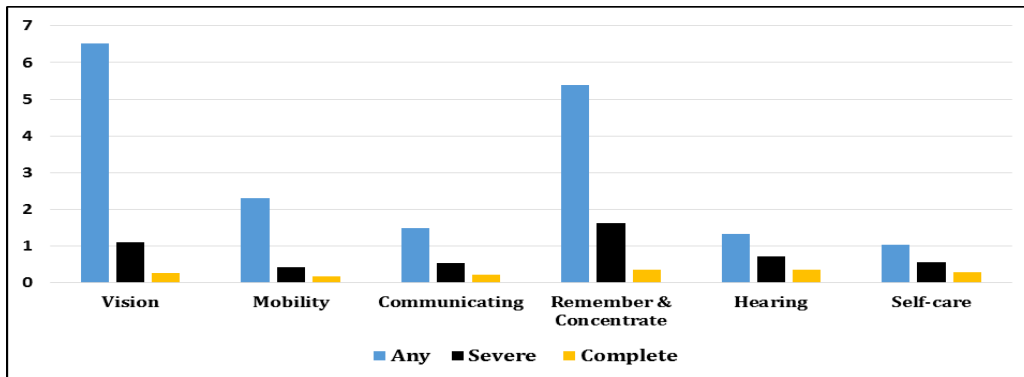
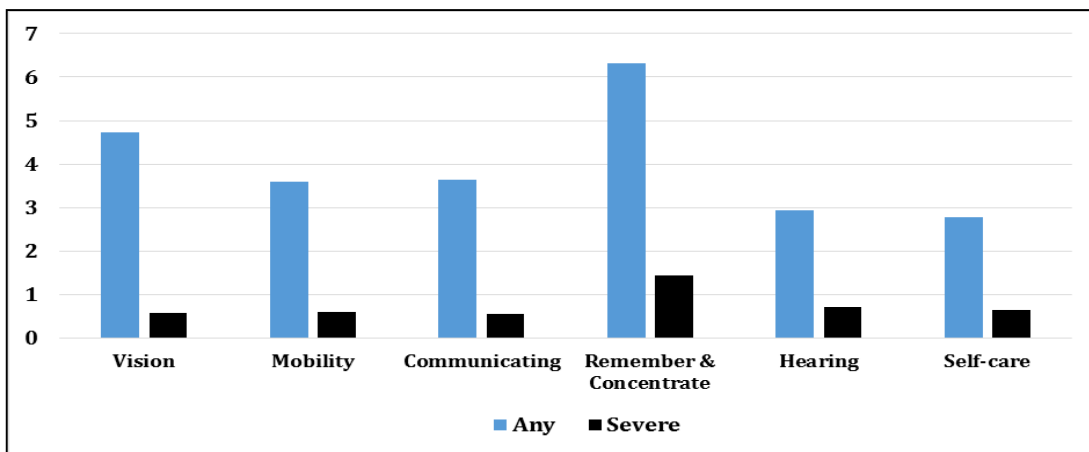


Figure 3.C: Prevalence of disability by domain among the disabled population (5+) of Census 2017



Source: From the published data of Egypt Population census 2017, (Tables 1-12 and 1-13).

³⁰ Any disability: any level of difficulty, Severe: both a lot of difficulty and cannot do at all and complete: cannot do at all.

Figure 4.A: The distribution of disability across educational level of household head among youth (15-29 Yrs.)

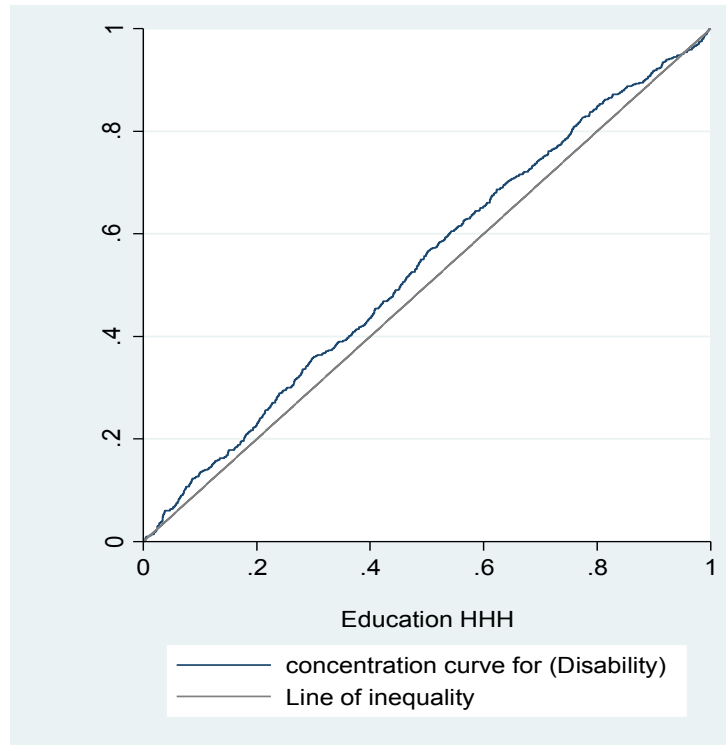


Figure 4.B: The distribution of disability across wealth quintiles among youth (15-29 Yrs.)

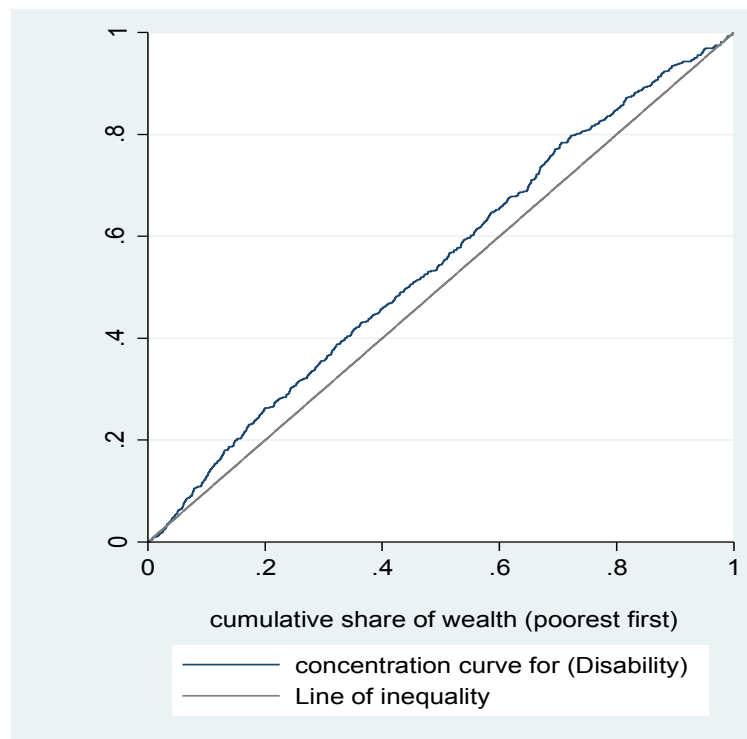


Figure 4.C: The distribution of disability across the 5 Regions among youth (15-29 Yrs.)

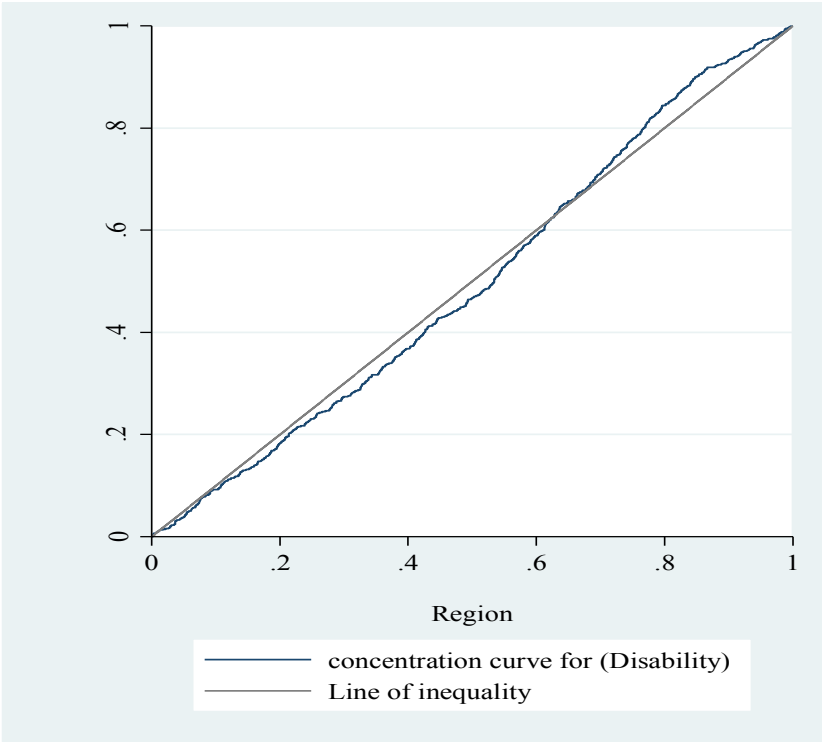


Figure 5.A: Concentration curve for youth with disability who never attended school by education level of household head

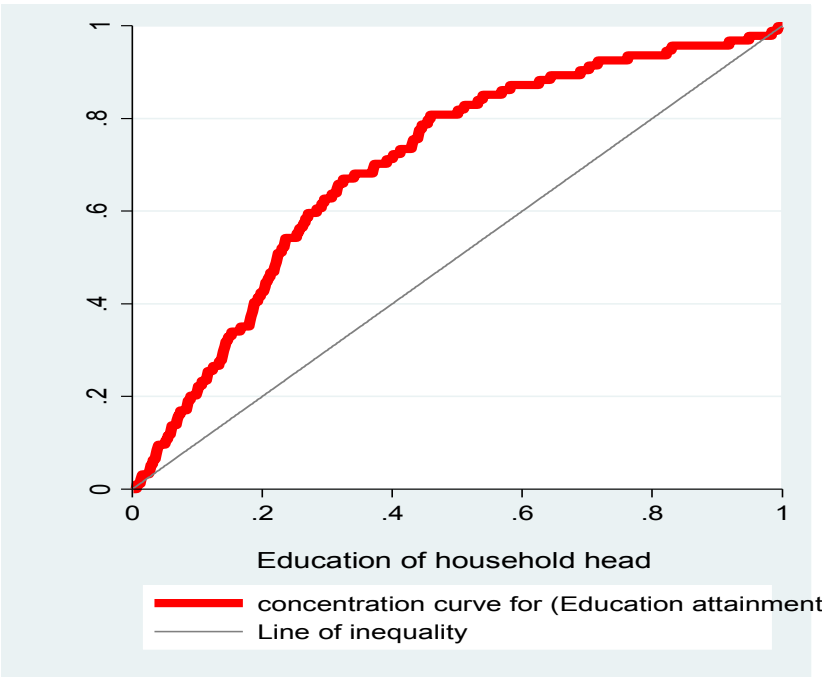


Figure 5.B: Concentration curve for youth with disability who never attended school by wealth levels

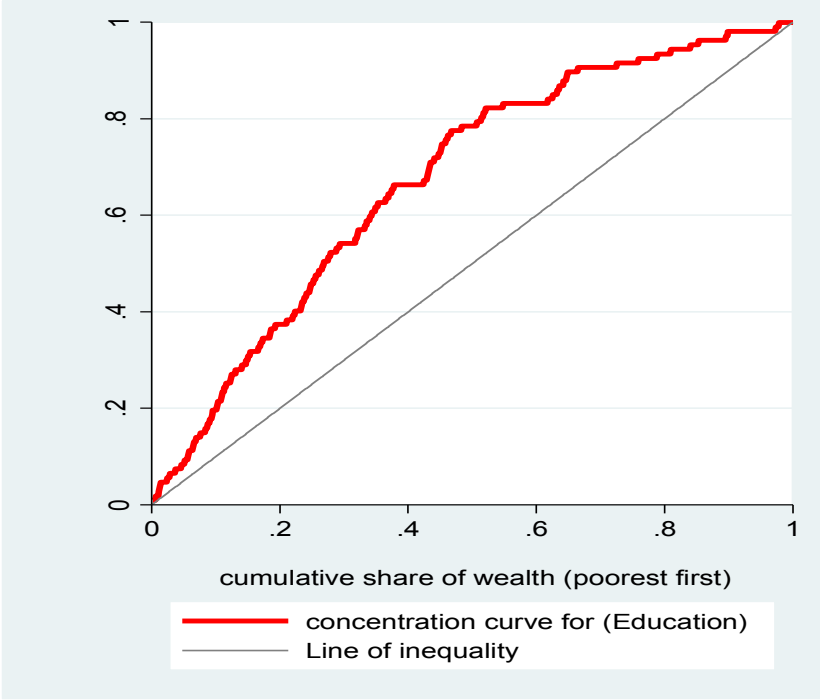


Figure 5.C: Concentration curve for youth with disability who never attended school by Region

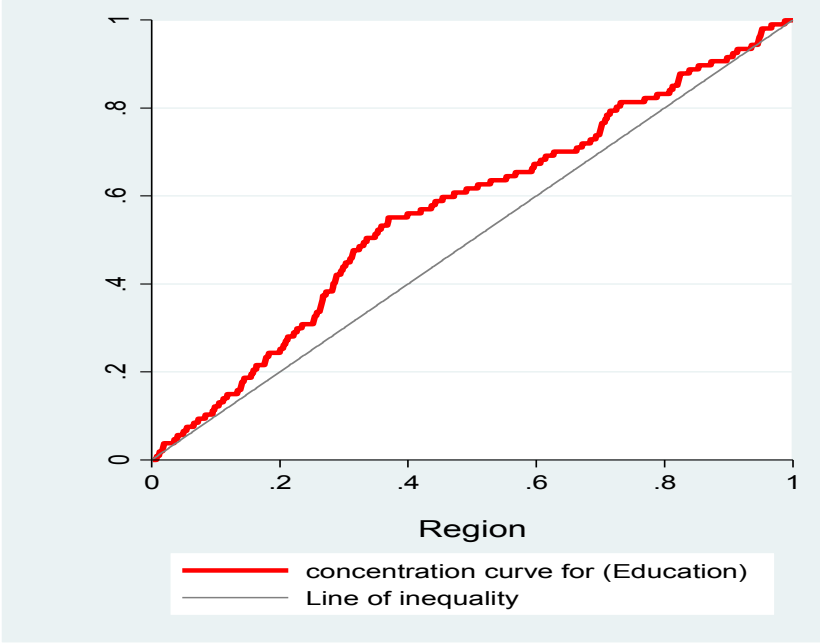


Figure 6.A: Concentration curve for youth without disability who never attended school by education level of household head

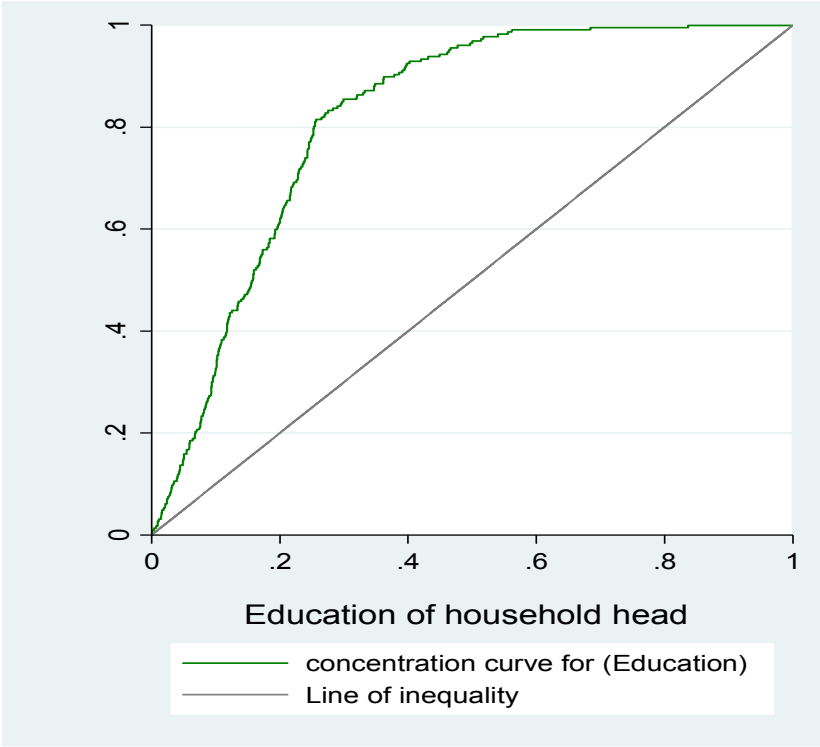


Figure 6.B: Concentration curve for youth without disability who never attended school by wealth levels

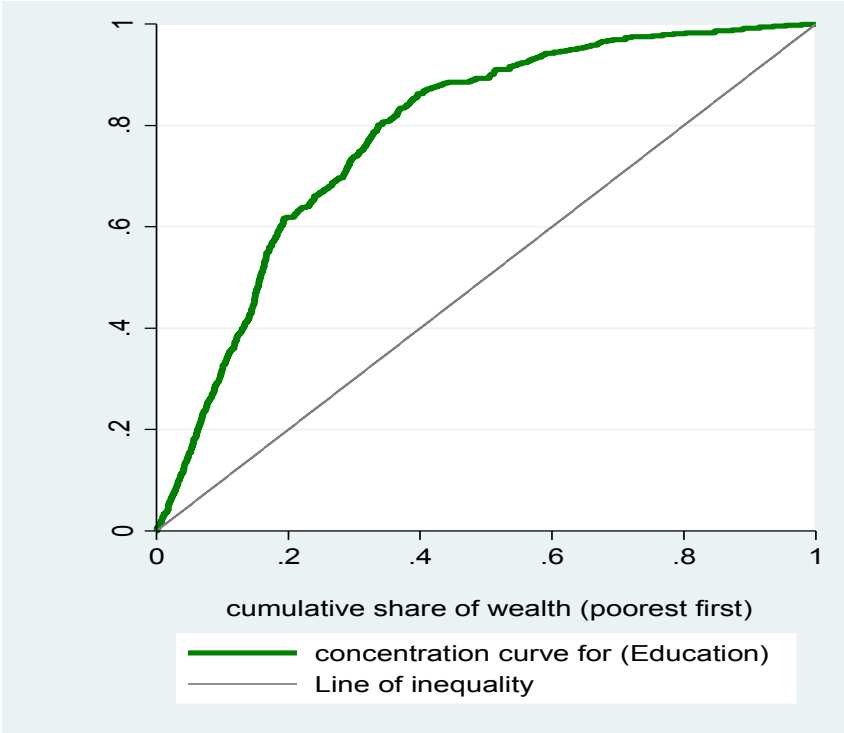


Figure 6.C: Concentration curve for youth without disability who never attended school by Region

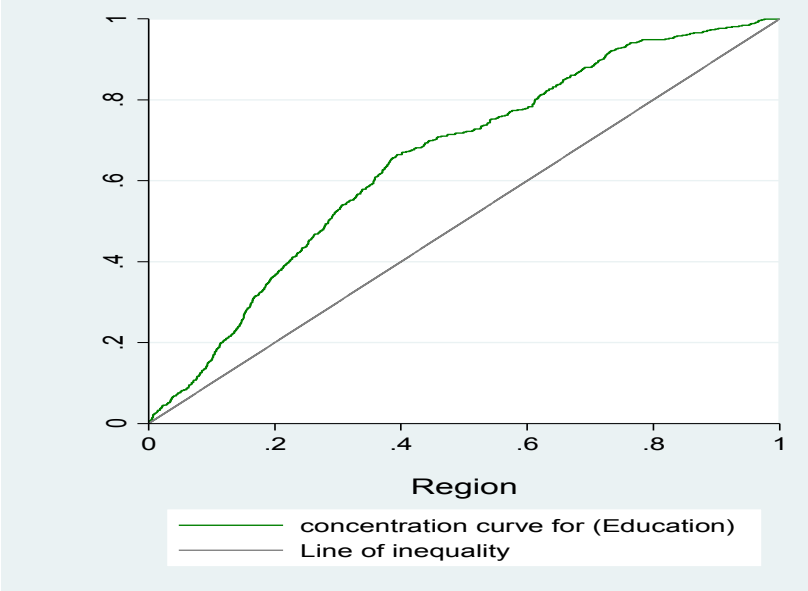


Figure 7: Percent of disabled youth (15-29) who have never attended school by domain and level of severity: HOS 2016

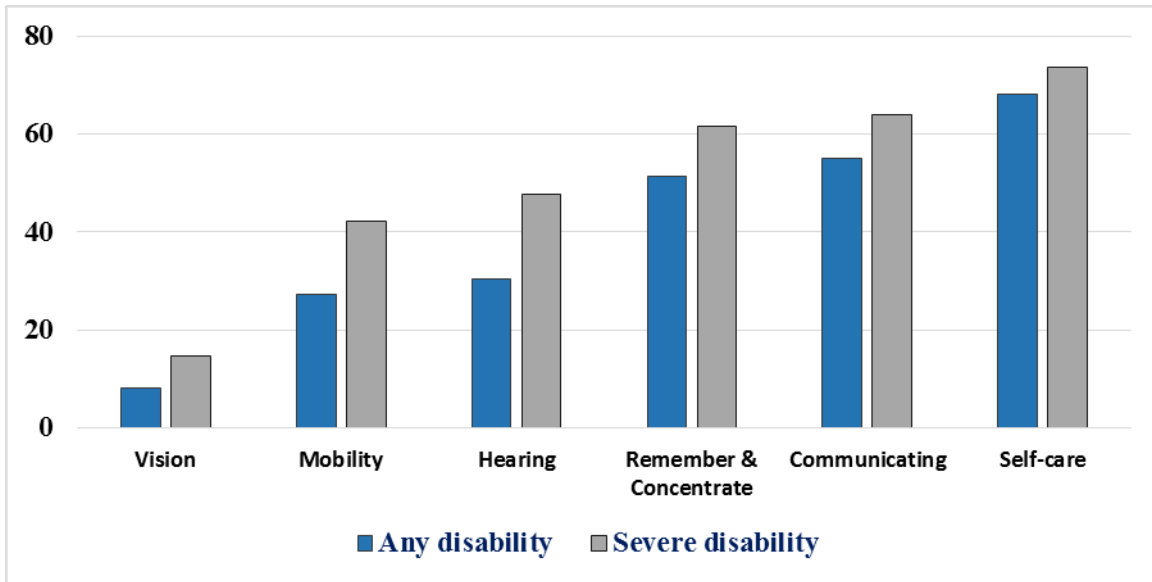


Figure 8.A: Marginal effects of some factors impacting deprivation of education: HOS 2016

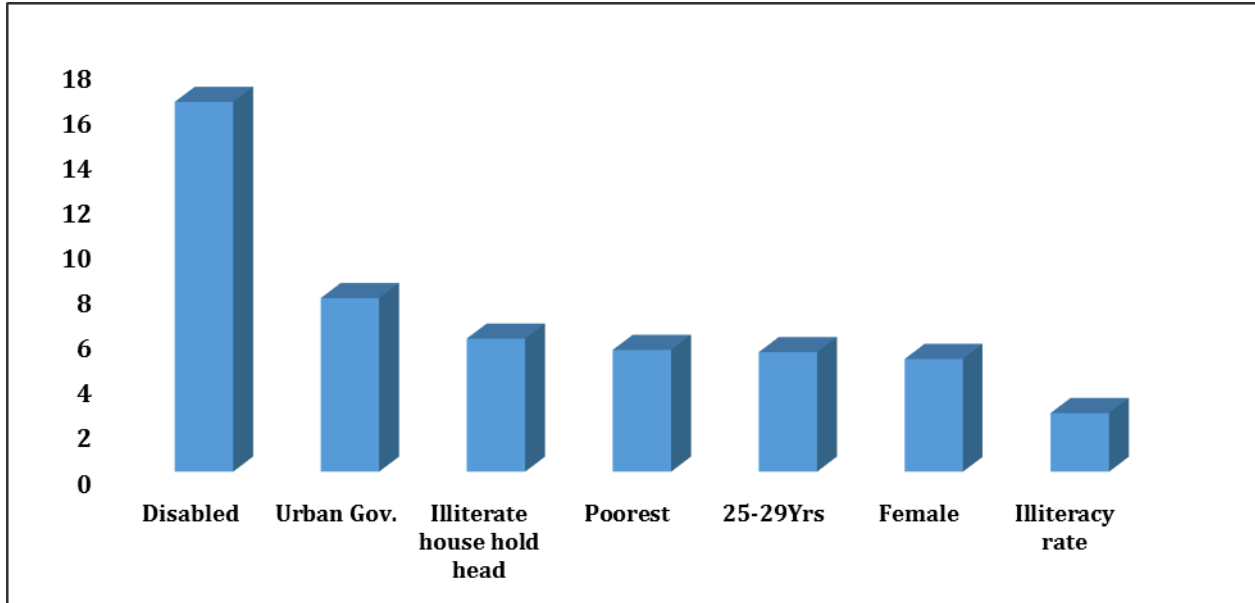


Figure 8.B: Marginal effects of interaction between disability and wealth on the likelihood of deprivation of school: HOS 2016

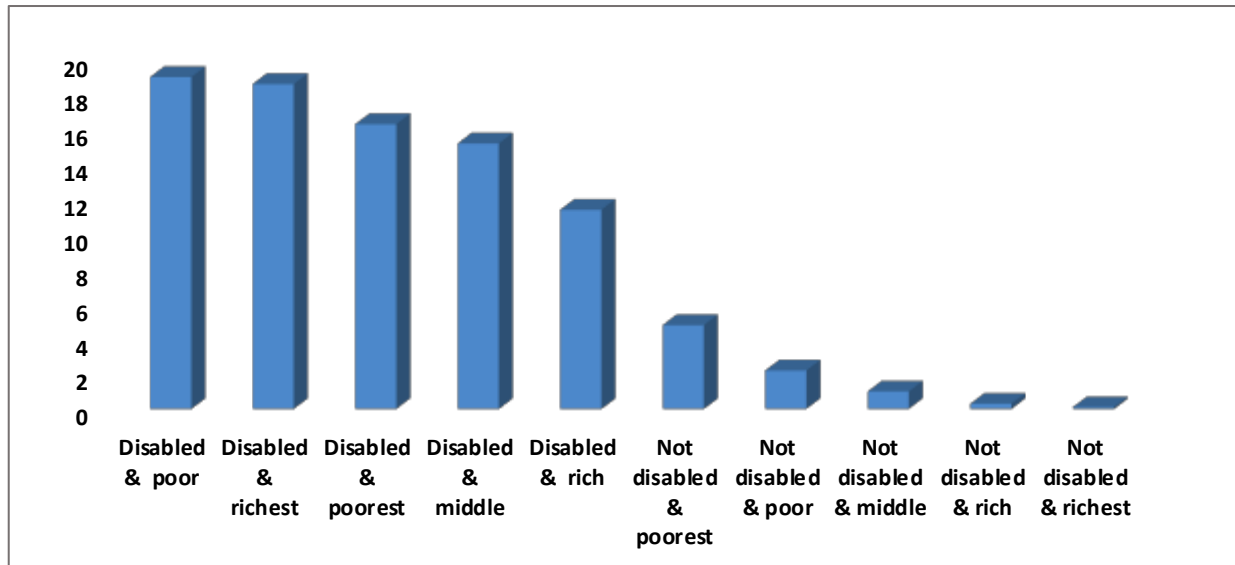


Figure 9: Profile of educational achievement among youth according to their disability status: HOS 2016

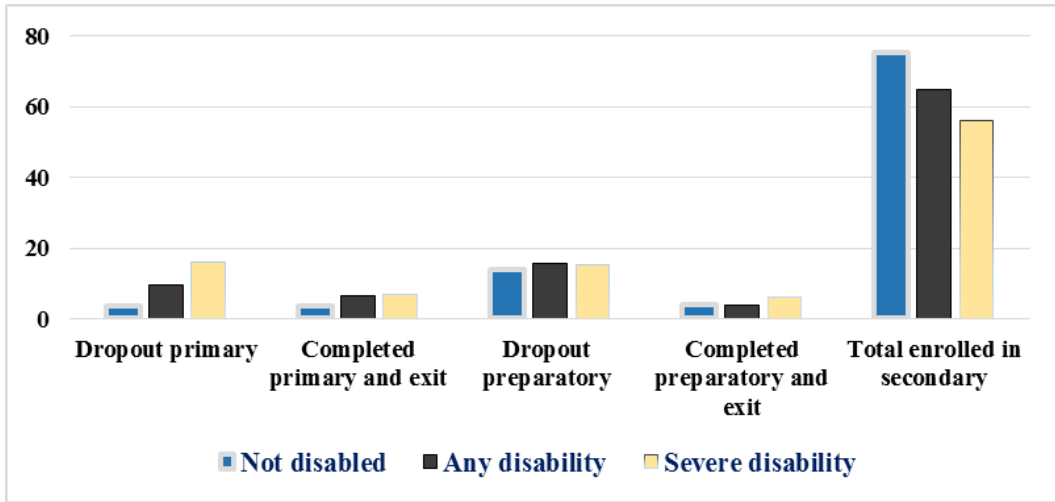


Table (1): Percent of disabled youth and disabled population sample who have disabilities in at least two domains (double disability) by level of severity: HOS 2016

Level of severity in at least two domains	Disabled youth (15-29)	Disabled sample population (5+)
Any	90	98.2
Severe	44.7	27.3
Complete	30	11.5
Total cases	609	5093

Table (2): Prevalence of any and severe disability according to different background characteristics among youth (15-29): HOS 2016

Background characteristics	Any disability	Odds ratio	Severe disability	Odds ratio
	% Disabled		% Disabled	
Overall	4.8	-	1.7	-
Sex				
Male	5.2	1.2*	1.8	1.08
Female	4.3	(R)	1.7	(R)
Age groups				
15-19	4.5	(R)	1.6	(R)
20-24	4.6	1.019	1.6	1.058
25-29	5.7	1.283*	2.2	1.411*
Marital status				
Never married	5.0	1.23	1.9	2.138*
Ever married	4.1	(R)	0.9	(R)
Birth order				
First	5.5	1.15	2.0	0.699
Second	4.5	0.92	1.5	0.518*
Third	4.9	1.02	2.2	0.787
Fourth+	4.8	(R)	2.9	(R)
No. of disabled in household[†]				
0	3.5	(R)	1.4	(R)
1	6.5	1.92*	2.4	1.686*
2+	14.9	4.79*	3.9	2.793*
Sex of household head				
Male	4.8	0.94	1.7	0.878
Female	5.1	(R)	1.9	(R)
Disability of household head				
Not disabled	3.8	0.39*	1.5	0.573*
Disabled	9.1	(R)	2.6	(R)
Education of household head				
Illiterate	5.5	1.64*	2.7	3.612*
Primary & Preparatory	5.3	1.58*	2.1	2.793*
Secondary	4.5	1.33*	1.2	1.640
Higher than secondary	3.4	(R)	0.7	(R)
Work status of household head				
Employed	4.7	0.93	1.6	0.82
Unemployed	6.0	1.21	3.3	1.68
Out of labor force	5.0	(R)	2.0	(R)

Table (2): (Cont.): Prevalence of any and severe disability according to different background characteristics among youth (15-29): HOS 2016

Background characteristics	Any disability % Disabled	Odds ratio	Severe disability % Disabled	Odds ratio
Wealth index quintiles				
Poorest	6.5	2.03*	3.0	4.23*
Poor	4.8	1.49*	1.8	2.45*
Middle	4.7	1.44*	1.9	2.66*
Rich	4.9	1.51*	1.2	1.57
Richest	3.3	(R)	0.8	(R)
Urban-rural residence				
Urban	4.1	0.762*	1.4	0.69*
Rural	5.4	(R)	2.0	(R)
Region				
Urban Governorates	2.7	0.642	1.0	0.884
Lower Egypt				
Urban	5.9	1.47	1.7	1.427
Rural	6.2	1.54	2.0	1.643
Upper Egypt				
Urban	4.5	1.11	1.7	1.412
Rural	4.5	1.09	2.1	1.733
Illiteracy rate in 1996				
10 – 29%	4.32	0.978	1.26	0.604*
30 – 49%	5.68	1.30*	1.89	0.918
50 +%	4.41	(R)	2.06	(R)

* Odds ratio is Significant at p-value < 0.05.

†Refers to total number of household members of age from 0-14 and 30+ who have any disabilities.

Table (3): The concentration index of disability among youth (15-29 Years) according to household head's level of education, wealth quintile, and region of residence: HOS 2016

Covariates	Concentration Index (CI)	Std. Error	Confidence interval (95%)	
			Upper	Lower
Household head's level of education	-0.215*	0.015	-0.126	-0.041
Wealth quintile	-0.091*	0.022	-0.134	-0.047
Region	0.007	0.020	0.047	-0.072

*Indicates statistically significant at p-value <0.05

Table (4): Percentage of youth (15-29) who have never attended school by disability status and background characteristics: HOS 2016

Covariates	Level of disability		
	Not disabled	Any disability	Severe disability
% Overall	4.4	17.7	33.9
No. of cases	12042	609	221
Sex of youth			
Male	2.3	14.9	29.4
Female	7.0	21.9	40.4
Age groups			
15 – 19	2.3	13.7	28.6
20 – 24	3.8	18.0	37.5
25 – 29	8.7	22.6	37.0
Birth order			
1 st	2.3	16.3	33.0
2 nd	2.2	16.2	34.0
3 rd	3.1	28.2	41.4
4+	5.1	42.9	41.7
No. of disabled members in the household			
0	4.2	19.5	34.4
1	5.1	19.4	41.0
2+	4.8	10.7	(20.7)
Sex of household head			
Male	4.5	17.0	31.9
Female	3.3	25.3	(44.8)
Disability of household head			
Not disabled	4.1	18.3	33.1
Disabled	5.4	17.7	35.0
Household head's level of education			
Illiterate	10.3	36.1	49.4
Primary & Preparatory	3.7	15.6	27.6
Secondary	2.1	7.4	15.9
Higher than secondary	0.5	7.2	(29.4)
Household head's working status			
Employed	4.5	14.5	29.3
Unemployed	6.3	30.8	(42.9)
Outside labor force	3.6	25.4	46.0

Table (4) (Cont.): Percentage of youth (15-29) who have never attended school by disability status and background characteristics: HOS 2016

Covariates	Level of Disability		
	Not disabled	Any disability	Severe & complete disability
Wealth index quintiles			
Poorest	13.6	30.5	43.0
Poor	5.4	24.2	38.3
Middle	1.8	11.3	25.0
Rich	0.9	5.3	(15.4)
Poorest	0.3	8.0	(35.0)
Region of residence³¹			
4 Urban gov.	1.2	14.5	(36.0)
Lower Egypt			
Urban	1.4	11.5	(40.0)
rural	3.8	12.5	27.8
Upper Egypt			
Urban	2.3	9.9	(11.5)
Rural	9.5	34.2	45.7
Frontiers	4.8	(14.3)	(40.0)
Illiteracy rate in 1996			
10 – 29%	1.36	10.84	33.90
30 – 49%	2.69	12.60	25.61
50 +%	9.78	32.34	42.31

Figures in Parentheses: total numbers of cases are less than 30.

³¹ The four urban governorates include: Cairo the Capital, Alexandria, the Suez and Port Said.

Table (5): The concentration index of deprivation of education among youth (15-29 Years) with and without disability according to household head's level of education, wealth quintile, and region of residence: HOS 2016

Covariates	Concentration Index	Std. Error	Confidence interval (95%)	
			Upper	Lower
Among youth with disability				
Household head's level of education	-0.38*	0.044	-0.299	-0.470
Wealth levels	-0.35*	0.042	-0.265	-0.429
Region	-0.16*	0.049	-0.062	-0.256
Among youth without disability				
Household head's level of education	-0.63*	0.017	0.662	0.595
Wealth levels	-0.57*	0.016	-0.537	-0.599
Region	-0.30*	0.019	-0.260	-0.337

*Indicates statistically significant at p-value <0.05

Table (6): Random effect model's estimate of the impact of disability on the probability of deprivation of education among youth (15-29 years.): HOS 2016

Variables	B	SE	OR	95% CI	
				Lower	Upper
Any disability ³²	2.63***	0.41	13.9***	6.15	30.65
Sex: Female	1.45***	0.21	4.25***	2.79	6.45
Age group					
20-24	0.71**	0.23	2.04***	1.29	3.24
25-29	1.64***	0.29	5.14***	2.84	9.09
Birth order					
2 nd	-0.04	0.21	0.96	0.64	1.44
3 rd	0.52*	0.27	1.69*	0.99	2.90
4 th	0.43	0.39	1.53	0.71	3.38
Sex of Household Head					
Female	-0.38	0.37	0.68	0.33	1.39
Disability of Household Head					
Disabled	0.59	0.48	1.81	0.69	4.61
No. of disabled in Household*					
1	-0.32	0.44	0.73	0.33	1.84
2+	-0.63	0.59	0.53	0.17	1.75
Education level of Household Head					
Not attended	3.58***	0.74	36.1***	8.71	158.7
Less than secondary	1.54**	0.70	4.70**	1.14	18.2
Secondary	0.14	0.74	1.15	0.25	4.7
Work status of Household Head					
Employed	-0.16	0.32	0.85	0.48	1.68
Unemployed	0.88*	0.45	2.40*	1.05	6.26
Wealth					
Poorest	2.58***	0.69	13.2***	4.57	68.2
Poor	1.22*	0.68	3.40*	1.18	16.39
Middle	0.04	0.70	1.04	0.28	4.49
Rich	-1.79*	0.99	0.17*	0.02	1.21
Region					
Urban Lower	-0.49	0.58	0.61	0.24	2.33
Rural Lower	-2.15***	0.66	0.12***	0.16	1.06
Urban Upper	-1.12*	0.57	0.32*	0.16	1.43
Rural Upper	-2.21**	0.85	0.11**	0.33	1.12
Illiteracy rate at community level: 1996					
Disability*poorest	1.76***	0.65	5.79***	1.62	20.71
Disability *poor	2.36***	0.85	10.64***	2.02	56.12
Disability *middle	3.52***	1.18	33.69***	3.29	344.51
Disability *rich	2.92***	1.00	18.58***	2.61	132.5
Constant	-12.61**	1.28	0.00003***		
Lnsig2u	2.004	0.214	2.004	1.58	2.42
Sigma_u	2.72	2.72	2.72	2.20	3.36
Rho	0.693***	0.69	0.693***	0.596	0.774

Significant level: * p<0.10, ** p<0.05 and *** p<0.01.

* Number of disabled members in the household and not in age group (15-29).

³² Ref. groups: Any disability (not disabled); sex (male); age group (15-19yrs); birth order (first); sex of household head (male); disability of household head (not disabled); number of other household members who have disabilities (zero); education of household head (above secondary); working status of household head (out of labor force); wealth (richest) and region (4 urban Gov.).

Table (7): Sequential logit model's estimate of the impact of disability on educational achievement for youth (17-29 years): HOS 2016

Variables	Maximum likelihood estimates of the odds ratios		
	From no education to primary	From primary to preparatory	From preparatory to secondary and above
Any disability ³³	0.72***	0.44***	0.73
Sex: Female	0.41***	1.50**	0.61**
Age group			
20-24	0.72	1.06	0.81
25-29	0.48***	1.68*	0.52***
Birth order			
2 nd	0.98	0.96	1.03
3 rd	0.74	0.67	0.74
4 th	0.59	0.38***	0.90
Sex of Household Head			
Female	1.19	0.91	0.83
Disability of Household Head			
Disabled	0.56	0.91	0.84
No. of disabled in Household*			
1	1.56	0.92	1.04
2+	1.95	1.04	0.94
Education level of Household Head			
Not attended	0.08***	0.012***	0.14***
Less than secondary	0.29**	0.03***	0.27**
Secondary	0.86	0.10**	0.56
Work status of Household Head			
Employed	1.17	0.68	0.80
Unemployed	0.65	0.81	0.78
Wealth			
Poorest	0.23***	0.13***	0.09***
Poor	0.48	0.19***	0.11***
Middle	0.91	0.26***	0.28***
Rich	2.47	0.59	0.30**
Region			
Urban Lower	1.32	1.42	3.50***
Rural Lower	3.83***	2.09**	2.46***
Urban Upper	2.32**	2.00*	3.51***
Rural Upper	4.33***	2.4**	2.92***
Illiteracy rate at community level: 1996	0.96***	1.00	1.00
Constant	1579.6***	1913.8***	381.50***

Significant level: *p<0.10, **p<0.05, ***p<0.01.

* Number of disabled members in the household and not in age group (15-29).

³³ Ref. groups: Any disability (not disabled); sex (male); age group (15-19yrs); birth order (first); sex of household head (male); disability of household head (not disabled); number of other household members who have disabilities (zero); education of household head (above secondary); working status of household head (out of labor force); wealth (richest) and region (4 urban Gov.).

Appendix A

Percent distribution of disability by type among the disabled Egyptian population: Census 1996, Census 2006 and SCS 2005*

Type of disability	1996 Census	2006 Census	SCS 2005**
Blind	12.4	13.3	18.3
Mute and deaf/mute	9.15	12.6	15.3
mental retardation	16.7	22.4	20.2
amputation of one limb or of more than one limb	4.7	6.01	45.4
unable to use one limb or more than one limb, and paralyzed	31.3	27.9	
lower limb or paralyzed all four limbs			
Other	25.7	17.7	
Overall level of prevalence	0.48	0.65	1.9

*These data were reproduced from (Nagy, 2013) with the generous permission of the author.

** Social Contract Survey (SCS)

Appendix B

Questions on Disability designed by UN Washington Group on Disability Statistics

The difficulties you may have doing certain activities because of a health problem.

- 1) Do you have difficulty seeing, even if wearing glasses?
- 2) Do you have difficulty hearing, even if using a hearing aid?
- 3) Do you have difficulty walking or climbing steps?,
- 4) Do you have difficulty remembering or concentrating?
- 5) Do you have difficulty (with self-care such as) washing all over or dressing?
- 6) Using your usual (customary) language, do you have difficulty communicating, for example understanding or being understood?

Response scales to these questions are:

- 1- No — no difficulty
- 2- Yes — some difficulty
- 3- Yes — a lot of difficulty
- 4- Cannot do at all.

Appendix C

Percent distribution of youth who are household head and who are not household head according to prevalence level of disability and some background characteristics, HOS 2016

Characteristics	Youth who are household heads (%)	Youth who are not household heads (%)
Has Disability		
Any	5.9	4.8
Severe	0.7	1.8
Attending education		
Never attended school	7.8	5.0
Sex		
Men	97.8	53.6
Age		
15-19	0.5	44.1
20-24	14.4	31.4
25-29	85.1	24.5
Marital status		
Never married	10.8	83.7
Region of residence		
The 4 Urban Governorates	20.2	18.0
Urban Lower	10.7	11.6
Rural Lower	26.1	28.7
Urban Upper	10.7	12.4
Rural Upper	26.1	26.7
Frontier Governorates	6.1	2.5
Wealth levels		
Lowest	21.3	20.5
Low	17.1	20.8
Middle	23.2	19.4
High	20.3	18.2
Highest	18.1	21.1
Total cases	410	12242

Appendix D

Table (D.1). Number of disabled youth who have disability in at least two domains by degree and domain, HOS 2016

Domain	Degree in both two domains together	Domain				
		Hearing	Mobility	Remember & Concentrate	Self-care	Communicating
Vision	-Any	18	23	26	24	23
	-Severe	5	9	10	10	10
	-Complete	3	3	3	3	4
Hearing	-Any		16	29	19	30
	-Severe		10	16	12	21
	-Complete		3	9	4	10
Mobility	-Any			34	46	40
	-Severe			22	30	24
	-Complete			16	19	16
Remember & Concentrate	-Any				64	84
	-Severe				42	59
	-Complete				26	31
Self-care	Any					74
	-Severe					49
	-Complete					33

Table (D.2): Number of disabled sample population who has disability in at least two domains, by degree and domain, HOS 2016

Domain	Degree in both two domains together	Domain				
		Hearing	Mobility	Remember & Concentrate	Self-care	Communicating
Vision	-Any	525	872	307	254	139
	-Severe & complete	40	112	44	56	30
	-Complete	9	14	12	17	10
Hearing	-Any		414	256	168	167
	-Severe & complete		50	61	46	74
	-Complete		17	29	20	36
Mobility	-Any			392	462	236
	-Severe & complete			102	229	106
	-Complete			47	93	53
Remember & Concentrate	-Any				276	305
	-Severe & complete				136	162
	-Complete				68	75
Self-care	-Any					290
	-Severe & complete					160
	-Complete					92